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BACKGROUND

In its effort to improve the quality of education in Indonesia, the Indonesian government has imposed Curriculum 2013 on schools of all level in Indonesia. The main difference between Curriculum 2013 and the previous curriculum lies in its implementation which uses the scientific approach. For the reason, teachers need to develop teaching strategies different from those they used to apply in the implementation of the previous curriculum. Besides, teachers also need to develop the techniques of evaluating students' learning achievement, which are relevant to the scientific approach. The evaluation has to be able to show the students' learning achievement in observing, experimenting, social networking, etc.

Authentic assessment conducted in the classroom and focusing on complex and contextual tasks enables students to perform their competence in a more authentic arrangement. It is very relevant to the authentic approach integrated in their teaching process, especially at elementary schools, or for appropriate lessons. It must be able to show which attitude, skill, and knowledge have or have not been mastered by the students, how they use their knowledge, what aspect they have or have not been able to apply, and so on.

On the basis of the above consideration, teachers can identify what materials the students can study further and for what material they need to have a remedial program. Authentic assessment, however, is not that easy!

FOREWORD

In the academic year of 2014, the government in this case the Ministry of Education and Culture has established the policy to run the curriculum of 2013 for the all levels of elementary and intermediate education in Indonesia. It means the schools have to be ready to implement the Curriculum of 2013. Basically, the implementation of the 2013 curriculum is an effort from the government to enhance the quality of education.

One of the characteristics of the 2013 curriculum is make use the scientific approach in the learning process. This approach is to improve the students' creativity in learning. In general, this approach seems to be a new thing for the teachers in which several problems and obstacles appear in its practice. The teachers are required to develop the learning strategies and the assessment systems which are relevant and appropriate in order to nurture the students' creativity. One of the assessment methods that can support the concept of scientific approach is by using the authentic assessment. Authentic assessment can give the description of the knowledge, the attitudes, and the skills as well as what has or has not owned by the students and the way they apply their knowledge. Also, in what case they have or have not been able to implement the learning acquisition.

Based to the above circumstances, the Study Program of Educational Research and Evaluation, Graduate School of Yogyakarta State University (Universitas Negeri Yogyakarta) conduct the international seminar on the theme "Classroom Assessment for Improving Teaching Quality". There will be three sub-themes on this seminar, i.e. Issues of Classroom Assessment Implementation, Implementation of Authentic Assessment, and Developing a Strategy of Creative Teaching. By having this seminar, the participants are expected to possess the knowledge and the skills to develop and to apply the authentic assessment.

Yogyakarta, November 8, 2014
Head of Committee

Prof. Dr. Sudji Munadi

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Theme 1:
ISSUES OF CLASSROOM ASSESSMENT
IMPLEMENTATION

ASSESSMENT IN DEVELOPMENT COMPUTER-AIDED INSTRUCTION

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Abstract

Assessment in development computer-aided instruction (CAI) is not only done on the final products, but the assessment also takes place during the development process. Similar to assessments conducted by experts (Expert Judgment), the assessment also carried out by the user to individual persons (one to one), a small group, an expanded group, and real users (in dissemination process). In developing CAI, there are several aspects to be assessed such as programming, learning design, contents, and also its visual aspect. Moreover, there are several indicators that should be included in developing CAI which are:

a. Software Engineering/Programming: (1). Effectiveness and Efficiency in the development and use of instructional media; (2). Reliable; (3). Maintainable (can easily be maintained and managed); (4). Usability (easy to use and simple in operation); (5). The accuracy in selection of the type of application / software / tool for development; (6) Compatibility (learning media can be installed / run on existing hardware and software); (7). Packaging of integrated instructional media and easy in execution; (8). Completeness of instructional media program documentation which consist of: installation manual (clear, brief, and complete); troubleshooting (clear, structured and anticipated); program design (clear and complete in describing program workflow); (9) Reusable (part or all program learning media can be reused to develop other learning media).

b. Aspects of Learning Design and Content Items: (1) Clarity of learning objectives (formulation, realistic); (2) The relevance of the learning objectives with SK / KD / curriculum; (3) The scope and depth of learning objectives; (4) The accuracy of the use of learning strategies; (5) Interactivity; (6) Provision of motivation to learn; (7) Contextuality and actuality; (8) The completeness and the quality of learning support materials; (9) Compliance with the aim of learning materials; (10) The depth of the material; (11) Ease to be understood; (12) The systematic, continuous, clear logic flow; (13) The clarity of description, discussion, examples, simulations, exercises; (14) Consistency of evaluation with the aim of learning; (15) The accuracy and provision of evaluation tools; (16) The provision of feedback on the evaluation results.

c. Aspects of Visual Communication / Display: (1) Communicative; according to the message and can be received / in line with the expected target; (2) Creative ideas pouring in the following idea; (3) Simple and attractive; (4) Audio (narration, sound effects, back sound, music; (5) Visual (layout design, typography, colour); (6) Media movement (animation, movie); (7) Interactive Layout (navigation icons).

Keywords: *Assessment, Development, CAI, Programming, Design, Visual*

Background

Development of Computer-Aided Instruction (CAI) is one of the areas of learning development that utilizes the computer as a tool and resource in the learning process. In the development, systematic steps are needed which include how to assess this CAI device. These assessed aspects depend on which way the computer-aided were developed. In this

development process, the emphasis is usually focussed on some parts, such as tutorial, drill and practice, animation, simulations, games, quizzes, problem solving and others. Utilization of this technology will result in good quality output if they were utilized properly.

Inappropriate utilization of technology/media will almost certainly not result in a productive learning environment which can ensure better learning. Schramm (1973) describes that the availability of media in the learning process is very important in order to stimulate a child's attention, so that it can increase the motivation to learn, help to facilitate the understanding of a given learning materials, which can ultimately improve learning outcomes. One of challenges and golden opportunities in the future is the growth of information technology that can be considered as an alternative option to be utilized in education, particularly in vocational education.

Instructional media is also a tool that must be available in the learning process. As the result would be skilled people, then better facilities are required in the process of learning. Learning planning and development are different to those in public schools. Vocational technology education is closely related to the world of work, so its instructional design will be different with instructional design in general. Learning experiences which are given in Vocational Schools is designed to be as close as possible to the conditions encountered in the work where learning is given.

These problems can be solved with complete equipment procurement, adequate teacher education, adequate managerial support, as well as the use of technology, especially information technology in teaching and learning. Associated with the development trend of information technology, the benefits of these technologies in education needs to be studied and further developed to aid the learning process, and to improve the quality of teaching and learning process. Thus in a series of education goals, especially in vocational schools, it is essential to do a maximum effort to utilize more of the information technology, such as software or hardware.

In order to make the development process becomes more effective and efficient, it is necessary to have some stages by looking at its media (visual and programming) and content aspects. Accurate assessment by considering many aspects will result in maximum results.

Problems

Based on the above issues, this paper will discuss what aspects should be assessed in the development of computer assisted learning.

Discussion

1. Aspects Considerations in Designing Program of Computer-aided instruction

In order to improve the quality of learning in CAI, it should be developed according to the principles of good learning. Thus, CAI must have certain characteristics. CAI typically has characteristics similar to the one that possessed by programmed instruction. This occurs because the shape of programmed instruction that is most common today is the CAI and it has replaced the programmed text. Diaz-Martin (2001) mentioned some of the characteristics of this CAI, namely:

... CAI provides regular and timely interaction with the instructor and current feedback. Students can repeat tutorials as often as needed and work at their own pace. CAI also can be used with greater numbers of students than a traditional classroom would hold. CAI and web-based instruction have opened avenues of access to individuals with disabilities that were not possible before.

Diaz-Martin (2001) argues that CAI provides timely and regular interaction current feedback to the instructor. The learner can repeat additional teaching whenever necessary and work at their own way. CAI can also be used in a larger number of learners than a traditional classroom had. CAI and web-based instruction has paved the way for access to individuals with disabilities that were not possible before.

Meanwhile, Eisenberg (1986) in (Sugilar, 1996) states several CAI characteristics which are: (1) it is possible for learners to learn anytime,(2) students cannot proceed to continue study if she or he do not know the whole problems during the learning process (3) there is a response promptly to any questions put by the learner, (4) if the learner answered incorrectly and felt embarrassed then nobody will know, (5) it allows each learner to participate in the learning process, and there is no possibility of learning is dominated by particular people. Elida & Nugroho (2003) more specifically mentioned characteristics possessed by developed CAI which becomes the specification of this model, namely:

a. Attractive

The first activity of learning is to attract the attention of students so that in the next events in learning process can work well. Learner's attention can be enhanced by providing sudden stimulation changes. There are many things can be done to attract the attention of students at the beginning of learning. According to Gagne and Briggs (Sadiman, Rahardjo, & Haryono, 2002), direct oral questions may attract attention. The

moving images and text on the monitor screen may also show the strange event, and therefore can bring attention of the students. Efforts to attract the attention of the students made with the intention that learners are motivated to learn.

b. Learning materials

Learning materials in CAI gradually prepared by utilizing existing facilities in computer software. It is carried out so that students can freely move within materials as desired. However, each time they start to study one learning material, it must be accompanied by a goal. Thus, the students will know the kind of capabilities that must be achieved after learning is complete.

c. Exercise Practice and Feedback

In practicing, a student can do exercises repeatedly, until he was able to answer every question. Every time each question is answered, the computer will provide feedback whether the answer given is right or wrong. If the answer is wrong then the computer will direct the students to try to find the correct answer. Meanwhile, if the answer is correct, the computer will also give some feedbacks. When finished answering the questions, the obtained scores will appear, along with a recommendation to repeat the material or proceed to the next subject. This is one of CAI advantages which is able to provide feedback to the learner. This is similar to what has been proposed by Sugilar.

Supriyono (1991) explains that there are two aspects that need to be emphasized in building CAI module package. They are: (1) The concept of computer-assisted instruction (CAI) is by considering the characteristics of students in the preparation of teaching strategies to be displayed in the monitor screen, and (2) implementation and the concept of computer-aided learning model. Meanwhile, Suryono (1995) has conducted research in the subject of electronic by using several aspects of CAI in the evaluation which included: (1) material, (2) display, (3) the interaction of students, and (4) program interactivity. The results showed that learners respond positively to the four aspects of CAI.

Furthermore Harun & Aris (2001) from students' perspective found several aspects that need attention of CAI program builder. They are:

- 1) The information design. This design can be understood as the process of determining the purpose of communicating through design of the material (contents) in the form of built CAI.
- 2) The interaction design. This design can be understood as a process to identify how to give control to the students. A good design is a design that makes the learner can

control and direct the flow of information available in CAI. Students can manage the flow of information to match with their expectations. The design of interaction should have four criteria:

- a) It can motivated students to obtain experiences by providing clear direction through relevant menu selection.
 - b) It can create an attractive searching path through the available information in CAI.
 - c) It can provide clear guidance that can be chosen by students whether they want to browse and do whatever they need to do.
 - d) It can make learning experience becomes easier and more intuitive.
- 3) The presentation design. This design relates on how to present the information and instructions in the display screen. There are several things that should be noted such as :
- a) The display must be simple.
 - b) The display should be consistent in terms of searching rules which were presented on the monitor screen, for example: the placement of the menu, the use of icon and the use of term in the icon .

Simonson and Thompson (1994) stated that there are 6 aspects that should be considered in developing CAI program. They are:

- 1) Feedback. Good CAI programs are seen when the students respond, the program will give immediate feedback in term of comments, praise, warning, or certain commands that help showing and directing the students to be correct or incorrect. Feedback will be more attractive and increase the motivation to learn if accompanied by illustrative sounds, images, or video clips.
- 2) Branching. CAI programs provide branching based on students' response. For example, if a student is always wrong in answering questions about a particular topic, then the program should recommend studying that section again. Furthermore, if a student is progressing faster than others then he can go directly to the top level. In another hand, if he performs less then he can back to study the previous section or given additional exercises.
- 3) Assesment. This is one of important aspects to know how far one student can understand the material that he has already studied. A student can asses himself through his final score or success chart which documented automatiCAlly. Teacher can then monitor his performance in other time.

- 4) Progress Monitoring. CAI program would be more effective if it always provide information to a student on which part of learning material that he should work on, what to be studied next and what to be achieved when finishing the learning process.
- 5) Direction. Effective CAI program is a program that can provide guidance to students towards the achievement of the correct answers. In addition, the instructions in the CAI program can make learning process becomes easier for students to study individually without the help of others.
- 6) Display. Planning the display screen CAI programs include the type of information, display components, and legibility.

According to Arsyad (2010), visualization of messages, information, or concepts to be conveyed to the learners can be developed into various forms such as photographs, drawings / illustrations, sketches / line drawings, graphs, block diagram, chart, and a combination of two or more forms. In order to design learning programs display refers to the four principles of design such as simplicity, coherence, emphasis and balance. Visual elements are used as the primary consideration in designing learning programs in order to look more interesting and will not make student bored. The elements are the background (background), text, images, colors, buttons, animations, sound, and video.

a. Simplicity

The meaning of simplicity in visual concept is the number of elements to be displayed matched with the target and will not be boring for students as one of learning communities. Messages or information will be presented in brief and accurate to make it easier for student in understanding the material compared to the long one before.

b. Integration

Integration means that the relation between object elements such as text, picture, buttons, sound, animation and visualization that included in program presentation should be interconnected and integrated in function as a unity. Each object must be interrelated and integrated as a unified system that can help the understanding of messages and information within the material.

c. Emphasis

Emphasis in visual learning concept is focusing on one of elements that should be highlighted to the students. Objects that have to be emphasized should be presented in such a way as colour, size, and links.

d. Balance

Balance concept needs high imagination level and experiments willingness in designing learning display. The example of balance concept implementation in learning program can be shown in term of colour selection and button/link placement, background visual, animation, text, logo and used visualization. Elements that should be considered in designing visualization of learning program such as background, text, picture, colour, button, animation, sound, and video.

Furthermore, LIPI, Pustekom and Ilmukomputer.com have already agreed the assesment criteria in software engineering aspects especially in developing learning media. The criteria consist of nine aspects such as (Wahono, 2006):

a. Effectiveness and Efficiency in Developing and Use of Learning Media.

Every time a program that has small size and not complicated features but works very slow. If a computer has unlimited speed and free memory (RAM) then it would be a problem. However, a computer has limited speed, memory (RAM) and permanent storage (hardisk) capacity. Therefore, it is really important to manage the resource use (CPU, RAM and hardisk) effectively and efficiently. Delays, poor response and throughput usually occurs because the manufacturer did not think about the efficiency of the resources absorbed by the program. For example, to display small size picture, the manufacture should use original image with high resolution, do not use compression efforts and accurate cropping. On the other hand, there are some images that should have high resolution but in reality, they use low resolution image. Furthermore, there are other factors that make resource uses become inefficient, for example incorrect use of algorithm. For example, to sort a group of data, manufacture does not use famous and effective sorting algorithm such as insertion-sort, merge-sort and so on. If the computer A with 100 times faster in speed compared to computer B with different algorithm for the same cases, the logic will be that computer A will perform faster than computer B. However, if computer B uses more precise and efficient algorithm then program in computer B can perform faster 10 times tan computer A.

One case that often arises in developing instructional media is the learning media creator is too excited and he presents all images library that he has. He also inserts several animation and simulation effects that he knows into his instructional media even though they are not really important and effective in helping learning process.

b. Reliability

The program is said to be reliable if the program can run well, not easily hang, crash or stop during operation. The reliability of the program was also judged on how far it can continue to run despite the error in the operation (error tolerance). Users need feedback in accordance with the conditions of the system (including how long a user must wait, etc.).

c. Maintainability (can easily be maintained and managed)

The structure of the program should be compiled with algorithms, flow presentation, organization, and linkages between parts so it is easy to modify. Code or script has to be made simple and easy to be understood even though its function is complex. The code is modular with documentation on each section that may facilitate the modification and changes (maintenance). It will be easier for everyone who wants to change/repair/add program features. Moreover, a programmer can also easily find bugs in the program. There is a statement that says that 60% of the work in cleaning bugs is one of a programmer's job.

The less code that has been written, the less need to maintain code or program. The more code a programmer writes, the more the programmer should think about its maintainability.

d. Usability (Easy to be used and simple in its operation)

It can be imagined that if one road does not provide traffic signs and road marking, people may get lost and do not know which way they should go. Similar to learning media, the availability of tool tip, help, icon, logo, button, etc will help users who use the media for the first time. Design and navigation placement will help users operate the media. If there is a fault in a program (error), then there will be a message with clear language displayed so that it can be easily understood.

The consistency of the shape and location of the navigation also affects user comfort when comprehending implicit information in learning media. By looking at the first appearance of a program, users can know the condition of the program and decide on other alternative actions. Every choice and visual material can be found if necessary without disturbing the user with overwhelmed information. Users can also guess, predict, and determine the relation between actions and results, control and resulting effects, software status and what is visible in the program.

e. Accuracy in selecting the type of application/software/tool to be used in development.

Learning media products will be developed with proper application and tools based on developer needs. For example, in creating graphi CAI design, the programmer needs graphi CAI processing software and not software that created to proceed words. Another example, if a user wants to make presentation, it will be easier for him to use a software that made special for creating presentation. Therefore, it is suggested to use proper and easy tools in making animation, simulation, tests, and other features.

f. Compatibility (Learning media can be easily installed/operated in various existing hardware and software)

The development of software and hardware are varied with higher specifications and higher speed in process. Several years ago, the highest access speed of RAM was only 8 MB. Nowadays, it can reach up to 1 G and more. CD ROM, before, has reading speed the highest 4x, nowadays it has more function and becomes more general with the highest speed similar to CD-RW speed 52X. It even can read DVD. The same happens for application software. It was simple and had longer process to operate all application inside it. Recently, the application software become more beautiful with better graphiCAI display and animative. They come with easier navigation and faster in their operation.

Learning becomes better if every person can work everywhere without any obstacles in computer specification and required software to operate the computer. Therefore any good product should be operated in many varied hardware and software condition. It means that it can operate in the lowest possible computer specification, various operating system in many platform and version, from the earliest until the latest version, and software with unlimited version (old and new version).

g. Packaging Integrated Learning Media Program and Easy in Execution.

Learning media should be packaged nicely. Installation process can run automatically by using Autorun feature. Once installed, the program can directly be used without any need to install the file one by one (plugin, etc) or computer rebooting process. Shortcut/icon can automatically appear after installation process with easy identifiable name. Feature to uninstall program is available to help users if they do not need the program anymore. Program can be developed without installation process. It means that by only one click, every process can operate by itself. It is getting easier for users, especially for students who are less familiar with computers.

h. Complete Documentation of Learning Media Program.

This question arises when the media that we have made was not equipped with documentation on how to install and how to use. The definition of software engineering by Ian Sommerville is: "Computer programs and associated documentation". Therefore, it cannot be forgotten that the term software does not only belong to computer program, but also documentation and related data configuration to make the program operate correctly. By this definition, the output of software production, computer program and complete documentation are related one another. This is less understood by developer so that they assume that it will be enough to give running program to the users.

Documentation of learning media that has been made should include : installation manual (clear, brief, and complete), trouble shooting (clear, structured and anticipatory), program design (clear and describe the workflow of program). Documentation is not only oriented to the easy use by providing help, readme, user manual, etc, but also oriented to the developer that imply to the completeness of documentation and explanation of program code so that it will be easier to modificate the program.

i. Reusability (Part or All Learning Media Program can be reused to develop other learning media)

After building level has been passed, a developer has to improve his ability not only oriented to the making process, but also oriented to how the features and program function can be reused in other programs. Reusability, in this case, means that the source code, icon, logo, button and so on should be designed so that the program can be easily reused in other learning media program.

Template menu, icon, logo, button, etc that have been made can be easily used in other program. Library (DLL, API, etc) are also packaged nicely so that it can be implemented by other program. Program is arranged in modular so that it can be reused (reusabilitas).

Conclusion

Based on above discussion, there are several aspects that become assessment in developing CAI that can be concluded as follows: Assesment indicators in developing CAI such as: a. Software Engineering/Program aspect: **Aspek Rekayasa Perangkat**

Lunak/Pemrograman: (1).Effectiveness and Efficiency in the development and use of instructional media; (2). Reliable; (3).Maintainable (can easily be maintained and managed); (4). Usability (easy to use and simple in operation); (5).The accuracy in selection of the type of application/software/tool for development; (6) Compatibility (learning media can be installed/run on existing hardware and software); (7). Packaging of integrated instructional media and easy in execution; (8). Completeness of instructional media program documentation which consist of: installation manual (clear, brief, and complete); troubleshooting (clear, structured and anticipated); program design (clear and complete in describing program workflow); (9) Reusable (part or all program learning media can be reused to develop other learning media). b. Aspects of Learning Design and Content Items: (1) Clarity of learning objectives (formulation, realistic); (2) The relevance of the learning objectives with SK/KD/curriculum; (3) The scope and depth of learning objectives; (4) The accuracy of the use of learning strategies; (5) Interactivity; (6) Provision of motivation to learn; (7) Contextuality and actuality; (8) The completeness and the quality of learning support materials; (9) Compliance with the aim of learning materials; (10) The depth of the material; (11) Ease to be understood; (12) The systematic, continuous, clear logic flow; (13) The clarity of description, discussion, examples, simulations, exercises; (14) Consistency of evaluation with the aim of learning; (15) The accuracy and provision of evaluation tools; (16) The provision of feedback on the evaluation results. c. Aspects of Visual Communication/Display: (1) Communicative; according to the message and can be received/in line with the expected target; (2) Creative ideas pouring in the following idea; (3) Simple and attractive; (4) Audio (narration, sound effects, back sound, music; (5) Visual (layout design, typography, colour); (6) Media movement (animation, movie); (7) Interactive Layout (navigation icons).

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THE MEASUREMENT MODEL OF INTRAPERSONAL AND INTERPERSONAL SKILLS CONSTRUCTS BASED ON CHARACTER EDUCATION IN ELEMENTARY SCHOOLS

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Abstract

The objective of this study is to test the constructs of intrapersonal and interpersonal skills based on character education in elementary school, and to evaluate the validity of indicators, and its constructs reliability. The population of this study were the fifth grade students of the elementary schools in Yogyakarta Special Region, including: Yogyakarta, Sleman, Bantul and Gunungkidul. The sample size was 464 students from 15 elementary schools. The data were collected by using a questionnaire and analyzed by using Explanatory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The results of this study are as follows that the constructs of intrapersonal and interpersonal skills based on character education in elementary schools has fulfilled the criteria of validity, reliability, and goodness of fit statistic. Thus, the construct of intrapersonal and interpersonal skills can be used to develop the assessment model of intrapersonal and interpersonal skills based on character education in elementary school. It can be used to detect the level of achievement of intrapersonal and interpersonal skills of elementary school students.

Keywords: measurement model, intrapersonal skills, interpersonal skills, character education.

Introduction

The purpose of character education in schools is to educate the students become the overall superior personal, namely the smart personal intellectually, emotionally, socially, and spiritually. The planting of this character education should start from the basic education in the elementary school. The building overall superior personal had been stated in pasal 3, UU No. 20/2003 about national education (Kemendiknas, 2011: 243).

The results of survey that was conducted in several elementary schools in Yogyakarta, it was found that 70% of elementary schools students intelligence that is developed in the elementary schools is the intellectual intelligence through cognitive assessment. The teachers attention of the importance the emotional intelligence, social, and spiritual development is still very low in the learning process and assessment. The assessment of students' character education is only based on observations of teachers during the school. Meanwhile the assessment of intrapersonal and interpersonal skills hadn't been in elementary school yet. The

assessment model that is used by teachers varies and is usually developed by the religious teachers. The most teachers assume that the building students character and morals is done through the religious subjects.

The assessment practice of learning outcomes in elementary schools is conducted by the cognitive assessment. The student appreciation is done by teachers with giving the students ranking and test scores (Zuchdi, 2010: 68). Although all teachers know that the education have three domains, namely cognitive, affective, and psychomotor, but in practice the affective and psychomotor assessment haven't received the adequate attention. This condition occurs due to a lack of the ability of educators to describe the performance indicators of the affective domain. Thus, teachers assessment haven't described the ability of students overall. As a result, teachers aren't able to provide the guidance of affective aspects which include the emotional, social, and spiritual intelligences. This affective aspects are manifested in the form of intrapersonal and interpersonal skills. Both of these skills are the core of the character education that need be given to students in the learning process in elementary schools.

The development of intrapersonal and interpersonal skills is very important because both of these skills have the major impact on a person's success in life.

The results of the studies conducted by Goleman (1995: 15), Gardner (1996: 26), and Bar-On (1988: 24; 1997: 123; 2000: 46; 2005: 94), Berkowitz (2002: 23) concluded that 80% of the deciding person's success was the emotional intelligence.

Similarly Zamroni's research found that 70% of success in life is not because of intellectual and vocational intelligences, but rather as a generic intelligence (2005: 49). The generic capability is shown through personal abilities and social skills.

. The results of the preliminary study conducted by researcher at the elementary schools in Bantul as the piloting school in character education was concluded that 80% of students had problems of the low intrapersonal skills, and 78% of students experienced a lack of interpersonal skills (Khilmiyah, 2011: 65; 2012: 62). Thus, this condition suggests that the intrapersonal and interpersonal skills of elementary school students very still low. According Zuchdi (2010: 69) that the intrapersonal and interpersonal skills can affect on the development of personality in a positive direction. The positive effects can form in respect for others, being able to find alternative solutions, creative, patient, and independent. To realize a student personality that has the good character, teachers need to assess periodically the students' interpersonal and intrapersonal skills. This character assessment is expected for developing students' potential as a whole, both intellectual ability and the ability of emotional, social, and spiritual.

The effects of lack of attention to intrapersonal and interpersonal skills in school can cause the existence of various forms of asocial behavior among elementary school students. Based on the research results by Marzuki (2008: 59), that a decline in the moral behavior of students from cultural norms and religious rules is caused by the low intrapersonal and interpersonal skills in students. Every day people felt that the moral values desired hadn't still been suitable. The decline in moral behavior and attitudes of these students was felt at all levels of education, especially at the elementary school level as the foundation of the first education for children in schools.

Therefore, this study is important and strategic to be done because the measurement model of intrapersonal and interpersonal skills constructs become the basis for arrangement the assessment model of intrapersonal and interpersonal skills based on character education in elementary school students. Thus, the findings of this study can be used by elementary school teachers to improve students' character embodied in the form of emotional, social, and spiritual intelligences. Besides, this assessment model can be used to determine the performance of intrapersonal and interpersonal skills in order to implement character education in elementary school students, so that teachers can do early the character building the elementary school students.

Constructs of Interpersonal and Intrapersonal Skills

Lickona argues that in teaching the good character should involve three aspects of character education, namely: (1) aspect of moral knowing (the knowledge of good morals), (2) aspect of moral feeling (feel a moral goodness), and (3) aspect of moral action (values moral practiced in life) (1992: 53). In aspect of moral knowing, there are six things that become purpose of the character education teaching, namely: (1) moral awareness, (2) knowing moral values), (3) perspective taking, (4) moral reasoning, (5) decision making, and (6) self-knowledge.

In aspect of moral feeling, there are six things that should be felt by a person to become a man of character, namely: conscience, self-esteem, empathy, loving the good, self-control, and humility. Meanwhile, in aspect of moral action is outcome a combination of two other character components required three aspects of character, that is competence, will, and habit. Based on the above opinion, the manifestation of the students character cover three aspects of character, namely: the moral knowing, the moral feeling, and the moral action performed by the students during the school

Manifestations of character education is also associated with intrapersonal and interpersonal skills. Intrapersonal skills are defined as the individual's ability to recognize, appreciate, managing, controlling sense of self, and feel the reality of self-spiritual to understand the reality of self-existence and dare to be responsible for private life, so that forming a noble personality. This definition was formulated as a result of the synthesis of five theoretical concepts of intrapersonal skills by Gardner (1993: 24-25), Lazear (2000: 24), Bar-On (1997b: 120), Lwin. (2005: 233), and Amin (1974: 61). Meanwhile, interpersonal skills are defined as the ability to appreciate the views of others, realizing social responsibility, working together, tolerant, and able to communicate with others. This definition as a result of the synthesis of five theoretical concepts of interpersonal skills by Gardner (1993: 240), Bar-On (1997b: 161), Lazear (2000: 23), Mant (1997: 161), and Cunningham & Corderio (2003 : 205).

Based on this conceptual definition can be formulated indicators of intrapersonal and interpersonal skills. Intrapersonal skills has five indicators, namely: (1) recognize self-feeling, (2) respect self-feeling, (3) managing self-feeling, (4) control self-feeling, and (5) feel the reality of self-spirituality. Meanwhile, interpersonal skills has five indicators, namely: (1) respect the views of others, (2) be aware of social responsibility, (3) collaboration with others, (4) tolerance toward others, and (5) communicate effectively with others.

Zuchdi (2010: 51-53) says that to assess the achievement of the objectives of character education, the assessment of intrapersonal and interpersonal skills can be done on three aspects of the character, namely reasoning, feeling, and behavior. Therefore, this study was conducted to develop a measurement model of intrapersonal and interpersonal skills constructs of elementary school students that covers all three domains, namely cognitive, affective, and psychomotor.

Method

The subjects of this study were the fifth grade students of the elementary schools in Yogyakarta Special Region including: Yogyakarta, Sleman, Bantul and Gunung Kidul. The sample size was 464 students from 15 elementary schools. The sample selection was done by purposive sampling based on a consideration of the child's age (10-12 years) and schools variation in aspects: (1) differences in the implementation of character education in elementary school, (2) differences as the piloting elementary school in character education, (3) religious differences, (4) differences in the length of time in school, (5) differences in

character education programs in schools. Based on these criteria, sample that was selected included: four elementary schools piloting in character education, two elementary schools non-piloting in character education, one private elementary school patterned nationality, four private elementary schools based on Islamic, two private elementary schools based on Catholic, two elementary schools implementing full day, two public and private “Madrasah Ibtidaiyah”.

The data were collected by using a questionnaire and analyzed using the Explanatory Factor Analysis (EFA) dan the Confirmatory Factor Analysis (CFA). EFA method is used to determine the eigenvalues which are formed to be a factor of the latent variable. Thus, this method is able to show the dimensions of the latent variable that can be used as a factor in the formation of intrapersonal and interpersonal skills constructs in aspects: cognitive, affective, and psychomotor. Meanwhile, CFA method is used to test the *criteria of the goodness of fit statistic* of the latent variables measurement model, evaluate the indicators validity and the construct reliability of the latent variables (Joreskog and Sorbon, 1999: 115).

Finding and Discussion

The results of the construct validity test by using EFA to construct intrapersonal and interpersonal skills of elementary school students are shown in Table 1.

Table 1. Results of Testing EFA

No.	Aspects of Intrapersonal and Interpersonal Skills	KMO MSA	<i>Eigenvalue Value</i>
1.	Intrapersonal-Cognitif	0.869	1 factor
2.	Intrapersonal-Affective	0.938	1 factor
3.	Intrapersonal-Psychomotor	0.924	2 factor
4.	Interpersonal-Cognitif	0.872	1 factor
5.	Interpersonal-Affective	0.937	1 factor
6.	Interpersonal-Psychomotor	0.902	1 factor

Based on the Table 1, the five aspects of intrapersonal and interpersonal skills constructs of elementary school students have characteristics value (eigenvalue) as one factor,

and the value of KMO MSA is greater than 0.70. This includes categories satisfying, and formed factor is unidimensional. This indicates that the five aspects of intrapersonal and interpersonal skills constructs of elementary school students in according with the indicators estimated as unidimensional. Meanwhile, the psychomotor aspects of intrapersonal skills are two factors that have eigenvalue greater than 1. Yet the factors are selected only one factor that have close meaning with the measured variables, and have a variance greater.

This study uses the second order confirmatory factor analysis (CFA). Measurements on the second order CFA shows the relationship between the indicators and the latent variables. The results of testing using the second order CFA for measuring the intrapersonal skill construct is shown in figure 1.

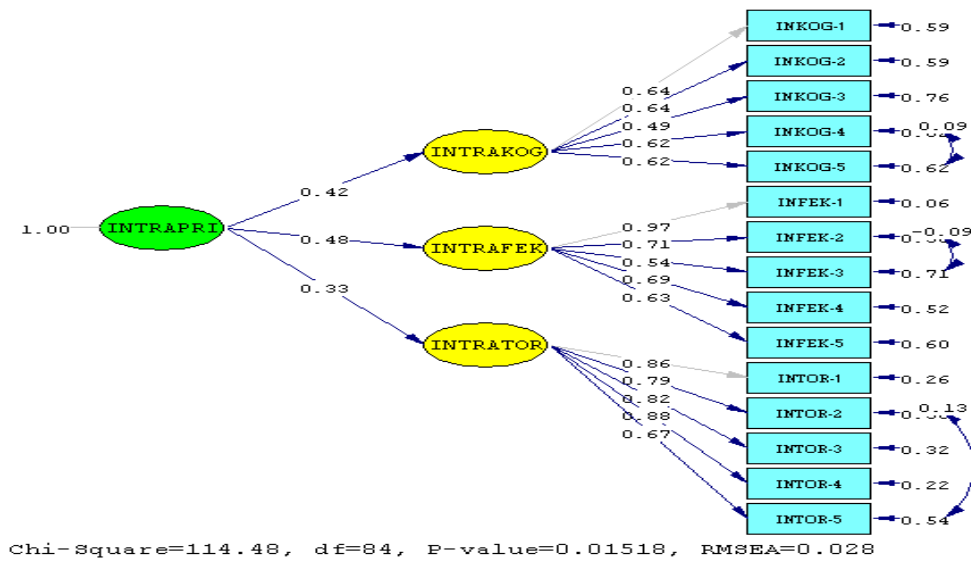


Figure 1. The test results of the intrapersonal skill construct

The test results of the second order CFA of the intrapersonal skill construct produces the goodness of fit index. The results of testing the second order CFA are shown in the following table 2.

Table 2. Results of fit test of the intrapersonal skill construct

No.	Goodness of Fit Index criteria	Cutoff value	Computation results	Comment
1.	P-value	> 0.05	0.01518	less good fit
2.	RMSEA	≤ 0.08	0.028	<i>good fit</i>
3.	RMR	< 0.05	0.041	<i>good fit</i>
4.	NFI	≥ 0,90	0.97	<i>good fit</i>
5.	NNFI	≥ 0.90	0.99	<i>good fit</i>
6.	CFI	≥ 0.90	0.99	<i>good fit</i>
7.	IFI	≥ 0.90	0.99	<i>good fit</i>
8.	RFI	≥ 0.90	0.97	<i>good fit</i>
9.	GFI	≥ 0.90	0.97	<i>good fit</i>
10.	AGFI	≥ 0.90	0.95	<i>good fit</i>

Source: Results of LISREL Analysis

Based on the statistics values of the model fit test results are obtained 9 GOF measure that indicate the good model fit and one GOF shows the less good model fit. Thus, it can be concluded that the measurement model of intrapersonal skill construct has fulfilled the criteria of the goodness of fit statistic, so that the measurement model of intrapersonal skill construct is expressed as a good measurement model. Therefore, the results of these tests can be categorized as the fit measurement model to measure the intrapersonal skill construct.

The measurement model of intrapersonal skill construct is analysed by using the second order confirmatory factor analysis. There are three latent variables of the intrapersonal skill construct, namely: cognitive, affective, and psychomotor aspects. In the first level, there are three measurements of the latent variables that are measured by 15 indicators, namely: (1) cognitive latent variable is measured by the observed variables (indicators): INKOG-1, INKOG-2, INKOG-3, INKOG-4, INKOG-5, (2) affective latent variable is measured by the observed variables (indicators): INFEK-1, INFEK-2, INFEK-3, INFEK-4, INFEK-5, and (3) psychomotor latent variable is measured by the

observed variables (indicators): INTOR -1, INTOR-2, INTOR-3, INTOR-4, INTOR-5. Meanwhile, the measurement of the second order CFA shows the relationship between the cognitive, affective, psychomotor latent variables and the intrapersonal skill construct. The results of second order CFA for intrapersonal skill construct is shown in Table 3.

Table 3. Result of Second Order CFA of intrapersonal skill construct

Variables	Stand. Loading Factors $\geq 0,50$	Standard Error	t value	Reliability		Comment
				CR $\geq 0,70$	VE $\geq 0,50$	
INTRAKOG				0.74	0.52	good reliability
INKOG-1	0.64	0.59	---			good validity
INKOG-2	0.64	0.59	9.74			good validity
INKOG-3	0.49	0.76	8.15			enough validity
INKOG-4	0.62	0.62	9.06			good validity
INKOG-5	0.62	0.62	9.04			good validity
INTRAFEK				0.84	0.59	good reliability
INFEK-1	0.97	0.06	---			good validity
INFEK-2	0.71	0.50	17.96			good validity
INFEK-3	0.54	0.71	12.48			good validity
INFEK-4	0.69	0.52	17.61			good validity
INFEK-5	0.63	0.60	15.46			good validity
INTRATOR				0.90	0.65	good reliability
INTOR-1	0.86	0.26	---			good validity
INTOR-2	0.79	0.38	20.29			good validity
INTOR-3	0.82	0.32	21.67			good validity
INTOR-4	0.88	0.22	24.11			good validity
INTOR-5	0.67	0.54	16.10			good validity

Source: Results of LISREL Analysis

Based on the test results of second order CFA, the intrapersonal skill construct is acquired 14 values observed variables (indicators) that have value t_{count} greater than 1.96 (the significance level of 0.05 is 1.96) and the coefficient of the standardized loading factor (λ) is greater than 0.50 ($\lambda > 0.50$). Thus, it can be stated that the observed variables (indicators) have good validity. Meanwhile, one value of the observable variables (INKOG-3) has value t_{count} greater than 1.96 ($t_{\text{count}} = 8.15$), but the coefficient value of standardized loading factor (λ) is smaller than 0.50 ($\lambda = 0.49$), so that it can be stated that the observed variable (INKOG-3) has sufficient validity to the cognitive latent variables (INTRAKOG). Thus, It can be concluded that the fourteenth indicators used to measure the cognitive, affective, and psychomotor on intrapersonal skills have good validity, but one indicator has sufficient validity.

The sequence of the indicators that have major contributions include: (1) the ability of self-conscious (INF EK-1) with $\lambda_6 = 0.97$; (2) be able to handle stress, and resilient (INTOR-4) with $\lambda_{14} = 0.88$; (3) the ability of sportsmanship (INTOR-1) with $\lambda_{11} = 0.86$; (4) take risks and dare to make their own decisions (INTOR-3) with $\lambda_{13} = 0.82$; (5) work hard, and never give up (INTOR-2) with $\lambda_{12} = 0.79$; (6) confident and persistent (INF EK-2) with $\lambda_7 = 0.71$; (7) capable of handling weaknesses, have a competitive spirit, and dare express their feelings (INF EK-4) with $\lambda_9 = 0.69$; (8) honest, and trustworthy (trust) (INTOR-5) with $\lambda_{15} = 0.67$; (9) the ability of reflective thinking (INKOG-1) with $\lambda_1 = 0.64$; (10) the ability to think critically (INKOG-2) with $\lambda_2 = 0.64$; (11) is able to feel the presence of God, recognizing the reality of the spiritual, and is able to take lessons every event (INF EK-5) with $\lambda_{10} = 0.63$; (12) creative (INKOG-4) with $\lambda_4 = 0.62$; and (13) faith and fear of God (INKOG-5) with $\lambda_5 = 0.62$; (14) to open up, be accountable to yourself and assertive (INF EK-3) with $\lambda_8 = 0.54$; and (15) to be innovative (INKOG-3) with $\lambda_3 = 0.49$.

Based on the test results of the second order CFA, three latent variables of the intrapersonal skill construct are obtained, as follows: (1) cognitive (INTRAKOG) has the good reliability ($CR=0.74$ and $CR \geq 0.70$; $VE=0.52$ and $VE \geq 0.50$); (2) the affective aspect (INTRAFEK) has the good reliability ($CR=0.84$ and $CR \geq 0.70$; $VE=0.59$ and $VE \geq 0.50$); (3) psychomotor aspect (INTRATOR) has the good reliability ($CR=0.90$ and $CR \geq 0.70$; $VE=0.65$ and $VE \geq 0.50$). Thus, it can be concluded that the reliability of all latent variables measurement model of the construct of intrapersonal skill are good.

The results of testing using the second order CFA for measuring the interpersonal skill construct is shown in figure 2.

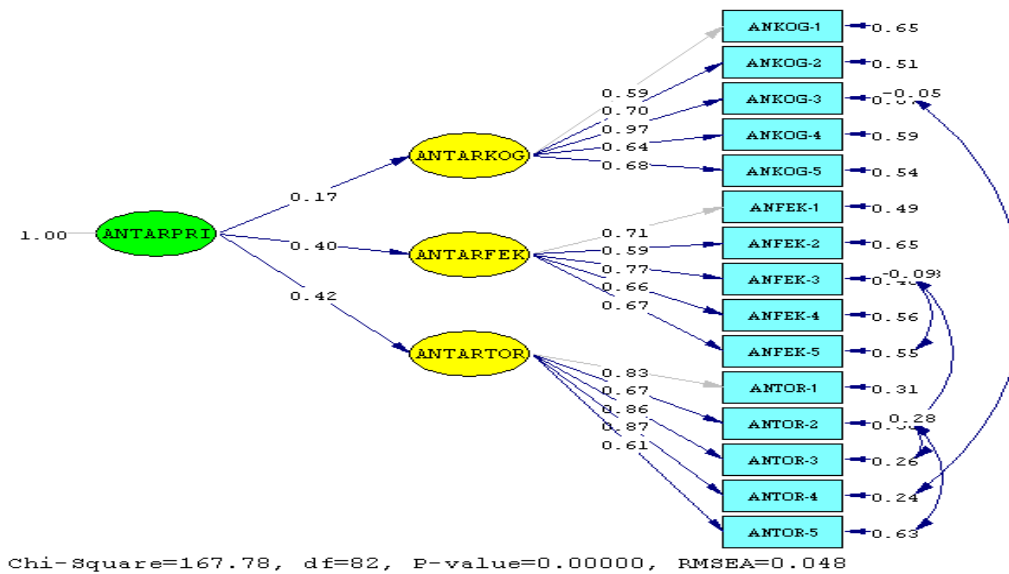


Figure 2. The test results of the interpersonal skill construct

The test results of the second order CFA of the interpersonal skill construct produces the goodness of fit index. The results of testing the second order CFA are shown in the following table 4.

Table 4. Results of fit test of the interpersonal skill construct

No.	Goodness of Fit Index criteria	Cutoff value	Computation results	Comment
1.	P-value	> 0.05	0.00000	less good fit
2.	RMSEA	≤ 0.08	0.048	<i>good fit</i>
3.	RMR	< 0.05	0.040	<i>good fit</i>
4.	NFI	≥ 0.90	0.96	<i>good fit</i>
5.	NNFI	≥ 0.90	0.97	<i>good fit</i>
6.	CFI	≥ 0.90	0.98	<i>good fit</i>
7.	IFI	≥ 0.90	0.98	<i>good fit</i>
8.	RFI	≥ 0.90	0.95	<i>good fit</i>
9.	GFI	≥ 0.90	0.95	<i>good fit</i>
10.	AGFI	≥ 0.90	0.93	<i>good fit</i>

Source: Results of LISREL Analysis

Based on the statistics values of the model fit test results are obtained 9 GOF measure that indicate the good model fit and one GOF shows the less good model fit. Thus, it can be concluded that the measurement model of interpersonal skill construct has fulfilled the criteria of the goodness of fit statistic, so that the measurement model of interpersonal skill construct is expressed as a good measurement model. Therefore, the results of these tests can be categorized as the fit measurement model to measure the interpersonal skill construct.

The measurement model of interpersonal skill construct is analysed by using the second order confirmatory factor analysis. There are three latent variables of the interpersonal skill construct, namely: cognitive, affective, and psychomotor aspects. In the first level, there are three measurements of the latent variables that are measured by 15 indicators, namely: (1) cognitive latent variable is measured by the observed variables (indicators): ANKOG-1, ANKOG-2, ANKOG-3, ANKOG-4, ANKOG-5, (2) affective latent variable is measured by the observed variables (indicators): ANFEK-1, ANFEK-2, ANFEK-3, ANFEK-4, ANFEK-5, and (3) psychomotor latent variable is measured by the observed variables (indicators): ANTOR-1, ANTOR-2, ANTOR-3, ANTOR-4, ANTOR-5. Meanwhile, the measurement of the second order CFA shows the relationship between the cognitive, affective, psychomotor latent variables and the interpersonal skill construct. The results of second order CFA for interpersonal skill construct is shown in Table 5.

Table 5. Result of *Second Order CFA* of interpersonal skill construct

Variables	Stand. Loading Factors \geq 0,50	Standar r Error	t value	Reliability		Comment
				CR \geq 0,70	VE \geq 0,50	
ANTARKOG				0.84	0.53	good reliability
ANKOG-1	0.59	0.65	---			good validity
ANKOG-2	0.70	0.51	12.30			good validity
ANKOG-3	0.97	0.07	14.11			good validity
ANKOG-4	0.64	0.59	11.48			good validity
ANKOG-5	0.68	0.54	12.01			good validity
ANTARFEK				0.81	0.50	good reliability
ANFEK-1	0.71	0.49	---			good validity
ANFEK-2	0.59	0.65	11.49			good validity
ANFEK-3	0.77	0.40	13.35			good validity
ANFEK-4	0.66	0.56	12.86			good validity
ANFEK-5	0.67	0.55	11.57			good validity
ANTARTOR				0.88	0.60	good reliability
ANTOR-1	0.83	0.31	---			good validity
ANTOR-2	0.67	0.56	15.14			good validity
ANTOR-3	0.86	0.26	21.36			good validity
ANTOR-4	0.87	0.24	21.69			good validity
ANTOR-5	0.61	0.63	13.66			good validity

Source: Results of LISREL Analysis

Based on the test results of second order CFA, the interpersonal skill construct is acquired 15 values observed variables (indicators) that have value t_{count} greater than 1.96 (the significance level of 0.05 is 1.96) and the coefficient of the standardized loading factor (λ) is greater than 0.50 ($\lambda > 0.50$). It can be stated that all observed variables (indicators) have good

validity. Thus, It can be concluded that the all indicators used to measure the cognitive, affective, and psychomotor on interpersonal skill have good validity.

The sequence of the indicators that have major contributions include: (1) understand the benefits of working together (ANKOG-3) with $\lambda_3 = 0.97$; (2) empathy, tolerance (ANTOR-4) with $\lambda_{14} = 0.87$; (3) harmony, mutual aid (ANTOR-3) with $\lambda_{13} = 0.86$; (4) the ability to be democratic, and fair (ANTOR-1) with $\lambda_{11} = 0.83$; (5) to be cooperative, solidarity, and participatory (ANFEK-3) with $\lambda_8 = 0.77$; (6) the ability to respect the wishes of others (ANFEK-1) with $\lambda_6 = 0.71$; (7) give priority to the public interest (ANKOG-2) with $\lambda_2 = 0.70$; (8) determine appropriate communication (ANKOG-5) with $\lambda_5 = 0.68$; (9) to be friendly, cheerful, and sociable (ANFEK-5) with $\lambda_{10} = 0.67$; (10) obey the rules, net (ANTOR-2) with $\lambda_{12} = 0.67$; (11) attention to others, be respectful, and tolerant (ANFEK-4) with $\lambda_9 = 0.66$; (12) know the difficulties of others (ANKOG-4) with $\lambda_4 = 0.64$; (13) skilled conflict resolution, and friends (ANTOR-5) with $\lambda_{15} = 0.61$; (14) the ability to understand the thoughts and feelings of others (ANKOG-1) with $\lambda_1 = 0.59$; and (15) care for the environment, feel partly responsible, self-sacrificing, and helpful (ANFEK-2) with $\lambda_7 = 0.59$.

Based on the test results of the second order CFA, three latent variables of the interpersonal skill construct are obtained, as follows: (1) cognitive has the good reliability (CR=0.84 and $CR \geq 0.70$; VE=0.53 and $VE \geq 0.50$); (2) the affective aspect has the good reliability (CR=0.81 and $CR \geq 0.70$; VE=0.50 and $VE \geq 0.50$); (3) psychomotor aspect has the good reliability (CR=0.88 and $CR \geq 0.70$; VE=0.60 and $VE \geq 0.50$). Thus, it can be concluded that the reliability of all latent variables measurement model of the construct of interpersonal skill are good.

Based on the test results of the second order CFA, it can be seen that two models, namely: (1) the measurement model of intrapersonal skill construct (INTRAPRI) consisting of intrapersonal-cognitive skill aspects (INTRAKOG), intrapersonal-affective skill aspects (INTRAFEK), intrapersonal-psychomotor skill aspects (INTRATOR), and (2) the measurement model of interpersonal skill construct (ANTARPRI) consisting of interpersonal-cognitive skill aspects (ANTARKOG), interpersonal-affective skill aspects (ANTARFEK), interpersonal-psychomotor skill aspects (ANTARTOR) have fulfilled the statistical requirements and are categorized as the fit measurement model. This means that both the measurement model have fulfilled the goodness of fit statistic, so that it can be used as an instrument to detect the intrapersonal and interpersonal skills achievement in character education in the elementary schools.

Besides, the test results of the second order CFA are also known items that contribute the biggest and the smallest as follows: (1) intrapersonal-cognitive skill aspects, the biggest

items are the effective thinking skill, and the critical thinking skill, meanwhile the smallest item is innovative; (2) intrapersonal-affective skill aspect, the biggest item is self-aware capability, meanwhile the smallest item is open, accountable to yourself and assertive; (3) intrapersonal-psychomotor skill aspect, the biggest item is able to handle stress, and tough, meanwhile the smallest item is honest, and trustworthy (trust); (4) interpersonal-cognitive skill aspect, the biggest item is to understand the benefits of cooperation, meanwhile the smallest item is the ability to understand the thoughts and feelings of others; (5) interpersonal-affective skill aspect, the biggest item is to be cooperative, solidarity, and participatory, meanwhile the smallest item is concerned with the environment, to feel partly responsible, self-sacrificing, and helpful; and (6) interpersonal-psychomotor skill aspect, the biggest item is empathetic, tolerant, meanwhile the smallest item is skillfully resolve conflicts, and friends.

Conclusion and Suggestion

The conclusions of this study can be formulated that the measurement models of intrapersonal and interpersonal skills constructs at the elementary school students are declared valid and reliable because all the indicators that are used to measure the cognitive, affective, and psychomotor skills in intrapersonal and interpersonal constructs have the loading factor coefficient values greater than 0.50. Meanwhile, the reliability of the intrapersonal and interpersonal skills construct have a composite reliability coefficient (construct reliability) greater than 0.70. This measurement model of constructs also fulfills the criteria in goodness of fit statistics, so that the measurement model of intrapersonal and interpersonal skills constructs at elementary school students are declared a measurement model that has fulfilled the criteria for a valid, reliable, and goodness of fit statistic. Thus, the results of this study can be developed to create the assessment model of intrapersonal and interpersonal skills based on character education in the elementary school.

Some suggestions are: (1) the measurement model of intrapersonal and interpersonal skills constructs based on character education in the elementary school can be used as a basis for developing the assessment instruments of intrapersonal and interpersonal skills based on character education in elementary school; (2) The use of this measurement model can encourage teachers to be more objective in detecting the level of achievement of intrapersonal and interpersonal skills of students in the cognitive, affective, and psychomotor aspects to the parents.

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LEARNING ASSESSMENT ON VOCATIONAL SUBJECT MATTERS OF THE BUILDING CONSTRUCTION PROGRAM OF THE VOCATIONAL HIGH SCHOOL IN APPROPRIATE TO CURRICULUM 2013

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Abstract

Among the fundamental difference the Curriculum 2013 and the previous curriculum were in terms of learning and assessment. The learning of curriculum 2013 had oriented to the student's competence development as a whole person, includes of attitudes, knowledge, and skills aspects as an integrated manner. While the previous curriculum learning orientation was partially in accordance to the the subjects or competencies characteristics to be achieved. As a consequence, teachers have to really prepared and competent to be able to implementing the curriculum. On the other hand, every turned of the curriculum always will have been the turbulence, both regard to the lack of socialization, teacher's unpreparedness and other resources, as well as the attitude of the curriculum rejecting itself. Therefore, the problem concerning the teacher's readiness to the curriculum 2013 implementation, particularly in the learning assessment in accordance to the curriculum 2013 is an urgent issue to be studied. The result of study illustrates that the teacher's readiness to the curriculum implementing in accordance to the learning assessment can be divided into two aspects, namely: assessment planning, and assessment implementation. The results of the study by Amat Jaedun et al. (2014), pointed out the teachers readiness to implementing instructional assessment on planning, have been assessed using the availability and completeness of the learning assessment aids in the poor prepared category. Meanwhile, the teacher's readiness to implementing instructional assessment on implementation aspects have been assessed by the relevance of the learning assessment to the competency characteristics to be assessed, especially in vocational subjects matters, were also in the less ready condition. This suggests that the teacher's readiness to learning assessment implementing accordance to the curriculum 2013 both in the planning and implementation aspects were in the poor prepared category.

Keywords: *Vocational Subject Matters Assessment Implementation*

Preliminary

Changing the curriculum was the one efforts taken by the government improving the education quality. Changing the curriculum was a necessity, because the curriculum had to be adjusted periodically to: (1) the vision and mission of the institution of education; (2) the demands of society (including the workplace); (3) the development of science and technology; (4) input from the profession; and (5) the results of the task analysis.

The curriculum of 2013 was designed to prepare the Indonesian man who has the ability to live, both as a individuals and a citizens who have a believed, productive, creative, innovative and effective and able to contribute to society, nation, state, and world civilization.

This goal will be accomplished when government and all citizens, especially teachers, tried to implementing the curriculum of 2013 correctly.

Many signaled stated that the various improvement efforts have been implementing to improve the education quality (including the school curriculum changes) was not able yet to improving the education quality significantly. One of the factors caused its implementation weaknesses. Moreover, it was undeniable that every the school curriculum turning always was a turmoil, both related to the unpreparedness of the educational institution to implementing the new curriculum, unpreparedness human and other resources, lack of the socialization, and the resistance itself. Therefore, the success in the curriculum implementation, including the learning process and assessment, depends on the teacher's readiness and education institution (schools), in preparing and carrying out the learning assessment. Moreover, the problem statement was formulated as follows.

How far the implementation of learning assessment conducted by the Building Construction Program of the Vocational High School Teachers in Yogyakarta Special Region in accordance to the assessment principles of the Curriculum 2013 implementation?

Discussion

1. Assessment of Learning

Educational Assessment, was defined the collecting and information processing to measure the students learning achievement (Permendikbud No. 66 tahun 2013). Basically, the assessment of learning can not be separated from the learning process. Therefore, the planning, implementing and developing of the learning assessment tools have to suited to the learning processes characteristics, tailored to the competencies characteristics set out in the school curriculum.

The structure of the High School Curriculum, consisting of compulsory subjects matters and a group of the optional courses. The compulsory subjects matters include nine subject matters with load of study were 24 hours per week, comprising: group of subjects in group A and group B. Compulsory subjects

In the vocational high school curriculum, subjects specialization group (C), consisting of: (1) Group of the Basic Expertise Subject (C1), (2) Group of the Basic Skills Program Subject (C2), and (3) groups of the Subjects Skills package (C3). The basic competences subjects in C2 and C3 grouping were set by the Directorate General of the Secondary Education, Ministry of Education and Culture, adapted to the technological developments and needs of the business and industry.

Those curriculum structure applies the principle that the students were the learning subject has the right to choose subjects matters according to their interests. Electives subject consist of academic options for SMA or MA as well as academic and vocational options for SMK or MAK. This elective subjects provides shades to function in education, and in it there is an option in accordance with the interests of learners.

In accordance to the Competency Standards, learning objectives includes the development realm attitudes, knowledge, and skills have been elaborated for each school. The three domains of competence has a path of a psychological processes were different. Attitude was obtained through "receiving, running, respecting, appreciating, and practicing" activity. The knowledge gained through the "remembering, understanding, applying, analyzing, evaluating and creating" activity. Meanwhile, the skills acquired through the "observing, asking, trying, reasoning, and creating" activity. Competence characteristic acquisition along the path difference (psychological processes) will greatly affect the characteristics of learning and assessment processes.

2. The Curriculum of 2013 Learning Assessment

The learning assessment conducted by the Building Construction Program of the Vocational High School Teachers in Yogyakarta Special Region was done in appropriate to Permendikbud No. 66 of 2013, on the Education Assessment Standard. Assessment has carried out meet to the objective, integrated, economical, transparent, accountable, and educative principles. In addition, the assessment must also satisfy the fair, valid, specific, and benefits principles.

Assessment of learning outcomes in primary and secondary education implemented by educators, schools, and the Government and / or independent agencies. Assessment of learning outcomes was done in the form of authentic assessment, self-assessment, project assessment, daily testing, midterm testing, the end of semester testing, the level of competence testing (UTK), the quality level of competency exams (UMTK), school exams and national exams.

Assessment on process and learning outcomes in curriculum 2013 implementation using the authentic assessment approach. The authentic assessment was done by teachers on an ongoing process. The authentic assessment was an assessment technique gathering an information can describe the learner's actual competence, includes the student readiness, processes, and learning outcomes assessment. It was an assessment to the multi-dimensional learner's behavior in real situations. Such assessments were not only using paper pencil test or written test, but also using a various techniques in accordance to the competencies have to assessed, such as performance testing, assignments, observations, and portfolios.

Hargreaves and Lorna Earl was quoted by Badrun Kartowagiran (2013), stating that the Authentic assessment could motivated students to be more responsible for their own learning, make judgments as an integral part of the learning processes, encouraging students to be more creative and apply their knowledge rather than just train the memory.

A similar statement was expressed by Grant Wiggins (Lund, 1997: 25) have pointed out that the authentic assessment has developed to facilitate of the learners in applying their knowledge and skills to solve real-life problems by providing an authentic aspect to their assignment. The authentic assessment was becoming popular because it offers a variety of shift from traditional assessment, particularly focusing on the usefulness of the knowledge and skills possessed to solve a real life problems, and appropriate to the professional world demands.

Similarly, Berg (2006: 7) based on an interview to John Muller revealed that differences between an authentic and a traditional assessment, that the traditional assessment measures how students have acquired the knowledge while the authentic assessment measures how students were able to apply their knowledge and skills to make it more meaningfulness for their life.

Furthermore, Gulikers (2004: 67) defines the authentic assessment was an assessment that requires students to use knowledge, skills and behaviors competencies be applied to solve the future professional life problems, in which the level of the assessment authenticity depend on the level a task resemblance to the real world situation he would faced.

Meanwhile, Lina (2000: 181) revealed that authentic assessment was a useful tools to provide a change evidence and evaluating the individual performance in a group working that may not be recorded by a traditional assessment instrument. In other words, authentic assessment was more sensitive to learner's changes as the learning process result.

Based on the above opinion, it can be concluded that the authentic assessment was an assessment that required learners not only answer the test correctly, but applied the knowledge, skills and attitude solved the daily life or professional life in the future problems. The authentic assessment can be done through many different types of assignments. So, the important points was a similarity assignment has given in school to the learner's real-life contexts faced by them.

Meanwhile, the characteristics of authentic assessment have five dimensions (Gulikers, 2004: 67), namely:

- a. Assignments were authentic, if the task containing the community in real life problems faced by students.

- b. Physical context, i.e. a tasks required students to demonstrate their capabilities both inside and outside the classroom.
- c. Social context, includes the social processes tasks in accordance to the student's real life, such as: co-operation, and task that can foster a climate of competition.
- d. Authentic assessment results, i.e. the tasks produce an authentic products, with characteristics: (1) the student's product quality or performance in accordance to real life, (2) requires the demonstration has illustrated a valid competence, (3) involves a lot of learning indicators, and (4) requires the work presentation to others both orally and in writing.
- e. Using the criteria include the realistic results, explicit disclosure of the characteristics of the results, based on its professional competence in a real situation.

Authentic assessment was done based on an ongoing and integrated to learning processes. Therefore, the authentic assessment in accordance to the competencies characteristic was be achieved, and also linked to the model of learning applied.

Learning activities on building construction program of SMK were divided into three, grouping, namely: (1) the theoretical learning, (2) the practicum learning in lab, and (3) the practice learning in workshop. Practice learning and practicum in lab were applications of the theoretical competences have students learned. In this case, there was a difference between theoretical learning and practice and practicum learning. The theoretical learning more emphasis on the cognitive (knowledge) training, whereas in practicum and practice learning more emphasis on the psychomotor or skills training. Among the three types of learning, the proportion of practice learning in the workshop was much greater than the proportion of theoretical learning, and laboratory experimental learning.

According to Soeprijanto (2010), the vocational practice learning process, consisting of lesson planning, lesson preparation, teaching practices, and assessment of learning outcomes. The planning of practice learning could consist of the job sheets preparation, class preparation, workshops preparation, and or the equipment used. The implementation of learning may be preceded by the presenting the material by the teacher (shop talk activity), followed by the students practices, and assessed to the process and student learning outcomes.

Mills (1977), stated that in the practice learning teacher has to: (1) determine the learning objectives, (2) analyze the skills and operating steps, (3) demonstrate the skill was accompanied by a brief description, to give attention to the key points and difficult parts, (4) provide an opportunity for students trying their own skills with supervision and guidance (simulation), and (5) provide an assessment of the student effort.

Meanwhile, Leighbody and Kidds (1968) states that steps in practices teaching were: (1) preparation, (2) the stage of student activities (practice), and (3) the stage of assessment of students' work. Thus, it can be summarized that the skill practice learning in the Building Construction program of SMK, includes three phases, namely: (1) planning, (2) the implementation phase of learning consisting of: (a) presentation by the teacher (shop talk) and (b) student's learning activities (practices), and (3) assessing to student's learning outcomes.

Meanwhile, student's competence achievement assessment of the building construction program of SMK includes the attitudes, knowledge, and skills competencies have done in a balanced way so that it can be used to determine the learner's relative position against the established standards. The techniques and instruments have used for assessing the attitudes, knowledge, and skills competencies were as follows.

a. Assessing the attitude competence

In this case, a teacher assessing the attitude competency through observation, self-assessment, peer assessment or peer evaluation, and journals.

- 1) Observation, was an assessment technique have done on an ongoing or continuing process using the senses, either directly or indirectly, using the observation guide that contains a number of observed behavior indicators.
- 2) Self-assessment, was an assessment technique by asking to learners expressing themselves advantages and disadvantages in the competence achievement context. The instruments was used was the self-assessment form.
- 3) Peer assessment was the assessment techniques by asking students to assess each other related to the competence achievement. The instruments was used the peer assessment sheet.
- 4) Journal, was a teacher's notes inside and outside the classroom observations containing information about the strengths and weaknesses of students regard to attitudes and behavior.

b. Assessment Knowledge Competency

Teacher assessed the knowledge competence through written tests, oral tests, and assignments.

- 1) The instruments of a written test were a multiple choice test, short answer, true-false, matching, and essay test. Essay test instrument should be equipped scoring guidelines (rubrics).
- 2) The oral test consist of a list of questions.

- 3) The instrument of assignment were a homework assignments and / or projects was done individually or in groups according to the characteristics of the task.

c. Skills Competency Assessment

Teacher assess skills competency through performance assessment, i.e. assessment have required the students to demonstrate a particular competency using practice test, project, and portfolio assessment. The instruments have used were a check list or rating scale have equipped with a rubric.

- 1) The practice test, was the assessment have demanded the skill response activity or behavior in accordance to the demands of competence.
- 2) Project, was a learning tasks which includes the design, implementation, and reporting of both written and spoken in a certain time.
- 3) Portfolio assessment, was the assessment carried out by assessing the entire collection of the student's work in certain fields which are reflective-integrative to determine the interests, developments, achievements, and / or learner's creativity in a certain time. The work could be in real action reflecting the students concern to the environment.

3. Graduation Criteria

Each student's learning outcomes will include the attitude, knowledge and skills competency, although its evaluated separately. The competency assessment was displayed in two forms, namely performance and descriptions. Assessment of knowledge and competence skills attainment initially was expressed in score (1-100), which was converted to a scale (1 - 4). Assessment of achievement attitudes was expressed by the level of quality, namely: Very Good (VG), Good (G), Fair (F), and less (L).

The graduation criteria for the knowledge competence was the achievement of minimum competence, i.e. when students are able to apply the knowledge gained; or if it was declared by a score ≥ 75 . The graduation criteria for skill competency when a student was able to demonstrate (show) the substance of the skills correctly; or if it was expressed by a score ≥ 75 . The passing criteria for the attitude was if students are well behaved, or when he or her expressed in terms of the value of $\geq 2,67$. Meanwhile, the school institution can determine the graduation criteria for the student's competence above the criteria have been established in accordance to the school institution conditions.

4. Assessment of learning in Building Construction Program of SMK

Teacher readiness on implementing learning assessment in accordance to the curriculum of 2013 measured based on the teacher's ability to plan and implement learning assessment in accordance to the the standard of educational assessment in the Permendikbud No. 66 of 2013. Data on the teacher readiness to learning assessment implementation in accordance to the curriculum of 2013 was collected using an enclosed questionnaire, open questionnaire, and documentation.

Results of the research was conducted by Amat Jaedun et al. (2014), shows that based on the enclosed questionnaire results the teacher's readiness to the learning assessment implementation in the curriculum of 2013 on the fairly ready. Nevertheless, the data was collected by the opened questionnaire showed that teacher's of Building Construction Program of SMK actually have not been fully readiness for assessing learning in the curriculum of 2013 implementation. It has been indicated by: (1) although the teachers have developed an evaluation instrument of learning in the lesson plan documents (RPP), but most teachers still do not understand the authentic assessment principles and application, (2) the teachers still need to the principles, procedures, techniques, and authentic assessment instruments examples to the curriculum of 2013 implementation, and (3) the design of learning assessment have been prepared by teachers in the lesson plan mostly not meet to the characteristics of authentic assessment.

Meanwhile, the result of the lesson plan document analysis also showed that even though the teachers had prepared the learning evaluation instrument in the lesson plan document, but the assessment instrument which had been prepared by teacher in the lesson plan has not met to the characteristics of authentic assessment. This was shown by the following data.

- a. Learning assessment instruments to assess the knowledge competence included in the lesson plan document, generally in the test questions form that does not contain the problems faced by the students in the real life community, or the problems will be faced by the students on the job (his profession).
- b. The tasks given to the students mostly do not required students demonstrating their capabilities both inside and outside of the classroom.
- c. The tasks given to the students mostly do not contain social processes that correspond to real-life learners, such as: cooperation, and foster a climate of competition.
- d. The tasks given to the students mostly do not produced the authentic products, have the characteristics: (1) the quality of product or the student performance was not in accordance to the student's real life, (2) the tasks given to learners were not calling for describes a valid

competency demonstration, (3) the tasks given to the students mostly do not involved a lot of indicators of learning, and (4) the tasks have not required the work presentation to others both orally and in writing.

- e. The tasks given to the students mostly do not use the reference / criteria including the realistic results, that based on his professional competence in a real situation.

5. Teacher's constraints in implementing the Learning Assessment

Regard to the lack of the teacher's preparedness in the learning assessment for curriculum of 2013 implementation, so many obstacles faced by teachers in implementing learning assessment. The constraints in implementing learning assessment faced by teachers, due to:

- a. Most of vocational teachers (subject matter of C1, C2, and C3) have not trained yet the curriculum of 2013 implementation,
- b. The lack of teacher's understanding to implementing the curriculum of 2013,
- c. The lack of guidance in implementing the curriculum of 2013 have easily understood by teachers, and
- d. The absence of examples of the learning and assessment models in curriculum of 2013 implementation.

Conclusion

Based on the results of the above review, it can be concluded as follows:

1. The teacher of Building Construction of SMK readiness for assessing of learning outcomes according to the authentic assessment principles of the curriculum of 2013 implementation has not been well prepared. Data from open questionnaire results showed that: (1) although the teachers have developed an learning assessment instrument in the lesson plan documents, but most of teachers still do not understand the authentic assessment principles and application, (2) the teachers still need an examples of the principles, procedures, techniques, and authentic assessment instruments to implementing the curriculum of 2013, and (3) the design of learning assessment that teachers have been developed in lesson plans document do not meet to the authentic assessment characteristics.
2. The lack of the Building Construction of SMK conducting the learning assessment according to the curriculum implementation of 2013 principles, mainly due to the following constraints:

- a. Many vocational teachers (groups C1, C2, and C3 subject) have not training yet in the curriculum of 2013 implementation,
- b. Lack of teachers understanding to implementing instructional assessment in implementing the curriculum of 2013,
- c. The lack of guidance in implementing the curriculum of 2013 have easily understood by teachers,
- d. The absence of examples of the learning and assessment models in the curriculum of 2013 implementation.

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ACCURACY OF EQUATING METHODS FOR MONITORING THE PROGRESS STUDENTS ABILITY

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Abstract

This research was a study of vertical equating using empirical data that aimed to find: (1) the accurate linear and equipercentile methods in Classic approach and mean&mean and maen&sigma methods in IRT approach; (2) The progress of Elementary students Grade III, IV, V, and VI ability (θ) in Mathematic using mix-model test. The data of this study were students' scorer on final exams Elementary school 2013 collected with anchor test design. The result showed that: (1) Standard Error of Equating (SEE) within the linear method was 0.607607 and equipercentile method was 0.505116, while Root Mean Square Different (RMSD) within the mean & mean was 0.393862 and mean & sigma method was 0.344474. The differences between the value of SEE and RMSD was very little, therefore the meaningfulness needed further study; (2) the four equating method provided information that θ increased in accordance with the increased of the class rank, with mean of the θ students Grade III, IV, V, and VI as 0.10412, -0.07581, 0.004436, dan 0.173415. But the increased of the θ value was relatively small, in that its meaningfulness also required further study.

Keywords: *Equating Method, Mixed-Model Test.*

Introduction

Law on National Education System in Indonesia mandates that an educational institution should be able to produce quality human resources so as to face the challenges of life today as well as in the future. Completion of the curriculum (Curriculum 2013) which includes competency standards, the material to be learned or taught, or the execution of the learning process, and achievement of learning objectives or assessment of learning outcomes is one of the efforts that have been done by the government.

In relation to the matters, Mardapi (2008, p.5) stated that the improvement in the quality of learning results from an educational quality might be started from the improvement in the quality of learning programs and in the quality of the evaluation performed in a class. The statement implied that the teachers as a component who directly encountered the students should be able to develop the potentials that the students had, both by means of the implementation of learning programs and by means of the evaluation model that an educational institution implemented. The evaluation model that the teachers implemented should be able to monitor or to provide the information about the learning process that had been conducted, the development of students' capability after attending the learning process and the learning results that the students had achieved so that the teachers might perform an evaluation toward the expected educational objectives.

A good evaluation demanded an appropriate data; therefore, the data should be supported by a good measurement process (Mardapi, 2008, p.5). The implementation of well-qualified measurement program will support all of the components who were involved in the learning process, especially the teachers and the students, to perform the efforts of attaining the quality of learning results according to the desired objectives. The teachers were demanded to improve their knowledge and to expand the mastery of learning materials so that they would be able to design well-qualified measurement tools (test) in order to measure the achievement of learning programs that had been implemented.

The measurement tools (test) in the mathematic had peculiar structure because the learning materials in mathematic were hierarchical ones. The characteristics implied that the students' mastery in certain classes was related to the mastery of the learning materials taught in the previous class. Thereby, in order to uncover the development of students' ability in the mathematics there should be an ability to design a test that connected the students' ability to the whole rank of the class. The teachers should be able to select the appropriate model, should be able to design an appropriate test model and to implement the test appropriately in order to achieve the information regarding the development of the students' ability.

The use of tests which are beyond the skills of student will lead the student being unable to answer a given item so that teacher does not get enough information about the development of students' abilities. Extreme differences in the ability of students in a classroom will lead teacher to have problems in making evaluations. Smart Students may have possibilities through statistical process to completely answer all the items that are on the level, and are likely able to answer questions with the material that was on the level, and vice versa.

According to Naga (1992, p. 347), a way to overcome this problem is to give slow students tests that are at the lower level, while the fast students are given a test at the level above it, then by equating the scale, a scores they get are converted back to its original position. According to Kolen and Brennan (2004, p. 5), two different test scores of two or more groups can be compared if the answering scores are equivalent and have the same scale. Equality between the score statistics can be done through equating. Equating is performed on a test that had different difficulty levels in different grades but measuring the same trait called vertical equating. Vertical equating can be used by teachers to uncover the development of students' abilities, even though the students are at different grade levels and different levels of ability, as long as the tests used will measure the same trait. It is thus very important to do a vertical equating for teachers because they can be obtained through a

vertical equating can be obtained information of the capability development of student, that can be used as a reference to the improvement of the quality of learning outcomes.

The results of existing studies show, there is not a superior method in all conditions. An equating method may be accurate in certain circumstances but inaccurate at other conditions. Therefore, the accuracy of the various methods of equating that exist both Classical and IRT approach, still needs to be further investigated. Teachers need to obtain information on what method gives the accurate results in the existing conditions, so that the information obtained in monitoring the development of students' ability will approach the truth.

A problem to be answered in this study were (1) which method gives more accurate results in vertical equating with classical approaches and which method in vertical equating with IRT approach ?; (2) how the development of the ability of students in grade III, IV, V, and VI in math based test is used?

Theoretically, this research is expected to contribute to the development of educational measurement in the Mathematics, among others: (1) provide information on the vertical equating with Classical and IRT approach to instruments mixed model test, which developed for secondary school.; (2) provide information about the development of students' skills in math at the level of different classes that can be used as a reference for the evaluation of mathematics learning in the classroom; and (3) provide information to develop research on vertical equating test with Classical and IRT approach for other science studies.

Practically, this research can be used in: (1) tracing the growth of student achievement in a learning program on a periodic basis according to class rank; (2) comparison of difficulty doing math in particular, according to the period of assessment and class rank, so it is possible to change the learning materials according to class rank; (3) perform a selection of majors through individual ability levels of students; and (4) provide guidance for teachers, in preparing the matter in a professional manner so as to provide a more professional and responsible learning.

Research Methods

The study was about a vertical equating that, in general, implemented a quantitative approach and within the implementation the research consisted of several interrelated parts namely the design of research instrument, the analysis of instrument characteristics, the analysis of the designed instrument characteristics, the comparison of equating method accuracy in the Classic approach and in the IRT approach and the research about the development of the students' ability.

The study begins with the development of instruments (tests) of mathematics achievement test, mixed-models for elementary school grade III, IV, V, and VI tested in the 2nd semester (summative tests) that were prepared on the subject of numbers, geometry and measurement. The fourth test package contains anchor items as much as 20%, for both multiple-choice or description. The definition of the outlines and the test formulation were performed by a team that consisted of two elementary school mathematic senior teachers. Content validity and readability matter involved two experts in the areas of mathematics and measurement, 6 teachers and 12 elementary students grade VI. The instrument (test) that had been revised then would be tested to eleven elementary schools. Trial data were analyzed using classical and IRT approaches using Parscale program (Muraki & Bock, 1977) with an estimated Marginal Maximum Likelihood (MML).

Research data collection was done by stratified random sampling involves a sample of 1034. consisting 257 third graders, 257 fourth graders, 260 fifth grade students, and 260 sixth grade students. Random application was done at the school level, school strata while having regard to the location and categories of the school.

Fulfillment of unidimensional assumptions and construct validity of the tests were carried out by exploratory and confirmatory factor analysis . The number of dimensions measured by the four tests, can be seen from the scree-plot Eigen value. This is in accordance with the opinion of DeMars (2010, p. 39) that the eigen value of the inter-item correlation matrix is one simple method to test dimensionality. Testing hypothetical measurement model fit to the empirical data using confirmatory factor analysis were performed according to class rank to group items contained in the test. The program used is lisrel 8:54 with indicators of goodness of fit (Joreskog & Sorbom, 1996, p. 27)

Design equating uses common items of non-equivalent design or anchor test design . The linear and equipercentile accuracy of the method was tested with Standard Error of equating (SEE) (Linn, 1989, p. 255), whereas the accuracy of the mean & mean and mean & sigma methods were tested with Root Mean Square Difference (RMSD) student ability (θ) before and after equating (Kim & Cohen, 2002, p. 31). Information about the development of students' abilities in math may be obtained from the equating score and ability scale of students of the four grades that were included.

Results and Discussion

Research data on the final semester exam grade III, IV, V, and VI Elementary corrected by two raters to get a good score. To ensure consistency of assessment, the scores of the two raters were tested using Hoyt inter-rater reliability test approaches (Mardapi, 2012, p. 86).

The Chi-Square Value in Bartlet test class III, IV, V, and VI, respectively for 1217.326, 1300.659, 1733.177, and 1746.443 with degrees of freedom 595 and p-value less than 0.01. These results indicate that the sample size used in the study was sufficient. The scree-plot of the Eigenvalue for the Grade III, IV, V, and VI tests show Eigen values ranging ramps on the second factor. This means there is a dominant factor in the test class III, IV, V, and VI.

LISREL running results of the test grade III get of chi-square value 94.63 with $df = 74$ and $p = 0.05330$, Root Mean Square Error Approximation (RMSEA) = 0.053, non-normed Fit Index (NNFI) = 0.949, Comparative Fit Index (CFI) = 0.958 and $\chi^2 / df = 94.63/74 = 1.28 < 3$; in grade IV chi-square value obtained for 94.58 with $df = 74$ and $p = 0.05369$, Root Mean Square Error Approximation (RMSEA) = 0.053, non-normed Fit Index (NNFI) = 0.953, Comparative Fit Index (CFI) = 0.962 and $\chi^2 / df = 94.58 / 74 = 1.28 < 3$; in grade V chi-square value of 93.24 with $df = 74$ and $p = 0.06474$, Root Mean Square Error Approximation (RMSEA) = 0.053, non-normed Fit Index (NNFI) = 0.951, Comparative Fit Index (CFI) = 0.960 and $\chi^2 / df = 93.24 / 74 = 1.26 < 3$; and the value of the chi-square test for grade VI 122.07 with $df = 100$ and $p = 0.06613$, Root Mean Square Error Approximation (RMSEA) = 0.045, non-normed Fit Index (NNFI) = 0.963, Comparative Fit Index (CFI) = 0.969 and $\chi^2 / df = 122.07/100 = 1.22 < 3$. It also means that the model test grade III, IV, V, and VI fit with the data.

The analysis of test item by means of Classic approach included the correlation of Pearson (rp) that was read in the output Parscale PH1. On the other hand, the analysis of test items by means of IRT approach included the parameter slope, the location and the probability that were read in the Output Parscale PH2. The summary of the results of analysis to the four test packages was presented in Table 1, Table 2 and Table 3.

Table 1.

The Analysis of Test Item for the Grade III Test, Grade IV Test, Grade V Test and Grade VI Test by means of Classic Approach

Component	Grade III Test	Grade IV Test	Grade V Test	Grade VI Test
Mean	25.96	26.770	27.25	27.660
Variance	30.045	31.146	46.127	46.822
Standard Deviation	5.481	5.581	6.792	6.843
Skewness	0.431	0.285	-0.001	-0.090
Curtosis	-0.034	-0.086	-0.585	-0.614
Minimum Score	12	13	10	10
Maximum Score	41	45	42	42
Median	25	26	27	28
Mean (r_p)	0.298	0.317	0.369	0.373
Mean (r_{ps})	0.367	0.391	0.455	0.460
Test Length	35	35	35	35
Subject	257	257	260	260

Table 2.

The Analysis of Test Item Parameter for the Grade III Test, Grade IV Test, Grade V Test and Grade VI Test by means of IRT Approach

Component	Grade III Test			Grade IV Test		
	Slope	Location	Prob.	Slope	Location	Prob.
Mean	0.537	-0.070	0.412	0.558	-0.228	0.513
St. Dev.	0.234	0.330	0.231	0.250	0.380	0.277
Variance	0.055	0.109	0.055	0.062	0.145	0.077
Minimum	0.247	-0.951	0.077	0.295	-1.333	0.052
Maximum	1.022	0.525	0.915	1.360	0.536	0.956
Skewness	0.784	-0.498	0.388	1.480	-0.880	-0.188
Curtosis	-0.610	0.099	-0.920	1.956	1.532	-1.092
Median	0.464	-0.033	0.377	0.475	-0.183	0.498
Test Length	35			35		
Respondents	257			257		

Table 3.

The Results of the Analysis of Test Item Parameter for the Grade V Test and Grade VI Test by means of IRT Approach

Component	Grade V Test			Tes Kelas VI		
	Slope	Location	Prob.	Slope	Location	Prob.
Mean	0.639	-0.324	0.417	0.644	-0.430	0.590
Standard Deviation	0.310	0.310	0.229	0.317	0.309	0.218
Variance	0.096	0.096	0.053	0.100	0.095	0.047
Minimum	0.252	-1.189	0.055	0.255	-1.243	0.198
Maximum	1.447	0.081	0.841	1.502	0.029	0.962
Skewness	1.375	-0.786	0.068	1.364	-0.881	-0.001
Curtosis	1.216	0.146	-1.147	1.242	0.575	-0.893
Median	0.539	-0.237	0.421	0.533	-0.351	0.586
Test Length	35			35		
Respondents	260			260		

Results of Equating

Vertical equating with linear method to get the conversion equation: (1) from class III to class IV is $IY(x) = 1.0265 X + 0.0942$; (2) from class III to class V is $IY(x) = 1.2864 X - 2.0135$; (3) from class III to class VI is $IY(x) = 1.2626X - 1.6558$; (4) from class IV to class V is $IY(x) = 1.1442 X - 0.5533$; (5) from class IV to class VI is $IY(x) = 1.1197 X - 0.4116$; and from class V to class VI is $IY(x) = 1.0984 X - 1.0340$. The mean scores and standard deviations of the results are presented with graphic equating as shown in Figure 1. The amount SEE equating with linear methods obtained by 0.607607.

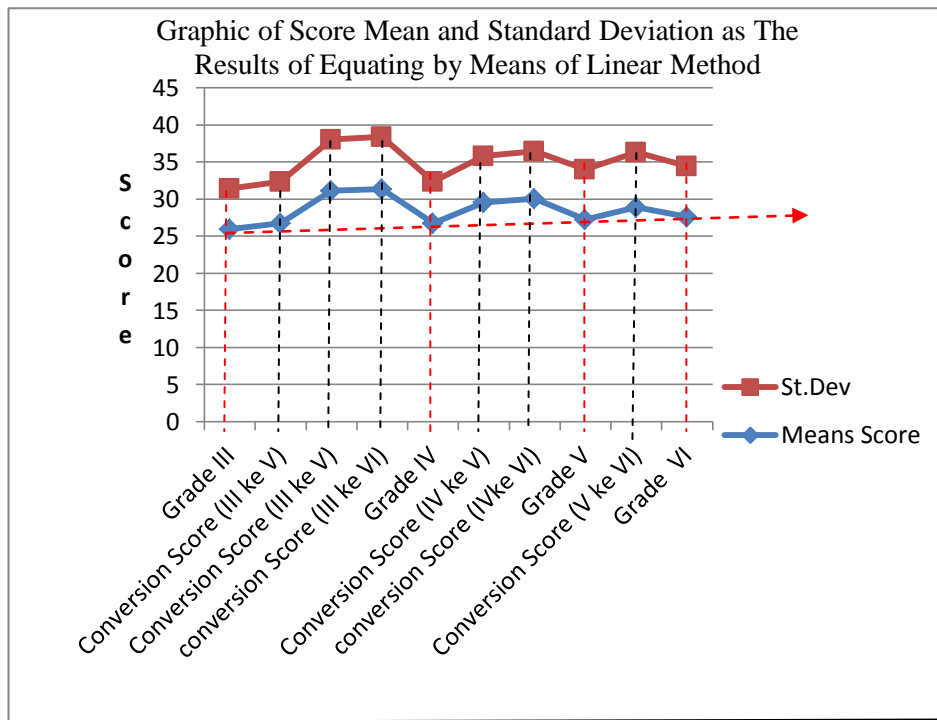


Figure 1. The Results of Equating by Means of Linear Method

The score equating by means of equipercentile was basically to put the students' score from the four test packages in the same percentiles. The results of equating and standard deviation was presented in the graphic form as seen in the Figure 2. The mean score of students has increased along with the increasing class rank. This means that the higher the class rank students' abilities increase. The value of SEE on equating method equipercentile obtained by 0.505116.

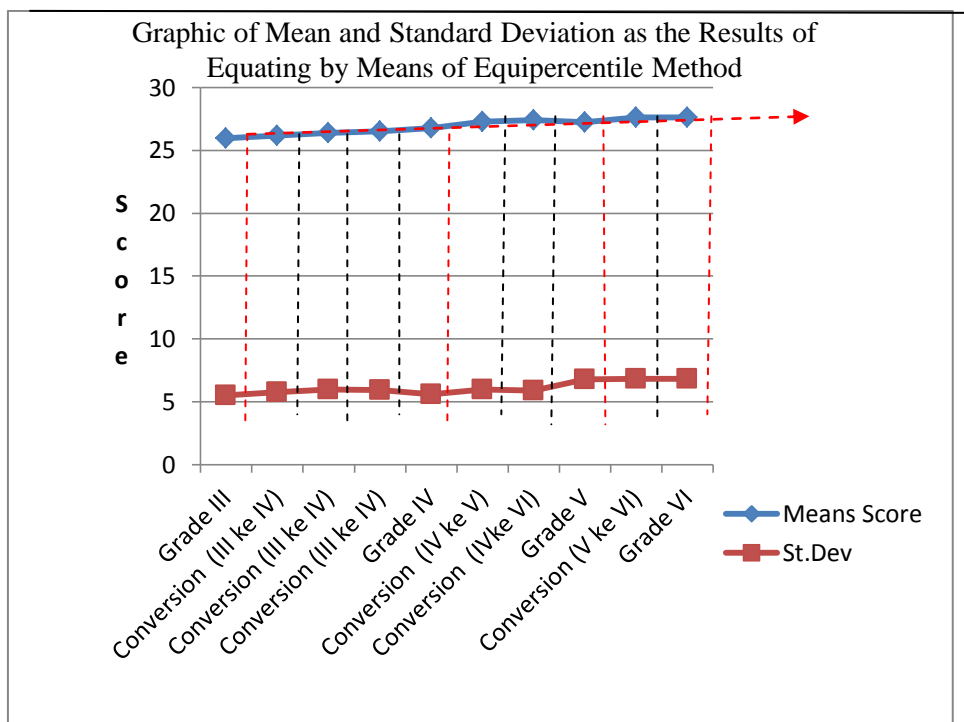


Figure 2. The Results of Equating by means of Equipercentile Method

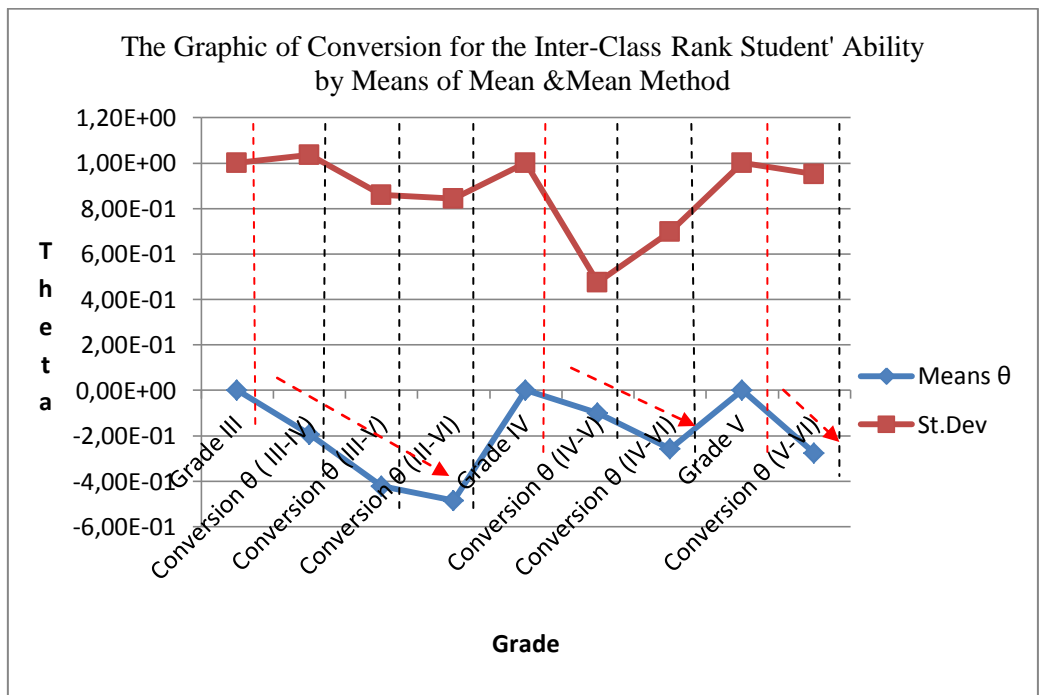


Figure 3. Graphic of Conversion for the Inter-Class Rank Students' Ability by means of Mean & Mean Method

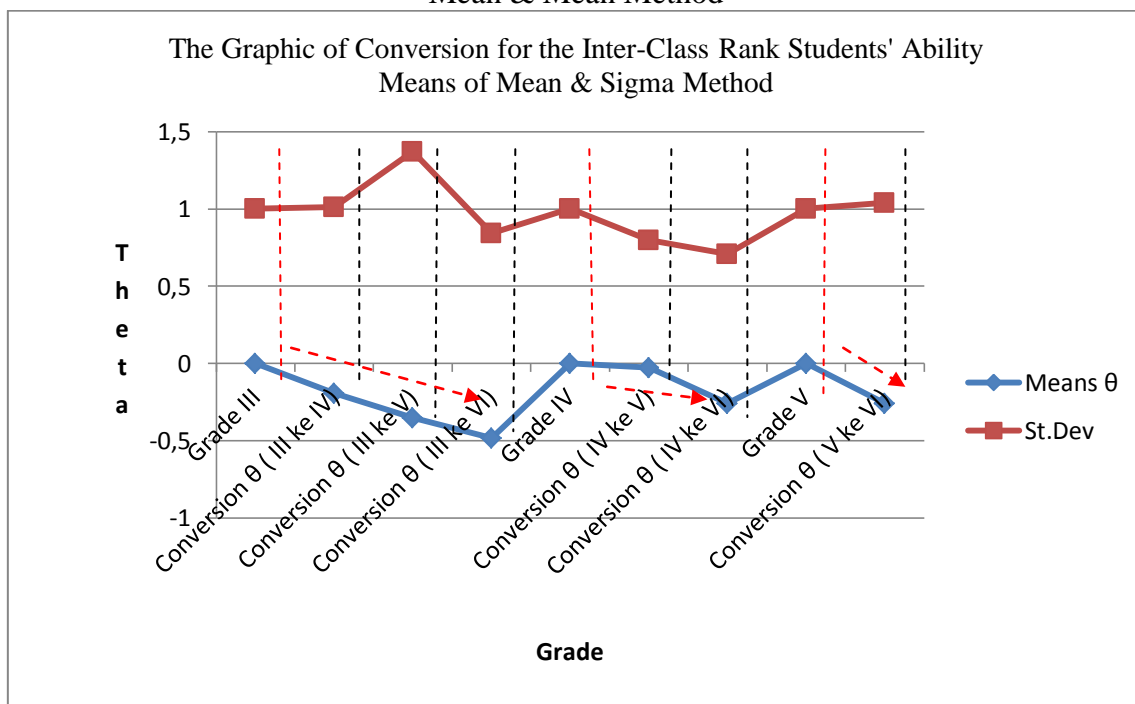


Figure 4. Graphic of θ Mean and Standard Deviation as the Results of Mean & Sigma Method

Constanta equating α and β in IRT approach, on mean & mean method calculated based on the mean of the different power levels and items difficulty. Whereas the mean & sigma

method constants α and β calculated by the mean and standard deviation of the parameter location.

Equating results of ability parameter θ on the mean & mean method presented with the graph in Figure 3. The value of RMSD mean & mean method 0.393862. Equating results of ability parameter θ on the mean & sigma method presented with the graph in Figure 4. The value of RMSD mean and sigma method 0.344474

Discussion

In linear equating method (Figure 1) it appears that the mean score of the students will go up if converted to a grade level above it. It also means that the ability of students has increased with the increase in class rank. However, if observed conversion equation from class III to V, VI to class III, class IV to V, VI to class IV and class V to VI it can be seen that the students who have low scores and high scores have different conversion directions. For example, the conversion of scores of class III to class VI gives the information that the students who score six down in third grade would be lower if the score is converted into the sixth grade, while students who score 7 and above, the score will be bigger. The same question can be investigated at different conversion equations. This shows the inconsistency of the results of the conversion by using the linear method.

Equating score with equipercentile method provide information that more consistent than the linear method. This can be seen from the graph that the average score conversion results, all have the same tendency after equating. The mean score of the sixth grade higher than the average score of the class V, which is higher than the average score of fourth grade, and higher than the mean score of grade III, the same is true of the class V and IV. This may imply that the ability of students has increased according to the increase in class rank. It is certainly very reasonable, because the knowledge students should have increased according to the learning experience.

Ability conversion equation (θ) follows the characteristic equation items. As explained above both the mean & mean method and mean & sigma method, student's ability will decrease if converted on a scale of ability above. Such information can be seen from the graph conversion of mean of students ability always to decrease if converted on a scale on it. The information can also be interpreted that mean the ability of students in the sixth grade higher than the average ability of students of fifth grade. The mean ability of fifth grade students is higher than the average ability of fourth graders, and mean ability of fourth graders higher than the average ability of third-grade students. This was confirmed by comparison concurrent calibration results of the mean ability of students, that indicate the

magnitude of the average ability of students of class III, IV, V, and VI, respectively for: -0.10412, -0.07581, 0.004436, and 0.004436.

Calculation results standard error equating (SEE) in linear method obtained the value of SEE 0.607607, while equating with equipercentile method obtained the standard error equating (SEE) 0.505116. Difference in the value SEE of 0.10249 not so large that its significance to distinguish the accuracy of both methods still need to be investigated. The results of RMSD calculation mean & mean method obtained the value of RMSD 0.393862, while the mean & sigma method obtained the value of RMSD 0.344474. Significance of differences in RMSD values to differentiate the accuracy of both methods still need to be further investigated through simulation studies.

Conclusions and Recommendations

Classical vertical equating approach provide information that the standard error equating (SEE) of equipercentile method 0.505116 and SEE of linear method 0.607607. Equipercentile method produces smaller SEE than the linear method, but the difference in SEE value very small and not significant in differentiating the accuracy of both methods.

Vertical equating with IRT approach provides information that Root Mean Square Difference (RMSD) ability (θ) of mean & sigma method 0.344474 and RMSD value of mean and mean method 0.393862. The resulting RMSD values mean & sigma method smaller than mean & mean method. however, differences in the RMSD value also very small so its not meaningful to distinguish the accuracy of both methods.

Fourth equating method used in this study, linear and equipersentile methods in classik, mean & mean, and mean & sigma method in IRT showed that the average ability students has increased with the increase in class rank. This is reinforced by the results of the concurrent calibration, that shows a comparison of the average ability of students of grade III, IV, V, and VI increased after equating with successive θ value of -0.10412, -0.07581, 0.004436, and 0.173415. However, the increase in the value of θ from a rank to rank above it very small, so it's meaningfulness remains to be investigated. The highest increase was in the sixth grade that was caused by the practice ahead of the school examinations.

This study uses empirical data, and differences in the accuracy of the methods used are not so great therefore it is necessary to simulation study to obtain more significant results. Fourth equalization method used in this study showed the ability of students in math has increased with the increase in class rank, but the increase is not too large so it needs further research.

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EFFECT OF PERFORMANCE ASSESSMENT ON STUDENTS' THE ACHIEVEMENT IN PHYSICS HIGH SCHOOL

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Abstract

Performance Assessment is an assessment technique that requires students engage in an activity that can demonstrate certain abilities and psychomotor skills as a form of knowledge mastery level. The reality on the ground shows that the assessment of students psychomotor aspects have not done optimally. The problem is whether the performance appraisal techniques affect the learning outcomes of students in learning high school physics? The method used is an experimental method. Research subjects class X SMA Negeri 2 Tondano academic year 2013/2014. The collection of data through the test early and test the ability of student learning outcomes. Data were analyzed using techniques Anacova. The results showed that performance assessment in a high school physics learning significantly impact to the student learning outcomes.

Keywords: *Performance Assessment, Physics Learning, Students' Achievement.*

Introduction

Physics as one of the branches of Natural Science is still often considered difficult because a lot of studying natural phenomena are microscopic and abstract concepts and the application of the formulas that are difficult. Presumably one of the reasons is the lack of involvement and interest in students to learn physics so that student learning outcomes are low. It needs to be addressed in various ways in order to study Physics achievements can be improved. One way to implement a performance assessment in the learning process.

Assessment activities are not new to the teacher or practitioner education, but the reality on the ground shows that the planning and conducting the assessment is still a serious problem. The results of the study concluded that Sarwiji Suwandi teacher's ability to prepare and conduct an assessment is still lacking. (Suwandi, 2010: 2)

It is assessment that should receive serious attention by the teachers. Hayat (2008: I-6) suggested that the assessment should be an integral part of the learning process (a part of instruction) and must be understood as an activity to streamline the learning process. Mardapi (2008: 5) also suggests that efforts to improve the quality of education can be achieved through improving the quality of learning and quality assessment system. Thus, assessment is an important aspect of improving the quality of education. Top of Form

One technique which has the character assessment can support the learning process that uses a scientific approach is the performance assessment is more emphasis on the process or

the work of learners. Stiggins (2004: 92) argues that Performance assessment is an assessment based on observation and judgment. Therefore, the performance assessment is suitable for assessing the competency skills that lead students demonstrate their performance. How this assessment is considered more authentic than the written test for what is considered more representative of the actual ability of learners. The issue is whether the learning performance assessment in physics empirically effect on student learning outcomes?

The purpose of this study was to determine the effect of the performance appraisal techniques to the learning outcomes of students in high school physics. To obtain significant results, the influence of prior knowledge students also need to be controlled. Prior knowledge by Mondolang (2013) suggests that contribute to student learning outcomes, and therefore these variables need to be controlled through statistical techniques.

Research Methods

This research was conducted in SMA 1 Tondano on odd semester 2012-2013 lessons for 3 months (August-October 2013) with the research subjects graders XD and XE, each totaling 28 students. This study uses an experimental research design with pretest-posttest control group (Sugiyono, 2012: 114)

Data was collected by giving the initial ability test and achievement test. Tests made in the form of a written test objective was previously performed tests and trials Panelists to calculate and determine the validity and reliability of the test.

Analysis of the data through the prerequisite test (normality, homogenitas) and test hypotheses with ANACOVA analysis techniques (Kadir, 2010; Supardi, 2012). Top of For

Research Findings

Description of Data Results

Table 1. Statistics variables X and Y

Data Statistik	A ₁		A ₂	
	X	Y	X	Y
N	28	28	28	28
scores Min	40	48	40	44
scores Max	84	92	84	88
STDV	12.19	11.35	10.502	10.502
Mean	60.43	71.00	61.29	65.29
Median	60	72	60	64
Modus	60	60,68,72	60	64
Range	44	44	44	44
Interval Clas	5	5	5	5
The length of grade	9	9	9	9

Explanation:

A1: The group of students who were given learning activities given performance assessment.

A2: The group of students who were given learning activities without any performance appraisal

N: Number of samples in each group

X: The ability of students beginning

Y: The results of student learning

Data Capability Initial Student In Classroom Experiments presented are in Table 1 below:

Table 1. Frequency Distribution of Students with Scores Initial Capabilities Performance Assessment (A1).

Interval Class	X_i	f_i	$f_{kum.}$	$f_{rel.(\%)}$
40-48	44	5	5	17.86
49-57	53	6	11	21.43
58-66	62	8	19	28.57
67-75	81	5	24	17.86
76-84	80	4	28	14.29
Total		28		100 %

In the histogram can be shown in Figure 1 below:

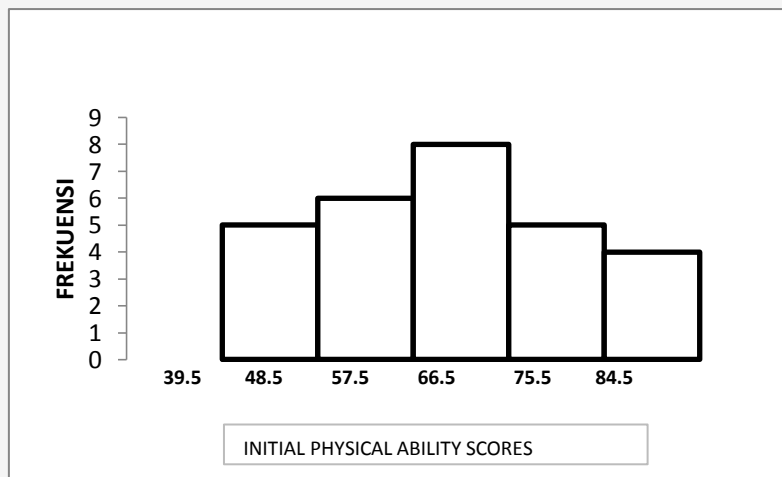


Figure 1. Histogram initial ability scores of students in the experimental class

Results of Initial Ability Students In Classroom control is presented in Table 2 below:

Table 2.

Frequency Distribution of Ability Scores Early control class (A2)

Interval Class	X_i	f_i	$f_{kum.}$	$f_{rel.(\%)}$
40-48	44	4	4	17.86
49-57	53	6	10	21.43
58-66	62	9	19	28.57
67-75	81	6	25	17.86
76-84	80	3	28	14.29
Total		28		100 %

In the histogram can be shown in Figure 2 below:

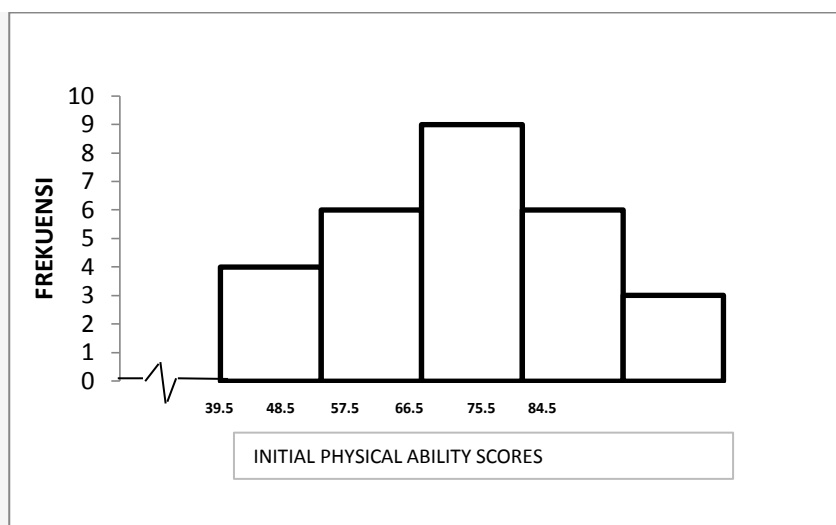


Figure 2. Histogram beginning physics students' scores on the ability of the control class

Student Results In Classroom experiments are presented in Table 3 below:

Table 3.

Frequency Distribution of Student Learning Outcomes Marke
Physics Group Performance Assessment (A1)

Interval Class	X_i	f_i	$f_{kum.}$	$f_{rel.(\%)}$
48-56	52	3	3	10.71
57-65	61	6	9	21.43
66-74	70	8	17	28.57
75-83	79	7	24	25.00
84-92	88	4	28	14.29
Total		28		100 %

In the histogram can be shown in Figure 3 below:

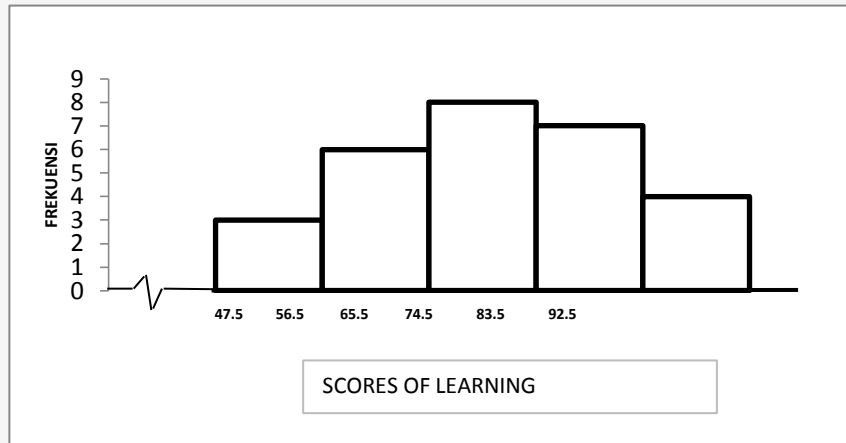


Figure 3. Histogram Score student learning outcomes in the experimental class

Student Results In Control Classes are presented in Table 4 below:

Table 4.
Frequency Distribution of Student Results on the control class (A2)

Interval Class	X_i	f_i	$f_{kum.}$	$f_{rel.(\%)}$
44-52	48	4	4	14.29
53-61	57	5	9	17.86
62-70	66	9	18	32.14
71-79	75	7	25	25.00
80-88	84	3	28	10.71
Total		28		100 %

In the histogram can be shown in Figure 4 below:

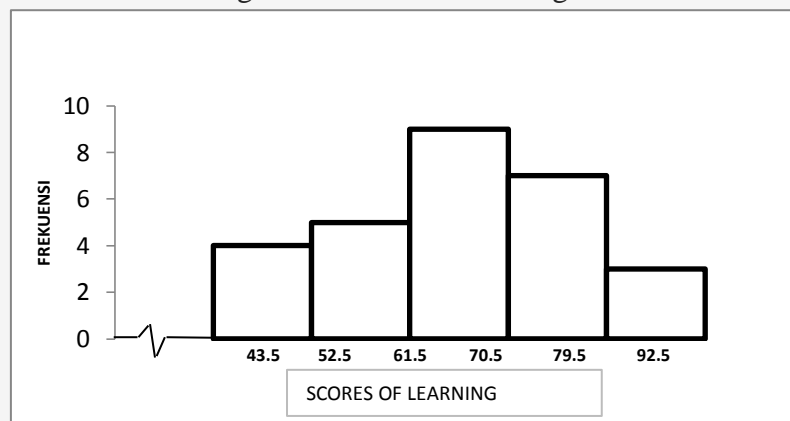


Figure 4. Histogram Score student learning outcomes in the experimental class

Testing requirements analysis includes data normality test, homogeneity test and linearity test. The test results are presented in Table-precondition the following table:

Table 5.

Results of calculation for data normality test prior knowledge of students and student learning outcomes experimental class and control class.

Group/Class		Values L_0	Value L_t	conclusion
Ability Students Early	A1	0.0908	0.161	Normal
	A2	0.084	0.161	Normal
Student learning outcomes	A1	0.083	0.161	Normal
	A2	0.073	0.161	Normal

Table 6.

Results of test calculations for data homogeneity prior knowledge of students and student learning outcomes in the experimental class and control class

Group / Class		Value F_0	Value F_t	Conclusion
Early Ability Students	A1	1.310	$\alpha (0.05) = 1.88$	Homogen
	A2		$\alpha (0.01) = 2.47$	
Students' the Achievement	A1	1.138	$\alpha (0.05) = 1.88$	Homogen
	A2		$\alpha (0.01) = 2.47$	

Table 7.

Results of the calculation of linearity tests and significance in experimental classes and control classes.

Group/Class		Value F_0	Value F_t	Conclusion
Eksperiment	A1	1.00	2.49	Linear
Control	A2	0.25	2.49	Linear
Eksperiment	A1	621.32	4.22	Significant
Control	A2	1423.30	4.22	Significant

Based on the data in Table 5, Table 6 and Table 7 it is known that the prerequisites for the analysis of covariance (ANCOVA) are met.

Summary of the test results ANCOVA-F as follows: $F_{count} = 142.78$. F_{table} for $\alpha(0.01) = 4.02$ and $\alpha(0.05) = 7.12$. obtained $F_{hitung} > F_{table}$ then H_0 is rejected, and it can be concluded that the assessment of learning physics effect on student learning outcomes. Because the results of the F test was significant ANCOVA or acceptance of the hypothesis showed significantly then tested further by statistical t-test to determine differences in learning outcomes between the experimental class (A1) with a control class (A2).

From the calculations, the price of $t=14.5$ and t table for $\alpha(0:01: 53) =2.660$ and for $\alpha(0:05: 53) =2,005$. Because t count $>$ t table then reject H_0 . Thus concluded that the controlling influence significantly the ability of early learning outcomes of students who were given higher than the performance assessment of student learning outcomes without performance assessment.

Conclusion and Suggestions

Based on the results of research that has been presented above it can be concluded that the assessment of performance (performance assessment) in a high school physics learning significantly impact the student learning outcomes. This is because in learning physics requires a scientific approach would be more effective if supported by a performance assessment. Therefore recommended in high school physics learning will be more effective if the valuation technique used is the technique of performance appraisal.

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TEST ITEM ANALYSIS PROGRAM DEVELOPMENT WITH RASCH MODEL ONE PARAMETER FOR TESTING THE ITEM DIFFICULTY LEVEL OF MULTIPLE-CHOICE TEST USING BLOODSHED DEV C ++ APPLICATIONS

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Abstract

This article was made in Item Response Theory lecture to improve the ability of students to learn the application of the theory of grain analyst using the model of Rasch model. This article is aimed to get a test item analysis program with Rasch model one parameter for testing the item difficulty level of multiple-choice test and to determine the distribution of the item difficulty level of the test which is analyzed using the result program of the development. The development of test item analysis program were performed using 4D models which is consist of define, design, develop and disseminate. The results of program development named RASCHAM. RASCHAM using Item Response Theory (IRT) which adapt the Rasch model one parameter. Based on the result of validation from four validators, the test item analysis program judged worthy used for test item analysis. Based on testing performed by comparing the analysis results of the QUEST can be concluded that the accuracy of RASCHAM program reached 92.80%. The analysis results of the item difficulty level with RASCHAM on the odd semester of final examination test items of the physics subjects from XI class of 2th Wonosari State Senior High School academic year 2013/2014 in Gunungkidul for code A is about 7.5% with a very easy category, 12.5% easy, 25% moderate, 47.5% difficult, 2.5% very difficult and 5% not good. While for code B is about 12.5% with a very easy category, 32.5% easy, 45% moderate, 45% difficult, 2.5% very difficult and 2.5% not good.

Keywords: *Rasch Model, Item Response Theory (IRT), RASCHAM, QUEST*

Introduction

The quality of education can not be separated from the quality of the performance of the teachers. That's why educators and professionals are required to have extensive knowledge and insight to be transferred to the learners. Professionalism of educators can be seen from the professionalism in carrying out tasks anyway. One of the main tasks of educators is to conduct an evaluation of the education process.

Discusses the evaluation of education recognized the existence of 8 quality assurance standards of education including content standards, process standards, competency standards, teachers and standards, standards of infrastructure, management standards, financial standards, and assessment standards. Standard assessment is an evaluation to measure student learning outcomes as prestasi learning. This means that the acquisition should be in accordance with the subject matter competency. Evaluation of learning outcomes is a series

of systematic and ongoing process to determine the quality of the learning that is based on certain predefined criteria. According to Budi Susilowati Emi (2012: 1), the evaluation of teaching and learning activities are also regulated in Law No. 20/2003 on National Education System in paragraph 1 which states that the evaluation is done in order to control the quality of education nationwide as a form of accountability of education providers to the parties concerned.

So far, there has not been an evaluation based on the analysis of good items. Analysis of items is a term used to define calculations and measurements of the subject's response to an item (Crocker & Algina, 1986). In general, item analysis aims to determine whether an item is an item that is good or bad as a measuring instrument. Analysis items are basically divided into two categories: analysis of qualitative and quantitative questions.

Qualitative analysis of a study intended to analyze the problem in terms of technical, content, and editorial. Quantitative analyzes point is a review of items based on the empirical data of the item in question. The empirical data obtained from the questions that have been tested. There are two approaches in the quantitative analysis, the classical and modern approaches.

Classical item analysis is the review process items through information from the answers of students in order to improve the quality of items is concerned with the use of classical test theory. (Millman and Greene, 1993: 358). Aspects to be considered in the analysis of classical item is any item assessed in terms of: level of difficulty grains, grain distinguishing features, and deployment of answer choices (for a matter of objective shape) or the frequency response at each answer choice.

Analysis of modern items that the review items using Item Response Theory (IRT) or item response theory. This theory is a theory that uses mathematical functions to connect the right opportunity to answer a question with a student's ability.

The use of classical item analysis there are still weaknesses. Weaknesses include the item parameters and the parameters are interdependent so that participants can not be generalized to other groups of participants. While the model of Item Response Theory (IRT) was able to cover the weaknesses of classical models. In the model of Item Response Theory (IRT) no dependence on grain parameters and parameters of the participants.

During this time the program has been developed using either item analysis of classical models and the model of Item Response Theory (IRT). One program of quantitative analysis of the popular items used are Iteman. Iteman developed by Micro Computer Adaptive Test (MICROCAT) Assessment Systems Corporation, the University of Pittsburgh. The program is very simple so that by studying a moment would've been able to master it. However Iteman

programs still use the classical theory, so the consumer still has weaknesses. The program can be used to analyze items to the model Item Response Theory (IRT), among others: Rascal, Pascal, Bigsteps and Quest. Each program has a different procedure to run. However, existing procedures it is still too difficult to be understood, so that the programs that should be used to facilitate analysis of items even harder because the procedure is too complicated and long. Programs item analyzes both quantitative analysis of the classical model and the model of Item Response Theory (IRT), which has been developed and disseminated largely dominated by foreign-made. While the program being developed in the country is still lacking. Untukitu, the author had the idea to develop a program analysis using the model item Item Response Theory (IRT). The model of Item Response Theory (IRT) used is specific to one parameter Rasch model. Program development results are validated by comparing the results of the development program with existing programs (QUEST).

Methods

This study aimed to obtain item analysis program with one parameter Rasch models for testing achievement test devices using Bloodshed Dev C ++ is feasible and accurate. Development model used in this study is a model 4D (Four-D Model).

Model 4D (Four-D Model) consists of defining phases (define), the design phase (design), stage of development (develop), and the dissemination phase (disseminate). The stages of the 4-D models are described as follows:

1. Defining Phase (define)

Defining in this case is to establish and define the needs in the development of item analysis program. Things to consider is the formatting and program development techniques. Through this defining stage formatting and program development techniques are analyzed based on their needs and in accordance with the criteria of modern item analysis.

2. Stage Design (design)

The objective of the design phase is to design a format item analysis program with one parameter Rasch models for testing the test results belajar menggunakan Bloodshed Dev C ++. In this phase, the program format item analysis using item analysis techniques one parameter Rasch models. Development is done using Dev C ++ software Bloodshed. The programming language used is C ++.

3. Development Phase (develop)

At this stage the program was developed with Rasch item analysis of the parameters of the model for testing the achievement test using Bloodshed Dev C ++ and ready for

use. Furthermore, in this stage of the evaluation and analysis of the program revision on items that have been made. Evaluation is done by consulting programs that have been made to two expert lecturers and 2 users with the intent to obtain advice. Then, be revised in accordance with the advice given by the validator.

4. Dissemination (disseminate)

At this stage, the dissemination of product development efforts. Dissemination of product development is done in SMA N 2 Wonosari by way of disseminating product development is limited only to teachers of physics.

Results and Discussion

The results of the research in the early stages of defining activities include establishing and defining the needs of the development program items with the Rasch analysis of the parameters of the model for testing the quality of the test results to learn multiple choices. Things to consider is the formatting and program development techniques. Through this defining stage formatting and program development techniques are analyzed based on their needs and in accordance with the criteria of modern item analysis.

To meet the criteria for the analysis of the modern items used Rasch item analysis techniques parameter. Pengertian model of one of the parameters here are the result of analysis obtained by the analysis of item. So the definition of the parameters is not a criterion of input data to be processed. The input data to be processed is a student answers a multiple choice. This input data is free in the sense that is not tied to a particular matter, the basic competence (KD) specific, or specific goals.

The objective of the design phase is to design a format item analysis program with one parameter Rasch models for testing the achievement test. At the design stage researchers collect references that support the development of program analysis items. References obtained came from a book, article or journal from the internet.

After references collected, researchers began to draft a plan and analyze it. The results of the draft plan include item analysis techniques; use software to create a program; the use of a programming language in making the program; making of the program flow scheme in outline; and prototype RASCHAM program.

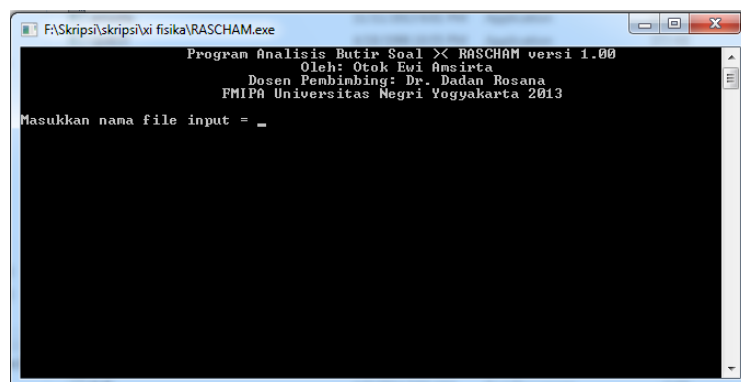


Figure 1. Display Program

At this stage of development has been done consists of the manufacture of items RASCHAM program analysis, validation RASCHAM, revised results RASCHAM validation, testing RASCHAM program. Validation program conducted by validator 2 and 2 users. In Tabel 1 and Table 2 respectively presented the results of the average ratings by the media RASCHAM validator and test results.

Table1. Recapitulation Item Difficulty Level for Code A Problem With Using RASCHAM Program

Category	Item	Numbers	Percentage
very easy ($-3 \leq bi \leq -2$)	10, 17, 18	3	7.5
easy ($-2 \leq bi \leq -1$)	4, 16, 32, 33, 36	5	12.5
moderate ($-1 \leq bi \leq 0$)	2, 3, 11, 14, 19, 20, 21, 23, 27, 39	10	25
difficult ($0 \leq bi \leq 2$)	1, 5, 6, 7, 12, 13, 15, 22, 25, 26, 28, 29, 30, 31, 34, 35, 37, 38, 40	19	47.5
very difficult ($2 \leq bi \leq 3$)	24	1	2.5
not good ($-3 > bi$ or $3 < bi$)	8, 9	2	5
Total		40	100

This study aimed to obtain an item analysis program with one parameter Rasch models for testing the quality of the multiple-choice achievement test (multiple choices) .Pembuatan soal ini item analysis program has dibuat sesuai with the planned design. The developed program is named RASCHAM program. The look of the program are as follows RASCHAM.

Table 1. Recapitulation Item Difficulty Level for Code B Problem With Using RASCHAM Program

Category	Item	Numbers	Percentage
very easy ($-3 \leq bi \leq -2$)	5, 12	2	12.5
easy ($-2 \leq bi \leq -1$)	3, 9, 11, 31, 37	5	32.5
moderate ($-1 \leq bi \leq 0$)	2, 7, 8, 13, 15, 16, 20, 22, 25, 27, 28, 34, 38	13	45
difficult ($0 \leq bi \leq 2$)	1, 6, 10, 14, 17, 18, 19, 21, 23, 24, 26, 29, 30, 32, 33, 35, 36, 40	18	45
very difficult ($2 \leq bi \leq 3$)	39	1	2.5
not good ($-3 > bi$ or $3 < bi$)	4	1	2.5
Total		40	100

The analysis showed that item difficulty index replicates the final semester of high school physics subjects N 2 Wonosari class XI Science in Gunung Kidul 2013/2014 school year about a code stretches from -2.13922 to 2.12202 while the code is about B extends from -2.82609 to 2.49759 . For Problem A code indicating that the level of difficult questions that have as much as 2.13922 which is about the number 10, 17, and 18 is about the easiest, while the matter of having a difficult level of 2.12202 is about the number 24 is the most difficult problem. For about the code bahwas oal B shows that have a level of difficulty of -2.82609 is about number 5 and 12 are about the easiest. As for who has the difficult level 2.249759, ie number 39 is the most difficult problem.

Conclusion

Based on the analysis of program validation of all aspects of the item in the excellent category by faculty experts and well by all three programs other validators, so that the item analysis program used for the analysis of feasible items. Based on tests carried out by comparing the results of the QUEST program analysis can be concluded that the accuracy reaches 92.80% RASCHAM program.

The results point to the difficulty level of analysis RASCHAM program on items Deuteronomy End Semester (UAS) odd subjects in class XI physics SMA N 2 Wonosari 2013/2014 school year in the district of Gunung for Problem A code is about 7.5% with a very easy category, about 12.5% easy, 25% moderate problem, 47.5% about the difficult, very difficult about 2.5% and 5% did not matter either. As for the matter of code B is about

12.5% with a very easy category, 32.5% easy matter, about 45% moderate, 45% about the difficult, very difficult about 2.5% and 2.5% does not matter either.

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EFFECTIVENESS OF REASONED OBJECTIVE CHOICE TEST TO MEASURE HIGHER ORDER THINKING SKILLS IN PHYSICS IMPLEMENTING OF CURRICULUM 2013

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Abstract

This research has been done to study usefulness and effectiveness of the reasoned objective choice test to measure higher order thinking skills (HOTS) in Physics (PhysROCTHOTS) implementing Curriculum 2013. Research subject was 1001 students of ten senior high school in Yogyakarta. Usefulness of the test was indicated by validity, reliability, total information function, and SEM. The test validity was obtained by experts judgment and goodness of fit to model. Goodness of fit of the test scoring in polytomous according to the partial credit model (PCM) to measure HOTS based on average of INFIT Mean of Square of 1.0. The effectiveness of the test was indicated by practicality and efficiency based on response of senior high schools physics teachers. The results show that: the PhysROCTHOTS is valid and reliable so the test is can be used to measure HOTS of senior high school students and the test scoring in polytomous according to PCM can measure HOTS of senior high school students implementing Curriculum 2013 effectively.

Keywords: *Reasoned Objective Test, Hots, Physics, Curriculum 2013*

Introduction

To improve the competitiveness of countries in the world trying to improve the quality of human resources. To improve the quality of human resource begins with improving the quality of national education. To improve the education quality in Indonesia is done by reviewing the curriculum every 10 years periodically. The curriculum has been approved by the government in 2013 further tried out its implementation in July 2013. Since July 2014 curriculum 2013 implemented nationally.

Curriculum 2013 was developed in three domains, namely attitudes (affective), knowledge (cognitive), and skills (psychomotor). The knowledge gained through the activities: remembering, understanding, applying, analyzing, evaluating, and creating (Lampiran Peraturan Menteri Pendidikan dan Kebudayaan RI No.66 Tahun 2013). The six levels of proficiency level abilities according to revised Bloom's taxonomy. Three low levels ability, namely: remembering, understanding, applying are lower order thinking skills (LOTS), while

the next three abilities, namely: analyzing, evaluating, and creating are a higher order thinking skills (HOTS) (Anderson & Krathwohl, 2001:30). Thus, curriculum 2013 mandated the learning process activities based on Bloom's taxonomy revised, even more emphasis on higher order thinking skills. This implies that the assessment of course, also includes the six abilities, not only LOTS but more emphasized HOTS.

Bloom's Taxonomy has long been applied in education and the present taxonomy is still used in many curricula and teaching material (Brookhart, 2010:39; Schraw and Robinson, 2011:158-159). Thus it was appropriate to adopt the learning ability in Bloom's taxonomy.

Based on Piaget's development theory, formal operational stage is the stage of the child began eleven years old. At this stage the child has begun to develop the ability to manipulate an abstract concept through the use of propositions and hypotheses, which is HOTS (Piaget, 2005:122 and Reedal, 2010:7). Senior high school students age between 15 to 18 years, so the high order thinking skills of high school students are already well established.

The curriculum 2013 aims to prepare Indonesian man to have the ability to live as a private citizen and a faithful, productive, creative, innovative, and affective and able to contribute to society, nation, state, and world civilization (Lampiran Peraturan Menteri Pendidikan dan Kebudayaan RI No. 69 Tahun 2013). This is what indicates the importance of HOTS. Similarly, in a physics lesson, students are not only required lower order thinking skills but also mastered the Physics high order thinking, which includes physics abilities in analyzing, evaluating, and creating.

To monitor the process, progress, and improvement of student learning outcomes continuously, the necessary assessment. Educational assessment is the process of collecting and processing information to measure the achievement of student learning outcomes (Peraturan Menteri Pendidikan dan Kebudayaan RI No. 66 Tahun 2013). In addition, an assessment of individual data collection activities that result illustrates characteristics (Djemari Mardapi, 2012: 7-12). Thus, assessment of learning outcomes in physics is the rating of the outcome of the learning process in physics that forms numbers describing the characteristics of individual students. Assessment can be done orally or in writing. A written appraisal performed by a written test. There are two forms of the written test questions, namely: selecting answers and supplying answers. Answer written test questions by selecting answers include: multiple-choice, two-choice (true-false, yes-no), matching, and causation.

Assessment should: (1) be designed to measure the knowledge and concepts, science process skills, and high order reasoning; (2) adopt the question type of PISA and TIMSS to encourage teaching and learning that contribute to the improvement of students' scientific literacy and explore the scientific thinking skills, critical, creative, and innovative; (3) emphasizes the mastery of lower and higher order concepts with various forms of assessment (multiple choice, multiple choice reasoned, limited description); and (4) introducing the type of questions that tested both nationally and internationally to students and science teachers (Pusat Kurikulum, 2007: 23-24).

Assessment in education using two kinds of measurement theory, namely: classical measurement and modern measurement theory. Classical test theory is also called the Classical True-Score Theory, Classical Test Theory named because elements of this theory has been developed and applied for a long time, but still valid today (Suryabrata, 2000:21). According to classical measurement theory that test scoring is usually done partially based on the steps that must be taken to correctly answer an item. Scoring is done every step and scores obtained by participants per item sums core of learners every step, and the ability estimated by raw scores. The scoring model is not necessarily appropriate, because the difficulty level of each step is ignored.

PCM is also appropriate to analyze the response to the measurement of critical thinking and conceptual understanding in science (Linden & Hambleton, 1997:101-102). PCM was developed to analyze the test items that require several steps to resolve. PCM can be given to measures that can be undertaken by individuals. Thus HOTS in physics test scoring would be more suited to this PCM.

The fact that multiple choice tests are more widely used than other forms of testing. This is because the usual multiple-choice test has certain advantages, among others: (1) the material being tested can cover most of the learning materials, (2) the student answers can be corrected easily and quickly, (3) answer to each question is definitely true or one, so that an objective assessment (Sudjana, 1990:49). While there are also drawbacks of this test, namely: (1) the possibility of students to guess the answer is still quite large and (2) the thinking of student can not be seen with the real (Sujana, 1990:49). Therefore we need a model that can reduce the weakness of such tests, reasoned objective multiple choice test as an alternative solution.

Assessment model was also influential on students' thinking skills. Van den Berg (2008: 15) states that the assessment can be implemented to assist students in improving their ability

to think critically. This is supported by another opinion, that the higher order thinking questions to encourage students to think deeply about the subject matter (Barnett & Francis, 2012:209). Based on these two opinion scan be concluded that the high order thinking skills tests can provide a stimulus for students to develop high ordert hinking skills as well.

Based on the results of preliminary surveys by conducting interviews with senior high school physics teachers in the Special Region of Yogyakarta (DIY), that the first, most schools use multiple-choice objective test that is common in the midterm test and final test of the semester. Second, multiple-choice tests that are used in most senior high school physics measure LOTS ability to: remember, understand, and apply. Third, multiple-choice test scoring usual dichotomous model, which means that if the item response is correct as given a score of 1, and ifonewas given a score of 0. The scoring models have not been fair because of the different error rate to get the same score namely 0. Thus, a multiple-choice test main stay test models used in senior high school and still measure the lower order thinking skills do not measure Physics higher order thinking skills (Phys HOTS). In addition, the scoring models used unfair because not using a model that considers politomous steps to resolve the matter.

Based on the above, to measure the learning outcomes of students not only lower order thinking skills, but also higher order thinking skills in Physics. This required a model of the instrument in the form of an enhanced objective choice hereinafter called reasoned objective test. Thus it is necessary to research on the application of the test to the test and scoring objective reasoned with PCM. The main issue to be raised in this study is the usefulness and effectiveness of reasoned choice objective test to measure higher order thinking skills (HOTS) in Physics (PhysROCTHOTS) implementing Curriculum 2013.

In line with the problem solved, then the purpose of this research was to test the usefulness and effectiveness of reasoned choice objective test to measure higher order thinking skills (HOTS) in Physics (Phys ROCTHOTS) implementing Curriculum 2013.

Research Method

Subjects of this research were all students of grade XI of the ten state senior high school in Yogyakarta. The number of research subjects as much as 1001 students. Determination of senior high school that is used as a subject for research based ranking of schools based on the value of the national examination in Physics of 2012 (low, medium, and high). The schools were used as research subjects, among others: SMAN 5 Yogyakarta, SMAN 11 Yogyakarta, SMAN 1 Bambanglipuro, SMAN 1 Sedayu, SMAN 1 Wates, SMAN 1 Pengasih, SMAN 1 Gamping, SMAN 1 Minggir, SMAN 1 Wonosari and SMAN 1 Patuk.

Data analysis of this research using the partial credit model 1 PL (PCM 1-PL) for testing the goodness of fit of learning outcomes test in Physics higher order thinking skills of senior high schools. Basic considerations are used, the first that the PCM as an extension of the Rasch model is a 1-PL models, can use the not large samples (Keeves & Masters, 1999: 12-13). Second, that the characteristic response to high order thinking skills item follow PCM.

Testing of the test usefulness used validity, reliability, total information function, and SEM. The test validity was obtained by experts judgment and goodness of fit to model. Goodness of fit of the test scoring in polytomous according to the partial credit model (PCM) to measure HOTS based on average of INFIT Mean of Square. If the average INFITMNSQ of 1.0 and standard deviation of 0, then the test fit with the model (Adams & Khoo, 1996:30). The effectiveness of the test was indicated by practicality and efficiency based on response of senior high schools physics teachers.

Result and Discussion

1. Usefulness of PhysROCHOTS

Structure of PhysROCHOTS consists of stem, the option of stem, reason, and the option of reason. The number of options and choices stem reason each of the five, as Figure 1.

Results of an expert judgment declared that PhysROCHOTS is valid to measure PhysHOTS. Testing of goodness of fit the overall test on the basis if the average INFITMNSQ about 1.0 and standard deviation of 0.0, then the test fit with the model PCM1PL. Based on Table 1, the value of mean INFITMNSQ of 1.01 (about 1) and a standard deviation of 0.02 (about 0.0), then the PhysROCHOTS sharpened reasoned choice objective test fit with the PCM1PL.

(stem).....
 (option of stem) A....
 B....
 C....
 D. ...
 E ...
 (reason)
 (option of reason) A....
 B....
 C....
 D. ...
 E ...

Figure 1. Diagram of PhysROCHOTS Structure

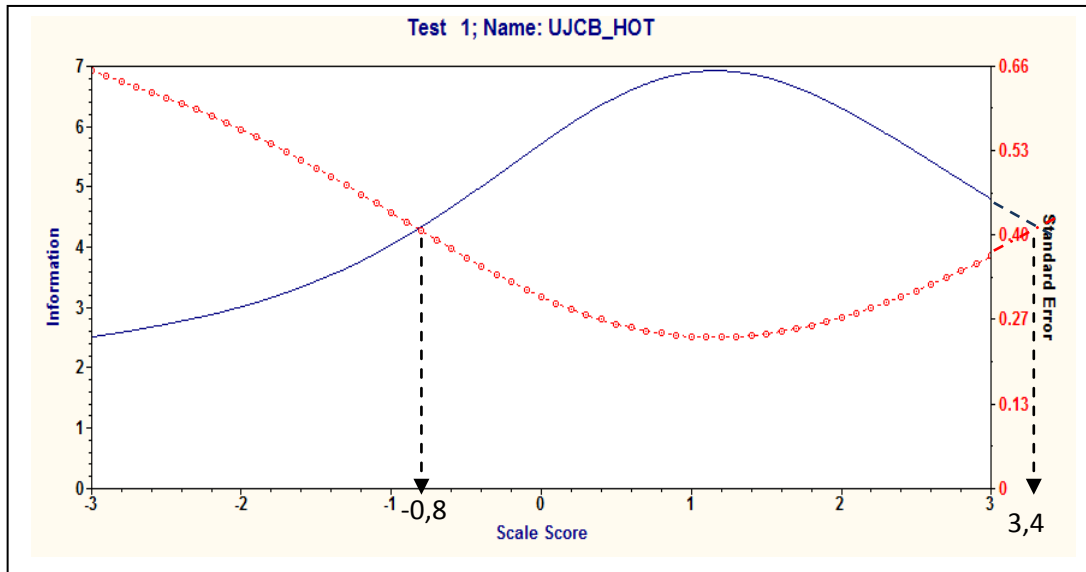


Figure 2. Total Information Function and SEM

Based on the analysis it is estimated the test reliability of 0.95. Reliability coefficient is quite high category. The test has a reliability coefficient of at least 0.90 with the test results of the testing can be used to make decisions about individuals (Suryabrata, 2002:39-40). In addition, based on Figure 2 that the test is appropriate for measuring students' physics higher order thinking skills that value from -0.8 to 3.4. This is supported by Nitko & Brookhart (2011: 223) that multiple-choice tests can be to measure higher order thinking skills. Based on the experts judgment, the goodness of fit, the coefficient of reliability, graphs total information function and SEM that the reasoned choice objective test can be used to measure Physics higher order thinking skills.

2. Effectiveness of PhysROCHOTS

Response of senior high school Physics teachers related to there as one objective choice test and the application of PCMin senior high school are presented in Table 1.

Table 1.

Response of senior high school physics teacher to test models and scoring models

Aspect	Statement	Percentage of teachers' response "Yes"
Suit ability of model and scoring	1. The use of model reasoned choice objective test to measure Physics higher order thinking abilities (PhysROCTHOTS) in senior high school is very precise	75
	2. Scoring model of PhysROCTHOTS in senior high school should be the polytomous (score 1, 2, 3, 4)	85
	3. PhysROCTHOTS in senior high school scored according to the partial credit model (PCM) is right	70
	4. Reasoned choice objective test scored according to the PCM can be applied to test the learning outcomes in physics	80
	Average	77.5
Practicality	5. To correct senior high school students' response of PhysROCTHOTS are flexible time because they do not have to finish each item for all students	85
	6. Scoring of PhysROCTHOTS in senior high school is easy to implement	80
	7. Model of reasoned choice objective test for measuring PhysHOTS in senior high school can explore information of student's knowledge	75
	Average	80
Efficiency	8. PhysROCTHOTS can be applied to a large number of senior high school students	90
	9. To measure Physics higher order thinking reasoned choice objective test require one rater	85
	10. The cost of the correction model of reasoned choice objective test to measure senior high school students' PhysHOTS is cheap	75
	11. The correction time of reasoned choice objective test for measuring physics higher order thinking in senior high school is short	80
	Average	82.5

Based on Table1, reasoned choice objective test with scoring model of polytomous four categories according to the PCM can be effectively implemented in senior high school. First, reasoned choice objective test is practical in using an scoring supported by 80 % of senior high school physics teachers. Second, the test is efficient because it can be used on a large number of students with a relatively low cost. In addition, the correction time of response of the reasoned objective test is relatively short. That is supported by 82.5% of senior high school physics teachers. Third, results of students' the exam assessment based on the stages can be completed students. Although only just completed the initial phase, participants had test scores. The highest value of course obtained when the examinee has completed all phases of the exam that clause. This is consistent with the statement Widhiarsa (2010: 6) that solve a problem only to the first stage is analogous to the category of 'never', while when it comes to the final stage, analogous to the category of 'always on'. Thus, the objective reasoned choice physics test can measure higher order thinking skills effectively.

Conclusion and Recommendations

Conclusion

Based on the analysis, the conclusions are as follows:

1. The reasoned choice objective test (PhysROCTHOTS) is valid and reliable so the test is can be used to measure senior high school students' Physics higher order thinking skills.
2. The PhysROCTHOTS scoring in polytomous according to PCM can measure senior high school students' Physics higher order thinking skills implementing curriculum 2013 effectively.

Recommendations

Based on the analysis, it is suggested that Physics teachers of senior high school should measure higher order thinking skill implementing curriculum 2013 with the reasoned choice objective test.

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DEVELOPING STUDENTS' SELF-ASSESSMENT AND STUDENTS' PEER-ASSESSMENT OF THE SUBJECT-MATTER COMPETENCY OF PHYSICS EDUCATION STUDENTS

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Abstract

This study is aimed at developing Students' Self-Assessment (SSA) and Students' Peer-Assessment (SPA) as a supplementary of the formative assessment on Physics teaching and learning, finding out the construct of SSA and SPA and finding out the effectiveness and the usefulness of SSA and SPA. The development procedure consists of two stages: development and validation. It is based on the spiral model from Cennamo and Kalk, with five phases: defining, designing, demonstrating, developing and delivering. Content validity expert judgment was measured through coefficient validity analysis from Aiken. Construct of cognitive domain was derived from learning continuum and had been validated by a focus group discussion and Delphi technique. The subjects of this study are sixth semester students of Physics Education of the University of Palangka Raya. The result of the study can be concluded as follows: 1) SSA and SPA can be used as a supplementary of the formative assessment, 2) the result of model fit, in which the GFI value is 0.996 and the SRMR value is 0.062, may be taken to indicate good fit, so developed theoretical model is supported by empirical data, 3) the group of SSA and SPA are more effective than group of non-SSA and SPA, besides students response declares SSA and SPA are reasonably effective and 4) the usefulness shows that SSA and SPA can be used as a feedback of the process and the results of the students' learning. Therefore, the results of the feedback are used to improve the learning process and the results of learning continuously.

Keywords: *students' self-assessment, students' peer-assessment, Physics competency*

Introduction

This study is focused on the discussion of classroom assessment in cognitive domain which is a part of the result of dissertation research. The classroom assessment in universities is beneficial to look at how successful students conduct learning, starting from the beginning up to the process and to give information about what ways should be conducted in order to develop less-satisfying learning outcomes. The assessment of students' learning outcomes is conducted by lecturers, so the role of lecturers is very dominant to assess the achievement of students' competency (The Law of Republic of Indonesia number 20, section 58, and verse 1, 2003 about National Education System). It is aimed at monitoring the integrated process, development and correction of learning outcomes. This is suitable for the purpose of classroom assessment which is conducted as keeping-track, checking-up, finding-out and

summing up to conclude whether the students have already mastered all set competencies (Hayat, 2010, p.5).

In accordance to the above description, the assessment which is conducted in all education levels should be based on the law of national education system. In order to implement the rule as instructed in the law and to fulfill the purpose of class assessment, formative assessment is conducted in the end of learning process. The implementation of formative assessment is aimed at knowing how deep the students have mastered a competency after following a learning process. According to Arends (2007, p.231), the purpose of classroom assessment is to diagnose knowledge, to give feedback, to evaluate and to mark. However, practically, there are still few universities giving diagnosis and feedback towards the result of the assessment.

Supporting the above explanation, Amien (1987: 99) claims that feedback must be delivered soon in the learning process in order to inform students about their work. The involvement of students in assessment is a basic of balanced assessment (Tola, 2010 p. 18). Moreover, Assessment Reform Group (1994, p. 4) states that developing learning through assessment can be done by involving the students to assess their competency themselves and to understand how to correct it. By being involved in self-assessment towards their achievement of cognitive competency, students will get information related to their difficulties in the items or attributes which are considered as hard. Thus, correction or development can be conducted to improve their learning outcomes. Attribute is a competency that must be acquired by the students to accomplish a question.

The existence of obstacles in conducting classroom assessment affects the process of giving feedback. Students cannot get the feedback soon after the learning, so they are not able to identify their difficulties. The result of assessment conducted by lecturers is used to monitor the learning process, learning development and students' achievement. Thus, another assessment is needed to supplement the formative assessment that later can overcome the obstacles so that students can get feedback about their work.

Information about the result of previous learning assessment can help improving the learning process. Based on that result, students' strengths and limitations or difficulties in following the learning process can be traced. It is in accordance to Nitko (1989, p. 447) who says that evaluation must be integrated with the learning. It means that there is a close relation between assessment and learning.

Based on the previous description, the effort to improve standard of education cannot be separated from the benefits of assessment result. The main point of the improvement is the development of learning process, so assessment system should be applied as a part of the

effort to improve the standard (Kumaidi, 2001a). This integration shows that assessment is an important component because it is inseparable from the process of education and learning. For that, students' self-assessment (SSA) is needed because it involves students in the assessment activity. SSA is an assessment approach that involves the students to honestly conduct the assessment toward their work.

Appropriate solution needs to be conducted when it deals with the emergence of obstacles in the formative assessment practices. To overcome the limitations in the formative assessment practices done by far, another assessment which involves students in assessment towards their competency achievement is again needed as a supplementary. Black and William (1998, p. 14) state that practically, peer-assessment can be used as a supplementary of previous assessment and a requirement of self-assessment. To supplement the formative assessment, students are involved in assessing their peers' competency in group after conducting it individually. This type of activity to assess each other with peers in group about competencies they have mastered is called students peer-assessment (SPA).

Nowadays, an assessment that can support classroom learning process is really needed for the assessment renewal in education. By developing SSA and SPA as a supplementary of formative assessment, it is expected to give meaningful contribution to the improvement of the process of education. Sadler, White and Frederikson (Haris, 2007, p. 28) argue that application of the SSA and SPA combination is one of the ways to improve formative assessment practices by using peer- and self-assessment. They also state that peer- and self-assessment is essential for learning.

Integrated use of SSA and SPA is rarely conducted by lecturers in a general learning process and specifically in Physics class. Thus, it is needed to review the effectiveness of SSA and SPA, whether they can improve the achievement of cognitive, affective and psychomotor competencies in Physics class. As a supplementary for formative assessment, SSA and SPA are needed to be reviewed in the part of basic construct and their development procedure.

SPA technique is adopted from Wiersma (2000, p. 3) who claims the term *group evaluation* or *peer evaluation*. Another adaptation is from Kane and Lawler (Keaten, Richardson and Elisabeth, 1993, p. 3) who purposes the term *ranking*. If it is used to detect the difficulties experienced by students, peer-rating is more appropriate because it gives detail information about the level of mastered and have not been mastered (Latham and Wexley, 1982, p. 88).

Research Method

This study applied a research and development asserted by quasi experiment. SSA and SPA integrated the measuring activity of learning outcomes with the holistic learning process. Thus, Spiral Cennamo and Kalk model (2005, p. 6) was chosen. It is often stated as five phases of development which is to: (1) define, (2) design, (3) demonstrate, (4) develop and (5) deliver.

The limited test subjects were students of Physics *Tadris* majoring *Tarbiyah* in STAIN Palangka Raya. The expanded test subjects were students of Physics Education of University of Palangka Raya who had followed the subject of Vibration of Frequency. Validation test subjects of SSA and SPA were students in the sixth semester who were following the lecture. They were divided into two classes. Class A was comparative group and class B was validation test group of SSA and SPA.

Development Process

In the development process of this study, there were define, design and demonstrate phases. The first activities were preliminary study, literature review and relevant research finding review, observation and identification of Physics learning process. Information taken from the activities was used to complete the development draft and assessment draft. This development process resulted prototype 1, prescription of SSA and SPA.

Validity Process

The draft that had been resulted in the development process was then tested for its illegibility and expert judgment, for the analysis and first revision producing prototype 2 prescription of SSA and SPA and also for the supporting instruments. The result of the analysis was then tested by limited test to look at the availability of time and instrument reliability. Limited subjects were 24 students of Physics *Tadris* majoring *Tarbiyah* of STAIN Palangka Raya. However, the analysis of content validity ratings had been done using Aiken formula through expert judgment before the instruments were used. The result showed that all instruments were contently valid. After that, analysis and second revision was done for the test result. It resulted a tentative model. Expanded test was conducted to the students of Physics Education of University of Palangka Raya who had followed the subject of Vibration of Frequency. Expanded test is used to look at composite reliability, level of difficulties and differentiator of item. The result of it was then analyzed to get the third revision.

Following the above process, instruments of SSA and SPA along with supplementary instruments were used in the validity test of SSA and SPA empirically in the learning process of Physics. Based on the empirical test, analysis using SmartPLS2.0M3 was conducted to look at construct validity and composite reliability. In order to see whether the developed model had suited the theory and application, model compatibility test was conducted using a

program named generalized structured component analysis (GesCA) (Heungsun Hwang, 2011).

Data Analysis Technique

Content validity of pre-test was conducted to look at whether all instruments used in the research were contently valid. The validity used Aiken formula (1985, p. 132-133). The measurement of rater reliability also used Aiken formula (1980, p. 957-958). Reliability of limited trial test used Cronbach Alpha. Expanded test data analysis technique included level of difficulties (LD) and discrimination index (DI). LD and DI were measured by objectives essay questions using Excel program.

Crocker and Algina (1986, p. 311), Ebel and Frisbie (1986, p. 231), Linn and Gronlund (2009, p. 356) define the difficulties of items as a proportion of the correct answers. Thus, Ebel and Frisbie (1986, p. 356) claim that the higher the difficulties index, the easier the items/questions of the test.

According to McDonald (1999, p. 78), Miller, Linn and Gronlund (2009, p. 357), Reynolds, Livingston and Willson (2010, p. 150), items discrimination or distinguishing ability of items is an index that refers to the degree or level how an item can distinguish between students who gain high score and they who get lower score in certain items/questions. Ebel and Frisbie (1986, p. 230) say if the main purpose of item selection is to optimize the test reliability, items having high discrimination should be chosen. The formula to measure the index of distinguishing ability of items is as follow.

$$\text{Discrimination Index (DI)} = \frac{\text{Upper class mean} - \text{Lower class mean}}{\text{Maximum score}}$$

The criteria used to categorize DI is adopted from Cracker and Algina (1986, p. 315). In the analysis of criteria items, if all students have already mastered indicators of the competency, the DI will be 0. However, the item is still claimed as a good item and can be used to show effectiveness of the process (Mardapi, 2012, p. 188). In this study, the data resulted from empirical validity test were used to describe the effectiveness and the application of SSA and SPA which are analyzed using Excel program. Qualitative data analysis technique in this study was used to explain the procedure of SSA and SPA development.

Discussion and Research Finding

The development of SSA and SPA in this research is focused on measuring students' cognitive competency mastery. It begins with the process of theoretical review, relevant previous research findings and observation towards Physics learning practice. The collected information was used to make the development of assessment's draft. Making a formula and

designing a draft of SSA and SPA instruments about cognitive competency was conducted through learning continuum of vibration of frequency material. The development process activity resulted prototype 1, while the validity process was generally about the test. Limited test, expanded test, analysis and revision resulted tentative model. To look at the construct, the effectiveness and use of SSA and SPA, empirical process was conducted in Physics learning.

The result of Aiken content validity test is generally summarized as seen in the following Table 1.

Tabel 1. Result Test of Content Validity Instrument

Instrument	V	V	Category	Result
	test	table		
Cognitive Scoring Guidance	0.95	0.74	valid	ALR
SSA Reflection	0.94	0.74	valid	ALR
SPA Reflection	0.90	0.74	valid	ALR

ALR: Accepted with Little Revision

Based on the Aiken content validity analysis as described above, the result showed that all instruments used in the research were contently valid. The result of descriptive analysis towards all instruments was all categorized as very good. The above table shows that all rater reliability values in the test process have attended the minimum reliability as required which have more than 0.70. It means that all instruments are reliable based on the test among the raters. Limited test is aimed at knowing the clarity of each item or question, the availability of time and instruments reliability. The value of instruments reliability measured by Alpha formula is 0.73. The result of reliability coefficient among raters is shown in Table 3.

Tabel 3. Pre-test Reliability among Raters

No	Instrument	Reliability Coefficient Value among Raters (R)	Description
1.	Scoring Guidance	0.94	Reliable
2.	SPA Reflection	0.75	Reliable
3.	SSA Reflection	0.96	Reliable

Expanded test analysis included the difficulty index, discrimination index and composite reliability were then conducted as shown in Table 4 and Table 5. The result of

instruments reliability of SSA and SPA in the second test or expanded test is shown in Table 4. In Table 5, the value of level of difficulties (LD) for all items is in the range of 0.30-0.70. Thus, all items were accepted.

Tabel 4. Second Test Composite Reliability

No.	Instrument	Composite Reliability
1.	COG	0.751
2.	SSA	0.785
3.	SPA	0.790

The third test was conducted in the Physics learning process. The test subjects to validate SSA and SPA were Class A, the control group, and class B, the test group. Empirical test was used to see the construct validity of SSA and SPA, composite reliability and achievement of cognitive competency.

Tabel 5. Level of Difficulties Index (LD) and Cognitive Item Discrimination Index (DI)

	Material	Item Characteristics			Category		Desc.
		Item	LD	DI	LD	DI	
Vibration (VB)	SAP 1 Simple Harmonic Oscillation on Spring	1	0.30	0.423	M	VH	Acc
		2	0.43	0.731	M	VH	Acc
		3	0.30	0.776	M	VH	Acc
	SAP 2 Simple Harmonic Oscillation on Mathematic Swing	4	0.43	0.769	M	VH	Acc
		5	0.49	0.657	M	VH	Acc
		6	0.57	0.444	M	VH	Acc
SAP 3 Vibration Equivalence	7	0.32	0.923	M	VH	Acc	
	8	0.45	0.538	M	VH	Acc	
	9	0.50	0.399	M	H	Acc	
Wave (WV)	SAP 4 Wave	10	0.53	0.548	M	VH	Acc
		11	0.51	0.462	M	VH	Acc
		12	0.42	0.757	M	VH	Acc
		13	0.38	0.657	M	VH	Acc
SAP 5 Wave Energy		14	0.63	0.581	M	VH	Acc

		15	0.47	0.487	M	VH	Acc
		16	0.63	0.650	M	VH	Acc
		17	0.58	0.615	M	VH	Acc
	SAP 6	18	0.69	0.731	M	VH	Acc
	Level of Sound Intensity	19	0.69	0.846	M	VH	Acc
		20	0.62	0.256	M	H	Acc
		21	0.69	0.333	M	H	Acc
Sound (SD)		22	0.69	0.469	M	VH	Acc
	SAP 7	23	0.68	0.633	M	VH	Acc
	Doppler Effect	24	0.69	0.628	M	VH	Acc
		25	0.70	0.550	M	VH	Acc
	Average		0.54	0.595	M	VH	
			0				

Tabel 6. Composite Reliability Value of Validity Test

No.	Construct	Component	Composite Reliability
1.	COG	VB	0.735
		WV	0.745
		SD	0.773
		COG	0.852
2.	SSA	VB	0.788
		WV	0.822
		SD	0.744
		SSA	0.876
3.	SPA	VB	0.866
		WV	0.795
		SD	0.710
		SPA	0.873

As seen in Table 6 above, composite reliability values of validation test of the instruments of COG, SSA and SPA are 0.852, 0.876 and 0.873. It can be concluded that all instruments are reliable. Some values of T-statistics in the analysis result of construct validity of SSA and SPA instruments, component VB, WV and SD are <1.96. However, the values

are positive. Thus, they are maintained in the instruments because deleting them can decrease the reliability level. Moreover, the instruments have been claimed as valid through expert judgment. In short, all indicators of SSA and SPA are valid. When it is viewed from the test of result for inner weights, the instruments results of SSA, SSP and COG is shown in Table 7.

Tabel 7. Result for Inner Weights

	Component	Original Sample (O)	Sample Mean (M)	Std. Deviation (STDEV)	Std. Error (STE RR)	T-Statistics
SSA	SSA -> VB	0.820	0.845	0.036	0.036	22.686
	SSA -> WA	0.915	0.909	0.028	0.028	33.236
	SSA -> SD	0.796	0.809	0.046	0.046	17.134
SPA	SPA -> VB	0.871	0.876	0.032	0.032	26.814
	SPA -> FR	0.895	0.905	0.024	0.024	36.998
	SPA -> SD	0.714	0.747	0.054	0.054	13.219
COG	COG -> VB	0.836	0.849	0.036	0.036	22.983
	COG -> FR	0.850	0.871	0.028	0.028	30.430
	COG -> SD	0.868	0.892	0.032	0.032	27.533

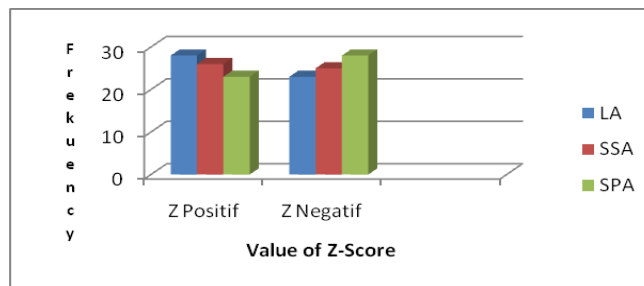
Table 7 above shows that all components of SSA, SPA and COG have T-statistics value > 1.96 . Thus, generally it can be concluded that all instruments of SSA, SPA and COG are valid.

The result of fit test of SSA and SPA model shows that GFI value is 0.994 and SRMR value is 0.062. It fits well because the GFI value is closed to 1 and SRMR value ≤ 0.08 . It can be concluded that the developed theoretical model is supported by empirical data. The following Table 8 shows that SSA and SPA (B) group is better than non-SSA and SPA (A) group. There is a meaningful trend of achievement increasing even though in the enough category.

Tabel 8. Achievement of Cognitive Competency

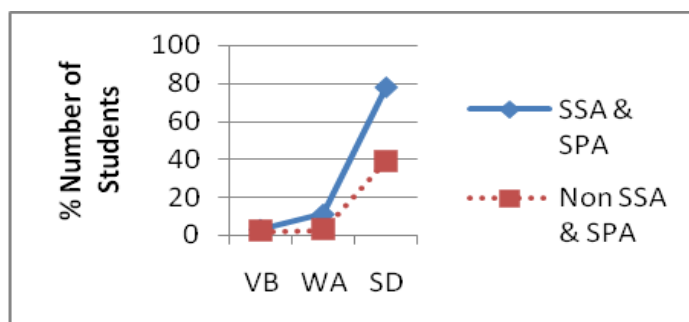
Learning Material	Max. Score	Group Average Score		Achievement Average (%)	
		A	B	A	B
1. Oscillation on Spring	30	3.4	10	11	33.3
2. Mathematic Swing	26	4.6	16	17.7	61.5
3. Equivalence of Vibration	60	3.7	16	16.2	26.7
4. Stationary Wave	40	4.1	15.6	10.3	39
5. Wave Energy	40	4.5	28.3	11.3	70.7
6. Level of Sound Intensity	30	5.5	22.5	18.3	75
7. Doppler Effect	42	6.5	31.3	15.5	74.5

If the values of z-score between lecturer’s assessment (LA), SSA and SPA are compared, it is clear that the value of SSA is closer to LA than value of SPA to LA. This is because cognitive is latent; it is basically understood by the person him/herself.



Picture 1. Value Comparison between LA, SSA and SPA

SSA and SPA group show more standard achieving in subject matter. If the effectiveness result is viewed from students’ response, it shows that SSA and SPA are effective to apply in Physics learning process. This is shown from the trend of increasing of students’ achievement. The line graph below shows the differences of standard achieving between the two groups.



Picture 2. Line Graph of Standard Achieving Differences in Each Subject-Matter

From the point of view of self-reflection, the results of usefulness of SSA and SPA are about the students' difficulties of cognitive assessment related to attributes and the items concerned as hard (item number 2 and 23). Most students see that SSA and SPA give positive feedback towards the improvement of learning achievement. Though, they still face some difficulties on the cognitive assessment attribute, specifically on the attribute C2, P1, P2 and S6.

Conclusion

The research finding and discussion about developed SSA and SPA can be concluded as follow.

1. Empirical result shows that SSA and SPA are quite effective to use as a supplementary for formative assessment because students' learning outcomes increase. It is shown from a quite good achievement and the acquired standard achieving in the group of SSA and SPA. The profile of individual standard achieving is better in SSA and SPA group. It is concluded that SSA and SPA are quite effective to use as a supplementary of formative assessment, especially in Physics learning process.
2. Based on model fit test of SSA and SPA, it shows that the model fits because the value of GFI is 0.994 and the value of SRMR is 0.062.
3. Based on descriptive analysis and reflection of SSA and SPA, it shows that the usefulness of SSA and SPA is very beneficial to use as a supplementary of formative assessment. The information that is collected directly support it very well because it can be used as a feedback towards the development of learning achievement and the improvement as well.

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**THE RESULT OF ASSESSMENT FOR STUDENTS IN SOLVING EXPONENTS
AND LOGARITHMS PROBLEMS
(CASE STUDY IN GRADE X CLASS MATHEMATICS AND NATURAL SCIENCE
(MIA) 2 STATE SENIOR HIGH SCHOOL 1 DEPOK 2014/2015)**

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Abstract

The objective of this research is to describe the result of assessment for students in solving exponents and logarithms problems in class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok, Sleman included the rate of achievements level of solving the problem, the percentage of completion of each items, and the absorption percentage of students in exponents and logarithms material. In addition, the objective of this research is to describe the mistake that being done by students of class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok, Sleman. This research is categorized into an explorative research with mixed-methods (quantitative and qualitative approach) with the participant-selection (qualitative-emphasized) model involving 32 students of class X Mathematics and Natural Science (MIA) 2 in Senior High School 1 Depok, Sleman. The 12 items of the instruments used are an essay on exponents and logarithms materials. The result of this research show that from the result of the essay test, the rate of achievements level of solving exponents and logarithms problem is about 54,59%, the percentage of completion of question 1a is 97%, question 1b is 79%, question 2a is 49%, question 2b is 41%, question 3a is 86%, question 3b is 55%, question 4 is 90%, question 5 is 53%, question 6 is 17%, question 7 is 74%, question 8 is 25%, and question 9 is 33%. The absorption percentage of students in exponents and logarithms materials is about 15,625%. Types of mistake that found on class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok in solving Exponents and Logarithms problem are, 1) change the negative exponential form to the positive exponential form, 2) change the root form into the sum of the roots, 3) change the fraction exponential form into a root form and determine the result, 4) algebraic operations of root form, 5) rationalize the denominator of a fraction of root form, and 6) simplify the logarithms.

Keyword: *Result of Assessment, Exponents and Logarithms Test, Types of Mistake*

Introduction

Teaching and learning activities (KBM) is an activity that is routinely done by educators and learners both inside and outside the classroom. Similarly, it is performed by university students in the Activities Practice Experience (PPL). University student practitioners who are studying as a teacher or educator also has the same function as the teacher that is as a facilitator who provide facilities as convenient as possible for their students in the learning process. A series of actions that occur between teachers and students in learning activities called learning process, that are discussion, question and answer, solving the problems, and others. A learning process is closely related to the process of understanding the concept of the material being studied. Especially for mathematics courses, build a good concept for students is not easy. The materials in mathematics are related to each other, which is a material may be a prerequisite for further material. If the understanding of the

concept will be a matter dominated and not well understood, it can inhibit the further understanding of the concept of matter that has a relationship with the material. Therefore, to determine the extent of students' understanding mastered in each material, a teacher doing an evaluation learning in the form of a test. Although Activities Practice Experience (PPL) is only done for 2.5 months, but to learn to be a good teacher, a university student practitioner is required to be able to evaluate learning, especially in the material being taught that is Exponent and Logarithm. Based on the test results, educators will know the extent to which the concept was mastered by the students to look at the mistakes in working on it.

Exponent and logarithm is a mathematical subject in class X SMA semester of learning about the concept of exponential, positive exponential form, negative exponential form, fraction exponential form, and the relationship with the fraction exponential form and the root form, standard form of a very small and very large numbers, algebraic operations of the root form, change the root form to the sum of the roots, logarithms and its concepts. Exponents and Logarithms is not easy for high school students because a lot of properties, both properties of exponents and logarithms to be learned. It also occurs in SMA Negeri 1 Depok class X Mathematics and Natural Sciences (MIA) 2 in Sleman. From the learning outcomes of PPL, students are still has many questions about the material, or asking how to accomplish the task / homework given by teachers related to Exponent and Logarithm. In addition, teacher also gave daily tasks for to be done by students. From the results of the completion of daily tasks performed by the students, it found that many students make mistakes. Before the remedial, the average score of students who are under the minimum completeness criteria (KKM) is determined by each school reaches 54.59%. This is indicates that students have difficulty in understanding the subject of Exponents and Logarithms. Mistakes that made by students is a natural thing, but if it happens continuously then it will lead students to less successful in understanding subsequent material that requiring prerequisites such material.

This is the benefits of error analysis in solving Exponents and Logarithms problems can be seen. By analyzing the errors made by the student, a teacher can determine the level of understanding and teachers will be easier to do the planning stages of enrichment learning material so the students can better understand and diminish mistakes made by students when solving problems exponents and logarithms in the next tests. Based on these problems, researchers are interested in analyzing the mistakes made by students of State Senior High School 1 Depok class X Mathematics and Natural Sciences (MIA) 2.

The objective of this research is to describe the result of assessment for students in solving exponents and logarithms problems in class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok, Sleman included the rate of achievements level of

solving the problem, the percentage of completion of each items, and the absorption percentage of students in exponents and logarithms material. In addition, the objective of this research is to describe the mistake that being done by students of class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok, Sleman.

The significance of this research is of practical significance. Practically expected to benefit and become material for the evaluation of teachers and students in learning mathematics, especially for Exponent and Logarithm subject.

Research Method

This research is categorized into an explorative research with mixed-methods (quantitative and qualitative approach) with the participant-selection (qualitative-emphasized) model. The population of the research is students in class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok, Sleman. The sample of the research are students in class X Mathematics and Natural Science (MIA) 2, Senior High School 1 Depok whose value is in that the minimum completeness criteria (KKM) is 73 for a total of 27 students. The research instrument used 12 test items Exponents and Logarithms problems made by researchers. According to Arikunto (1993: 207-209) an essay test, there are no standard guidelines in conducting the analysis in question, then the way is taken role in assessing the test item used is one of them held a checking validity. The validity of the items was done using expert judgment that is the teachers of mathematics Senior High School 1 Depok, Sleman.

There are two types of data collected in this research: quantitative data in the form of scores of students based on the test results of the students' work in the Exponent and Logarithm, absorption, average student scores, and the percentage of achievement attained by students; as well as qualitative data in the form of a description of the mistakes made by students. Assuming that the student has learned the material Exponents and Logarithms include exponent concepts, properties of exponents, zero power of a number, negative exponential form, fraction exponential form, root form and its relationship to fraction exponential form, algebraic operation of the root form, rationalize the denominator of a fraction of the root form, change the root form into the sum of the root form, the concept of logarithms, properties of logarithms, and standard form of numbers.

Techniques of data analysis done with reference to the criteria of errors made on each of the following aspects:

1. If students do the following things:

- a. Not able to compare some of the concepts in the solution of problems. It is said that the student made a mistake in understanding the concept.
2. If students do the following things:
 - a. Did not write down the formula used.
It is said that the student made a mistake in the application of the principle.
3. If students do the following things:
 - a. Made a mistake in determining the strategy
 - b. Using a mathematical formula that is outside the norm of the solution of problems.
It is said that the student made a mistake in the technical.

Research Findings and Discussion

The objective of this research is to describe the result of assessment for students in solving exponents and logarithms problems in class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok, Sleman included the rate of achievements level of solving the problem, the percentage of completion of each items, and the absorption percentage of students in exponents and logarithms material. In addition, the objective of this research is to describe the mistake that being done by students of class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok, Sleman viewed from the aspects of understanding the concept, aspects of the implementation of the principles, and technical aspects.

This research was carried out by giving the exponents and logarithms test in essay test form. The number of items used in this study was 12 items about Exponents and Logarithms. The table below show the value achieved by students of class X Mathematics and Natural Science (MIA) 2 Senior High School 1 Depok, Sleman:

No	Nama Siswa	Skor yang diperoleh													Tambahan	Jumlah skor	Ketercapaian (%)	Perbaikan	
		No Soal	1		2		3		4	5	6	7	8	9				Ya	Tidak
			a	b	a	b	a	b											
		Bobot	2	8	8	12	6	4	8	6	10	10	8	14	4	100			
1	Siswa 1		2	8	1	1	6	1	1	1	2	0	0	0	4	27	27	v	-
2	Siswa 2		2	8	3	3	5	4	3	5	1	1	8	1	4	48	48	v	-
3	Siswa 3		2	8	3	12	6	4	8	1	2	9	1	12	4	72	72	v	-
4	Siswa 4		2	8	8	0	5	2	8	6	0	10	2	1	4	56	56	v	-
5	Siswa 5		2	8	3	1	6	1	8	6	1	6	1	1	4	48	48	v	-
6	Siswa 6		2	8	1	1	6	1	8	1	1	5	1	1	4	40	40	v	-
7	Siswa 7		2	3	8	9	5	1	8	1	1	10	1	3	4	56	56	v	-
8	Siswa 8		2	8	6	8	6	2	8	6	3	10	2	14	4	79	79	-	v
9	Siswa 9		2	1	5	8	5	3	8	6	1	9	1	1	4	54	54	v	-
10	Siswa 10		2	3	2	12	5	3	8	1	1	10	1	3	4	55	55	v	-
11	Siswa 11		2	8	5	12	6	4	8	6	1	10	3	14	4	83	83	-	v
12	Siswa 12		2	8	8	2	1	3	8	4	5	6	1	5	4	57	57	v	-
13	Siswa 13		2	7	3	3	6	3	8	6	1	9	1	5	4	58	58	v	-
14	Siswa 14		1	5	1	2	6	2	8	1	2	10	1	9	4	52	52	v	-
15	Siswa 15		2	6	3	1	6	3	8	1	1	1	1	1	4	38	38	v	-
16	Siswa 16		1	8	6	12	3	4	8	6	1	10	1	14	4	78	78	-	v
17	Siswa 17		2	8	5	5	4	1	1	1	1	10	2	1	4	45	45	v	-
18	Siswa 18		2	8	3	3	6	1	8	1	4	10	1	2	4	53	53	v	-
19	Siswa 19		2	4	3	0	3	0	8	1	2	1	0	1	4	29	29	v	-
20	Siswa 20		2	8	6	10	6	4	8	6	8	10	8	11	4	91	91	-	v
21	Siswa 21		2	8	3	4	6	1	8	1	1	10	1	2	4	51	51	v	-
22	Siswa 22		2	5	3	2	5	1	8	2	1	9	1	1	4	44	44	v	-
23	Siswa 23		2	2	3	6	6	1	8	1	1	2	1	14	4	51	51	v	-
24	Siswa 24		2	2	1	1	5	6	8	6	1	10	3	7	4	56	56	v	-
25	Siswa 25		2	3	6	6	6	4	8	1	1	2	1	14	4	58	58	v	-
26	Siswa 26		2	8	3	4	6	1	8	2	1	8	8	1	4	56	56	v	-
27	Siswa 27		2	8	5	0	0	0	8	1	3	10	1	0	4	42	42	v	-
28	Siswa 28		2	8	2	9	6	1	8	1	1	10	1	1	4	54	54	v	-
29	Siswa 29		2	4	5	5	6	1	8	6	1	10	1	3	4	56	56	v	-
30	Siswa 30		2	8	6	3	6	1	8	4	1	0	0	0	4	43	43	v	-
31	Siswa 31		2	8	3	12	6	4	8	5	1	10	8	6	4	77	77	-	v
32	Siswa 32		2	5	2	1	5	2	2	4	1	10	1	1	4	40	40	v	-

From the result of the research show that the rate of achievements level of solving exponents and logarithms problem is about 54,59%. From these results can be assessed that the level of student achievement in working on Exponents and Logarithms problems are still very low. Whereas, question 1b is an easy question with the percentage of completion is 97%, question 1b is 79%, question 2a, 2b, and 3a are quiet difficult questions with the percentage of completion consecutively are 49%, 41%, and 86%. Question 3b is a difficult question with the percentage of completion is 55%. Question 4 is an easy question with the percentage of completion is 90%. Question 5 is a quite difficult question with the percentage of completion is 53%, question 6 is a difficult question with the percentage of completion is 17%. Question 7 is an easy question with the percentage of completion is 74%, question 8 is a quite difficult question with the percentage of completion is 25%, and question 9 is a difficult question with the percentage of completion is 33%. The absorption percentage of students in Exponents and Logarithms materials is about 15,625%. It is a very low category of absorption percentage.

The students' answers to the Exponents and Logarithms problems also analyzed descriptively with the steps that have been made. The results of the analysis of the types of errors made by students in solving Exponents and Logarithms problems described as follows:

1. Error understanding concepts (Students are not able to compare several concepts in the solution of problems)

a. Students make mistakes in understanding the concept of the negative exponential form.

Students make mistakes in understanding the concept of the negative exponential form is in the question number 1b. Students assume that solving the problems of the negative power of a number mean just eliminate the negative sign only. There are also students who think that the negative power would be a subtrahend for the base form of the rank numbers. For example:

$$2^{-3} = 2 - 3 = -1$$

- b. Students make mistakes in understanding the concept of zero power of a number.
Students make mistakes in understanding the concept of zero power of a number is at question number 7 that is after changing the logarithm into exponential form. Many students assume that if a number with the power of 0, the result is also 0.
2. Error applying the principle (did not write down the formula used)
 - a. Students do not write a formula or a general form in question 3b is about changing the shape of the root to the sum of the root. This is according to the discussion with the students because the students are still confused in the use of formula, there are also students who have forgotten the formula.
3. Technical error

Made a mistake in determining the strategy

- a. Students made a mistake in changing the fraction exponential form into the root form.
Students make mistakes in changing the fraction exponential form into the root form is in the question number 1a. There is one student who has difficulty in changing fraction exponential to the root form.
- b. Students made a mistake in changing the negative exponential form into positive exponential form.
Students make mistakes in changing the negative exponential form into positive exponential form is in the question number 1b.
 - a. Students make mistakes in simplifying the positive exponential
Students make mistakes in simplifying the positive exponential is in the question number 1b.
 - b. Students made a mistake in choosing the form of the opposite sign form in rationalizing the denominator fractional root form
Students make mistakes in choosing the form of the opposite sign form in rationalizing the denominator fractional root form is in the question number 2a and 2b.
 - c. Students make mistakes in algebraic operations of the root form

Students make mistakes in algebraic operations of the root form is in the question number 2a, 2b, 3a, 4, and 5. From the analysis of the test results found that many students were wrong in doing subtraction and multiplication operations

d. Students make the mistakes in equating the denominator of a fraction of the root
Students make mistakes in equating the denominator of a fraction of the root is in the question number 2b.

e. Students made a mistake in determining the steps in the solution of the equation
Students make mistakes in determining the steps in the solution of equation in the question number 5. The step right that is make the exponent of the number equal to 0, but a lot of students wrote the exponent is equal to 1.

f. Students make mistakes in the use of the properties of logarithms to solve the problem

Students make mistakes in the use of the properties of logarithms to solve the problem is in the question number 6 and 8. According to the discussion with the students this is happening because there are many properties of logarithms, so when do the problems students will become confused to choose the properties.

g. Students have difficulty in changing the logarithms form to the exponential form
Students make mistakes in changing the logarithms form to the exponential form is in the question number 7. Students are still confused in using the relationship between the logarithms and exponents:

$$a^b = c \Leftrightarrow \log_a c = b$$

Using a mathematical formula that is outside the norm of the solution of problems

a. Students write a wrong formula or the formula that is outside of the rules of mathematics.

Students write a wrong formula or the formula that is outside of the rules of mathematics is in question number 9. The right formula is presented below:

$$\sqrt{a} + \sqrt{b} = \sqrt{(a + b) + 2\sqrt{ab}}$$

But students write as follow:

$$\sqrt{a} + \sqrt{b} = \sqrt{(ab) + 2\sqrt{a + b}}$$

Conclusions and Suggestions

Types of mistake that found in class X Mathematics and Natural Sciences (MIA) 2 State Senior High School 1 Depok in Exponent and Logarithm test given by the researchers according to the theory referred to in this research are:

1. Error understanding concepts (Students are not able to compare several concepts in the solution of problems)
 - a. Students make mistakes in understanding the concept of the negative power of a number
 - b. Students make mistakes in understanding the concept of zero power of a number
2. Error applying the principle (did not write down the formula used)
 - a. Students do not write a formula or a general form that is changing the shape of the root to the sum of the root.
3. Technical error

Made a mistake in determining the strategy

- a. Students made a mistake in changing the fraction exponential form into the root form
- b. Students made a mistake in changing the negative exponential form into positive exponential form
- c. Students make mistakes in simplifying the positive exponential
- d. Students made a mistake in choosing the form of the opposite sign form in rationalizing the denominator fractional root form
- e. Students make mistakes in algebraic operations of the root form
- f. Students make the mistakes in equating the denominator of a fraction of the root
- g. Students made a mistake in determining the steps in the solution of the equation
- h. Students make mistakes in the use of the properties of logarithms to solve the problem
- i. Students have difficulty in changing the logarithms form to the exponential form

Using a mathematical formula that is outside the norm of the solution of problems

- a. Students write a wrong formula or the formula that is outside of the rules of mathematics.

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RELIABILITY RANKING AND RATING SCALES OF MYER AND BRIGGS TYPE INDICATOR (MBTI)

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Abstract

One of the personality models is Myers Briggs Type Indicator (MBTI). This model has been developed in the personality instrument using force choice and has been administration by the simple format. The base of force choice is ranking format. It has weakness completed by rating format. The study aims to analyze the reliability of MBTI personality using ranking and rating format, and to present the characteristic of personality undergraduate student using two format.

The study employed quantitative methods. The subject of the research is 134 undergraduate students of Yogyakarta State University. They come from three study programs, the educational of math, the educational of economic, and guidance and counseling. The data were collected by giving questionnaire. The reliability of each dimensions instrument was analyzed using alpha Cronbach. The all dimensions were analyzed using composite reliability. The personality characteristics subject was analyzed by descriptive statistic.

The findings of this study show that two instrument were reliable. The reliability instruments were various in many dimensions. The lowest reliability was sensing type and the highest reliability was thinking and feeling in the ranking format, and the extrovert in the rating format. The lowest reliability was the sensing not only in the ranking but in the rating format as well. The all reliability instrument or composite reliability of ranking format was 0.74 and the rating format was 0.72, It showed that the reliability of forced-choice format was higher than rating format. The result of measurement personality characteristic of Yogyakarta undergraduate student is dominant extraversion in focus attention, dominant sensing in finding out about things, dominant feeling in making decision and dominant judging in orientation the other world. Consequently, Yogyakarta undergraduate students prefer to outer world, strive for harmony with others and friendship, and prefer to do something ordered and scheduled.

Keyword: *personality, reliability, ranking, rating, MBTI*

Introduction

The life will be happy if we know our personalities. Personality is a pattern of the way of thinking, feeling, showing character, and conducting activity that determining person's ability to adapt to the environment. One of the instruments identifying characteristic personality of person is Myers-Briggs Type Indicator or MBTI (Boyd & Brown, 2005; Bradley & Hebert, 1997). The instrument was developed by Katharine Cook Briggs and her daughter, Isabel Briggs Myers, based on Carl Gustav Jung's theory of Psychological Types

(1921/1971). Jung argues that there are four basic psychological functions of human related to the world, namely: sensation, intuition, feel, and thought (Briggs-Myers & McCaulley, 1985). They argue that the characteristics of human behavior can be distinguished on the types of preferences. These preferences are based on: 1) focusing direction consisting of extravert and introvert types; 2) the way of obtaining information consisting of sensing and intuition type; 3) the way of making decisions consisting of thinking and feeling type; and 4) the orientation towards the outside world consisting preferences of judging and perceiving.

MBTI instrument is formed by paired comparison format. This format was designed from pairing statement in one item. From the two alternative statements in each item, it must be selected only one statement from the two types of the same dimension. For example, the introvert type is paired with the extrovert type, the thinking type is paired with the feeling type, the sensing type is paired with the intuition type, and the judging type is paired with the perceiving type. The paired comparison format is introduced by Thurstone (1927). This format is based on the forced-choice format (McDonald, 1999). It was the measurement model that forces the subject to response one of two or more statements.

The forced-choice is same as ranking format if there are two responses or statement that must be chosen. This format has two advantages to the response of a subject. It is avoided from social desirability and faking (McDonald, 1999, Barislow, 1958, Chernyshenko, 2009). Social desirability is a general statement in which people possibly respond to the statement dishonestly. It may be concluded that subject's response is known as faking. Therefore, it is difficult to detect the real opinion or response from the subject. Nevertheless, this type of instrument has weakness because the subject is forced to choose one statement though both of them are appropriate or inappropriate. On the other side, another model instrument, called the rating model, is responded freely. Subjects are free to respond to the statement as they wish though they may respond to it by faking. Thus, the weakness of forced-choice or ranking format can be covered by the rating format, and vice versa.

The comparison of the two formats of instrument has been studied by Setiawati (2013). She studied the scaling of multiple intelligence instrument using Thurstone types or ranking format and Likert type designed by a rating format. The results show that Likert-type instrument is more accurate than the Thurstone type is. The accuracy is caused by Likert type's variations of the answer which is more than the Thurstone type is. The Likert type has five responses while the Thurstone type has two responses. Thus, it needs further research to determine the accuracy of both types by creating the same variations.

The result of measurement using MBTI instrument is characteristic personality from several pattern of personality from many types. There are four dimensions of the two type of personality. Thus, the all patterns of personality have 16 alternate personality types. MBTI is widely used to determine differences in personalities in various fields, such as education, career development, organizational behavior, group functions, team development, personal and executive training, individual psychotherapy, couples, and families, and context of multicultural interaction (Center for Applications of Psychological Type, 2008). It design originally by ranking format, but it can be design by rating format. The Data of this study were collected using two format instrument.

This study aims to investigate the characteristics of the instrument MBTI and the types of personality of students in Yogyakarta by using the format type instrument with ranking and rating.

Method

The data were collected by giving questionnaire of MBTI instrument. It was modified into two formats, the forced-choice format (the original format) and the rating format. Both of format, were formed from the same construct and item. The specification items of the instrument can be showed in the table 1.

Table 1 Specification Items of the Instrument

Based on Preferences	Types of Preference	Number of Items	
		Forced-choice format	Rating format
Focusing direction	Extrovert (E)	1,9,19,29,35,41,53	1A,5A,10A,15A,18A,21A,27A
	Introvert (I)	2,10,20,30,36,42,54	1B,5B,10B,15B,18B,21B,27B
The way of obtaining information	Sensing (S)	3,13,17,31,39,45,55	2A,7A,9A,16A,20A,23A,28A
	Intuition (N)	4,14,18,32,40,46,56	2B,7B,9B,16B,20B,23B,28B
The way of making decisions	Thinking (T)	7,11,21,25,37,47,49	4A,6A,10A,13A,19A,24A,25A
	Feeling (F)	8,12,22,26,38,48,50	4B,6B,10B,13B,19B,24B,25B

			5B
The orientation towards the outside world	Judging (J)	5,15,23,27,33,43,51	3A,8A,12A,14A,17A,22A,26A
	Perceiving (P)	6,16,24,28,34,44,52	3B,8B,12B,14B,17B,22B,26B

From table 1, could be showed that both of two format have the same items but different in the number of item. Then, they were tested to subject of research. The subject of the research is undergraduate students of Yogyakarta State University. Meanwhile, to determine subject of research, the cluster random sampling was employing. They come from three study programs, the educational of math, the educational of economic, and guidance and counseling. The all subject were 134 undergraduate students.

Finally, there were two techniques to analyze the data: 1) analyzed the reliability instrument, 2) analyzed the characteristic of personality. The reliability of each dimensions instrument was analyzed using alpha Cronbach. Then, the all dimensions were analyzed by using composite reliability. The characteristic of personality subject was quantitative analyzed by descriptive statistic. All analysis of the data used Excel program.

Results

One of the characteristic instruments in classical theory was reliability. The concept of reliability in classical test theory assumptions is associated with observed scores (X), true score (T), and error score (E). The main concept of this theory is $X = T + E$, or the observed score is the combination of the true scores and error scores. Based on these assumptions, the concept of variant scores or total variance is the combination of the true score variance and the error score variance. The assumptions made in the formula $\sigma_t^2 = \sigma_r^2 + \sigma_e^2$ (Gulliksen, 1950, Lord & Novick, 1968, Allen & Yen, 1979, Thissen & Wainer, 2001).

The reliability of data instrument associated with measurement errors in the measurement data. Djemari Mardapi (2008) said that measurement error is part of unreliability data. It is studied in measurement of social sciences. Based on the concept of scores in the classical theory, the reliability of the measured data can be explained from the variant score. An association between the variant score as mentioned in the assumptions of classical theory can be used to explain the definition of reliability which is a variant of interaction errors and score. The concept of reliability can be formulated as $\rho_{xx'} = 1 - \sigma_e^2 / \sigma_x^2$,

where reliability is the magnitude of the error variance and variance score. Based on this formula, it can be explained that the larger the error variance is the smaller the coefficient reliability and will be vice versa. The score of reliability, variance score, variance error influence to the characteristic of instrument. The formula alpha from Cronbach was used to estimate the reliability from two formats. The result of data analyze could be seen in table 2.

Table 2. The Reliability and Standard Error Measurement (SEM) of Two Formats Instrument

No	Dimension	Ranking-format			Rating-format		
		Variance	Reliability	SEM	Variance	Reliability	SEM
1.	Extrovert	2,66	0,53	1,83	2,72	0,6	1,1
2.	Introvert	2,66	0,53	1,83	2,45	0,43	1,39
3.	Sensing	1,85	0,3	1,55	1,88	0,34	1,24
4.	Intuition	1,85	0,3	1,55	2,78	0,52	1,34
5.	Judging	3,09	0,6	1,94	2,71	0,5	1,34
6.	Perceiving	3,09	0,6	1,94	2,35	0,42	1,36
7.	Thinking	3,52	0,62	2,17	2,88	0,57	1,24
8.	Feeling	3,52	0,62	2,17	2,62	0,57	1,14
9.	Total instrument		0.74	1,87	31	0.72	1,27

Table 2 shows that the reliability instruments were various in many dimensions. The lowest reliability was sensing type and the highest reliability was thinking and feeling in force-choice type, and the extrovert type in the rating format. The lowest reliability was the sensing not only in the force-choice format but in the rating format as well. The all reliability instrument or composite reliability of ranking format was 0.74 and the rating format was 0.72. It showed that the reliability of forced-choice format was higher than rating format.

The data from forced-choice and rating format are different. Although the data from both types of instruments are different but there are connected. The calculation of coefficient correlation from many dimension or two formats are calculated using Pearson correlation. The result of correlation test shows that coefficient correlation or $r = 0.791$ and probability of significance or $p = 0.02$. Consequently, the two of formats are connected.

The term of error measurement related to the error variance or standard error of measurement (SEM). The formula of SEM or $\sigma_e = \sigma_t \sqrt{1 - \rho_{xx'}}$. SEM magnitude affects the reliability, it can be said that the accuracy of measurement results can be seen by the SEM. The smaller the SEM measurement will be more precise measurement results. Table 3 showed that the SEM of ranking format was higher than rating format, therefore, unless the ranking format have more reliable than the rating format, the rating format had more precise. It condition was influenced of the variance of ranking format was higher than the rating format.

The data from ranking and rating format are different. Although the data from both types of instruments are different but there are connected. The calculation of coefficient correlation from many dimension or two formats are calculated using Pearson correlation. The result of correlation test show that index correlation or $r = 0.791$ and probability of significance or $p = 0.02$. Consequently, the two of formats are connected.

The Profile of characteristic personality was analyzed by descriptive statistic using mode. The mode data from two format instrument could be seen in table 2.

Table 2 Descriptive Statistic the Data of Two Format Instrument

No	Dimension	Mode	
		Force-choice	Rating Formal
1	Extrovert	4	5
2	Introvert	3	5
3	Sensing	5	6
4	Intuition	2	4
5	Judging	5	6
6	Perceiving	2	5
7	Thinking	3	4
8	Feeling	4	5

Table 2 shows that the preferences of focusing direction, in force-choice format the extrovert is more dominant than introvert is, but in the rating format both types have similar score. Another score shows that to obtaining information, in the two formats instrument, the

sensing is more dominant than intuition is. Meanwhile, the way of making decisions, the feeling is more dominant than the thinking is in both of formats instrument, and the orientation towards the outside world, the judging is more dominant than perceiving is in the two formats. From the all preferences, the characteristic personality of subjects are extrovert, sensing, judging and feeling (ESJF). Consequently, the pattern of personality of Yogyakarta State University Students is ESJF.

The extrovert people have motivated and strong energy from outside and environment. The sensing people like taking information from their perception or sensation. The judging people have many plans and arrangements in their live. And the feeling people have many value in their lives and base on humanity in the interaction with the other people. From this characteristic, Yogyakarta undergraduate students prefer to outer world, prefer to do something ordered and scheduled, and strive for harmony with others and friendship.

The score of rating format is higher than ranking format is. It is coursed that the rating format might be to response high in the pairs of items. Choosing one statement out of several statements in ranking makes this type of instrument have difference characteristic to other instruments which provide a statement with various different responses. This instrument will be different responses for one stimulus. Hence, it will be obtained various kinds of responses on several provided stimuli. This is inline with Oliveres & Brown's (2010, p.935) stated that this type of instrument is spared from the same answers or there is bias in giving responses such as an extreme agreement response. It is also stated that by using this type of instrument, weaknesses in responding such as lack of various responses or 'halo effect' will be avoided.

The ranking instrument has strength related to subject response that tends to be spared from social desirability and faking (Mc Donald, 1999, p.24, Chernyshenko, et.al., 2009, p.108). Therefore, Social desirability is a general statement that tends to be responded by a subject dishonestly, that creates difficulties in finding out the real opinion of the subject. Meanwhile, *faking* is a tendency of subjects to choose responses that do not represent their characteristics or intentionally change their responses to make them included in the desired group. Thus, both formats instrument have weakness and strength in their object matter.

Conclusion

The findings of this study show that two formats of instrument are reliable in the both formats instrument using composite reliability. The reliability instruments were various in many dimensions. The lowest reliability was sensing type and the highest reliability was thinking and feeling in the ranking format, and the extrovert in the rating format. The lowest

reliability was the sensing not only in the ranking but in the rating format as well. The all reliability instrument or composite reliability of ranking format was 0.74 and the rating format was 0.72, It showed that the reliability of ranking format was higher than rating format.

The result of measurement personality characteristic of Yogyakarta undergraduate student is dominant extraversion in focus attention, dominant sensing in finding out about things, dominant feeling in making decision and dominant judging in orientation the other world. Consequently, Yogyakarta undergraduate students prefer to outer world, strive for harmony with others and friendship, and prefer to do something ordered and scheduled.

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**THE COMPARISON OF ITEMS' AND TESTEES' ABILITY PARAMETER
ESTIMATION
IN DICHOTOMOUS AND POLITOMUS SCORING
(STUDIES IN THE READING ABILITY OF TEST OF ENGLISH PROFICIENCY)**

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Abstract

This study aimed to compare the testees' ability estimation in the politomus and dichotomous scoring model. The data used in this study are the responses of testees to the Test of English Proficiency (TOEP) set 1 in reading subtest, which are usually scoring in dichotomous model then they are scoring in politomus model. In the reading subtest of TOEP, in one text presented several items related to the text. In the dichotomous scoring, each item is scored one by one item. As alternative, every item item is scored using dichotomous model separately, but for every text, the acquisition of these items are added to the score attained politomous model. The estimation of items' and abilities' parameter in dichotomous scoring were done using the Rasch models and in the politomous scoring were done with partial credit models using QUEST software. Comparative analysis of the two models are seen based on the average results of the estimated difficulty level, graphical analysis, calculating the correlation, and the results of the value of information function. The results of the analysis showed that the average item difficulty dichotomous scoring model is 0.486 with a standard deviation of 0.895 and the mean level of difficulty politomous scoring model is -0.105 with a standard deviation of 0.695. The correlations between abilities of participants using the dichotomous and the politomous scoring model is 0.94. The value of information function in the dichotomous scoring model is higher than in the politomous scoring models. These results indicate that the Reading of TOEP set 1, the dichotomous scoring model is better than the politomous scoring model.

Key Word: dichotomous scoring model, politomous scoring model, Reading, Test of English Proficiency (TOEP)

Introduction

The scoring models for multiple-choice items typically using dichotomous scoring models, the correct answer is scored 1 and the wrong answer is scored 0. Similarly, to scoreresponses of English tests especially on reading subtest, a text usually consists of many questions, and each question is given a score of their own. The scoring of the correct answer is conducted to determine the ability of participants in the test directly.

The alternative ways is considering the text used in readingsubtest. A text and many items related the text are considered one item, which has many items of its supporters called testlet. The item supporting the text is scored individually the correct answer is scored 1 and the wrong answer is scored 0. The scores acquisition in the item is the sum of the scores items' supporters. The model is called the scoring of politomous models. For example in Figure 1 is the Reading test on TOEP 1. Initially presented text, then compiled a few questions based on the text.

The moon is the only natural satellite of the earth and a unique member of the solar system in several respects. With a radius of 1,738 km, it is approximately one-quarter of the size of the earth and 81.3 times less massive. Although the solar system contains both larger and more massive satellites than the Moon, none except Pluto's newly discovered moon differs so little from its planet in mass or size. Indeed, the Earth-Moon system constitutes a veritable double planet

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|--|--|
| <p>1. The text is mainly about</p> <ul style="list-style-type: none"> A. the solar system B. the moon C. the satellites D. the planets <p>2. The word <u>its</u> (line 5) refers to</p> <ul style="list-style-type: none"> A. Earth B. the Earth moon C. Pluto D. Pluto's moon | <p>5. The text seems to suggest that</p> <ul style="list-style-type: none"> A. the Earth-Moon is a unique system B. Pluto does really have a satellite C. the Moon D. Earth |
|--|--|

Figure 1. An Example of a Text and its Items Related on Reading Subtest of TOEP 1

An item analysis to determine the characteristics of the item and estimate the ability of candidates can be done using the classical test theory and the item response theory. In item response theory with dichotomous scoring, the analysis that can be selected is the logistic model, of 1 parameter logistics (1PL, Rasch), 2 parameter logistics (2PL), and 3 parameter logistics (3PL) (Hambleton & Swaminathan, Hambleton, Swaminathan & Rogers, Heriretnawati, 2014). In item response theory with politemous scoring model that can be used include partial credit model (PCM), graded response model (GRM) and generalized partial credit model (GPCM) (Van der Linden & Hambleton, 1997). Utilization of the politemous scoring models on reading subtest, especially in the Test of English Proficiency (TOEP) has not been done, including comparison the two models to know which model is better. Related to the politemous scoring model, this study compares the ability of participants to the estimate of the dichotomous and politemous scoring models on reading subtest of TOEP. The model compared in this study is a model for the Rasch (1PL) for dichotomous scoring model and partial credit model (PCM) for politemous scoring model.

The equations used in the Rasch model (Hambleton, Swaminathan, and Rogers, 1991, Hulin, 1985) as follows:

$$P_i(\theta) = \frac{e^{(\theta - b_i)}}{1 + e^{(\theta - b_i)}} \quad , i : 1, 2, 3, \dots, n \dots \dots \dots (1)$$

where:

$P_i(\theta)$: the testee probability at θ to answer i item correctly

θ : testee's ability

b_i : item difficulty index for item- i

e : natural number (2,718)

n : the number item in test

The parameter b_i is a point on the ability scale to have 50% probability to answer the item correctly. Suppose a test item has parameter $b_i = 0.3$ means that the required minimum of 0.3 on a scale of ability to be able to answer correctly with probability 50%. The greater the value of the parameters b_i , the greater the ability needed to answer correctly with probability 50%. In other words, the greater the value of the parameters b_i , the more difficult the item.

The partial credit model (PCM) is an extension of the Rasch models, assuming different items has the same discrimination index. PCM has some similarities with the Graded Response Model on the items suspended in a tiered categories, but the difficulty in every step of the index does not need to be sequenced, a step can be more difficult than the next step.

The general form of PCM according to Muraki & Bock (1997: 16) as follows.

$$P_{jk}(\theta) = \frac{\exp \sum_{v=0}^k (\theta - b_{jv})}{\sum_{k=0}^m \exp \sum_{v=0}^k (\theta - b_{jv})}, \quad k=0,1,2,\dots,m \dots\dots\dots(2)$$

Where

$P_{jk}(\theta)$ = Probability of participants capable of obtaining a score category k to item j ,

θ : The ability of the participants,

$m + 1$: the number of categories of j item,

b_{jk} : index of item difficulty category j k

$$\sum_{h=0}^k (\theta - b_{jh}) \equiv 0 \quad \text{and} \quad \sum_{h=0}^h (\theta - b_{jh}) \equiv \sum_{h=1}^h (\theta - b_{jh}) \dots\dots\dots(3)$$

The score on the PCM category shows that the number of steps to complete the item correctly. The higher scores category shows the greater ability than a lower score categories. In PCM, if an item has two categories, then the equation 2 is an equation on the Rasch models.

To compare the results of the estimation of the two scoring models used the average ratio estimation abilities. The estimation results with dichotomous scoring models and scoring

polynomial models then correlated and made scatter plot. It also conducted a comparison of the value of the information function in both scoring models.

The item information function is a method to describe the strength of an item on the test and declared the contributions of items in uncovering the latent ability (latent trait) as measured by the tests. Using the item information can be known which item fits with the model that helps in the items selection. According to Hambleton and Swaminathan (1985), mathematically, item information function is defined as follows.

$$I_i(\theta) = \frac{[P'_i(\theta)]^2}{P_i(\theta)Q_i(\theta)} \dots\dots\dots (4)$$

where :

i : 1,2,3,...,n

$I_i(\theta)$: information function i-item

$P_i(\theta)$: probability of testee with θ ability to answer i-item correctly

$P'_i(\theta)$: derivative function $P_i(\theta)$ to θ

$Q_i(\theta)$: probability of testee with θ ability to answer i-item incorrectly

The information function of item in one parameter logistic model (1PL) defined by Birnbaum (Hambleton & Swaminathan, 1985: 107) in the equation follows.

$$I_i(\theta) = \frac{2,89}{[(\exp(1.7(\theta - b_i)))][1 + \exp(-1.7(\theta - b_i))]^2} \dots\dots\dots (5)$$

where :

$I_i(\theta)$: item information function i

θ : the level of the subject's ability

a_i : different power parameters of the i-th item

b_i : item difficulty index parameter i-th

c_i : pseudo guesses index (pseudoguessing) item ith

e : natural numbers whose values approaching 2,718

Based on the equation of the information function above, the information function satisfies the properties:(1) in the item response logistic model, the information function of item approaching a maximum value if θ approaching to b_i .

The value of information function on the polytomous scoring is the sum of the value of information function of each item category. In this regard, the value of information function will be higher if the value of the information function of each category has a value. The item information function ($I_j(\theta)$) can be defined mathematically as follows.

$$I_j(\theta) = \sum_{k=1}^m I_{jk}(\theta) \dots\dots\dots(6)$$

The value of the test information function is the sum of the value of information functions of the test items (Hambleton&Swaminathan, 1985:94). In this regard, the value of the test information function will be high if the items composing the test have a higher information function. The value of informaton function of test ($I(\theta)$) can be defined mathematically as follows.

$$I(\theta) = \sum_{j=1}^n I_j(\theta) \dots\dots\dots (7)$$

The values of the item parameters and abilities are the estimation results. Because of they were the estimation results, the truth is probabilistic and not liberated by error measurement. In the item response theory, the standard error of measurement (SEM) is closely related to the information function. The value of information function has inverse quadratic relationship with SEM, the greater the information function, the SEM is smaller or vice versa (Hambleton, Swaminathan, & Rogers, 1991, 94). If the value of the information functionis expressed by $I_i(\theta)$ and the estimated value of SEM revealed by $SEM(\theta)$, then therelationship between the two, according to Hambleton, Swaminathan, & Rogers(1991: 94) is expressed by

$$SEM(\theta) = \frac{1}{\sqrt{I(\theta)}} \dots\dots\dots(8)$$

Method

This study used a quantitative approach.The data were analyzed including TOEP 1 data especially on Reading subtest consisting of 50 items in 7 texts. The test responded by high school students in four provinces, Jakarta, West Java, Yogyakarta, and East Java of Indonesia, which involved 600 testees. The testees’ responses was scored by the dichotomy model at 50 items and the polituous models at 7 texts.

The analysis is carried out to compare the two scoring models that estimate the participant's ability and item parameter estimates, descriptive analysis on the level of difficulty, perform chart analysis on the item characteristic curve of polituous and

dichotomy data, calculating the correlation of ability parameter of dichotomous and and polytomous scoring model, and calculate the value of the function of both scoring model. The results are compared qualitatively and quantitatively. The best model is a model produce smaller SEM values or bigger value of information function.

Results and Discussion

Using the Rasch model of assisted Quest computer program, can be estimated item parameters for the 50 items on Reading subtest. The estimation results are presented in Table 1. Based on these results, it can be derived that there are two easy items (numbers 9 and 29), and there are three items that are difficult (numbers 23, 32, 39).

Table 1. Parameters 40 Items in Dichotomous Scoring Model

Item	b	Item	b	Item	b	Item	b	Item	b
1	-0.86	11	-0.04	21	1.25	31	-1.32	41	0.01
2	-0.14	12	0.89	22	-0.62	32	3.77	42	-0.96
3	0.92	13	-0.36	23	2.37	33	0.09	43	0.21
4	-0.49	14	0.89	24	0.65	34	-0.24	44	0.01
5	-0.08	15	-0.34	25	-0.77	35	0.17	45	1.62
6	-0.14	16	0.57	26	-0.9	36	-1.61	46	0.93
7	-1.25	17	0.25	27	-0.6	37	-0.43	47	-0.3
8	-0.55	18	-1.81	28	-0.21	38	-1.11	48	0.26
9	-2.03	19	-0.95	29	-2.32	39	2.87	49	1.08
10	0.94	20	1.15	30	-0.85	40	-0.7	50	1.06

Using the partial credit model, the analysis carried out by the Quest computer program, can be obtained parameters for the 50 items on Reading subtest with 7 texts. The estimation results are presented in Table 2. The results obtained are in line with the results of the analysis using Rasch models, there are two items that have a relatively easy categories and three categories of items are relatively difficult.

Tabel 2. Parameters of Items' Category in Polytomous Scoring Model

No.	1	2	3	4	5	6	7	8
1	-2.24	-1.77	-0.81	-0.62	-0.27	0.31	0.58	1.21
2	-1.75	-1.59	-0.82	-0.3	0.63	1.34	3.36	
3	-2.15	-1.56	-0.61	-0.2	0.48	0.74	1.25	3.22
4	-1.66	-1.81	-1.08	-0.73	-0.15	0.14	0.9	
5	-1.54	-1.32	-1.46	-0.59	0.52	1.59	2.89	
6	-0.83	-1.18	-0.78	-0.4	0.19	0.67	2.97	
7	-0.81	-0.46	-0.05	0.89	1.76	2.89		

Based on the items parameters, can be made the image of item characteristic curve for dichotomous scoring models. For example, the first text that consists of 8 items. Image characteristic curve for grains in one text is presented in Figure 1. Observing that it can be obtained that there are 2 items that have a similar level of difficulty, so that it can be represented by two other items.

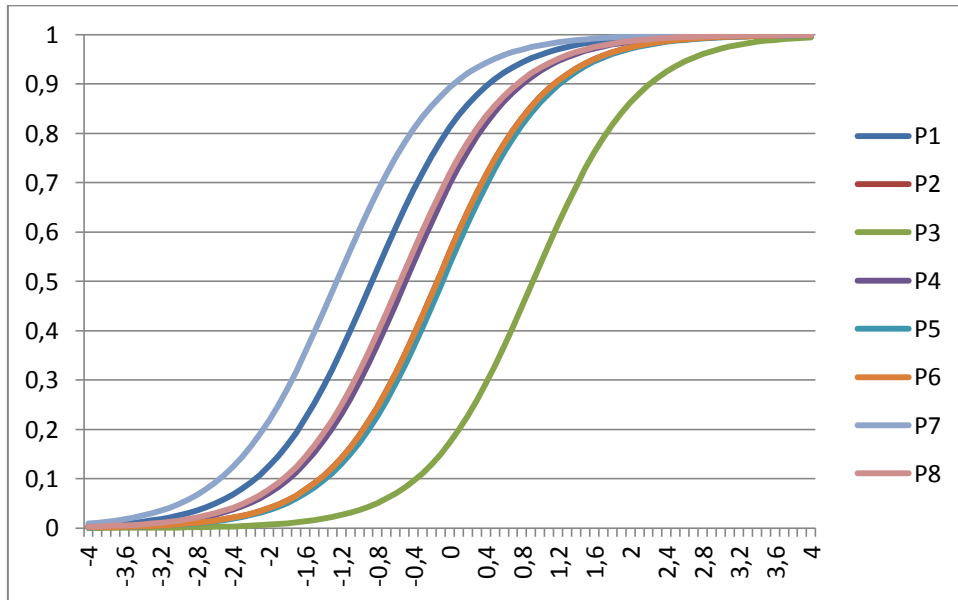


Figure1. The Item Characteristic Curves of 8 items Composing Text 1

The picture of item characteristic curve for politomus scoring presented in Figure 2. Looking at the picture, it is found that the categories 4, 5, 6, and 7 do not have a function to estimate the probability answering correctly or estimating the testee's ability. The category 4,5,6, and 7 have been represented by four other categories.

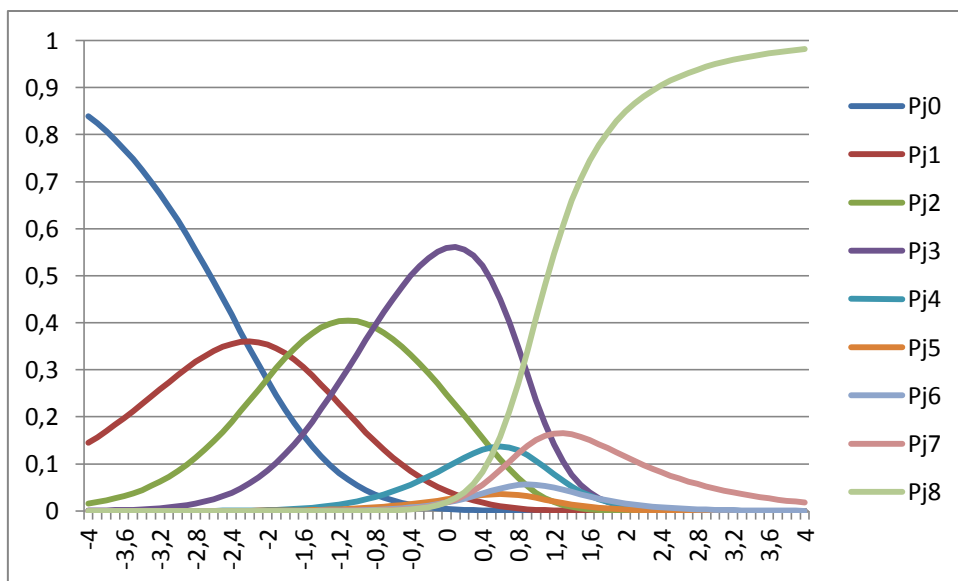


Figure 2. Category Response Curves of Items Composed Text 1

The estimation results of the testee's ability on the politomous and dichotomous scoring model presented in Table 3. Based on these results, it is obtained that the result of estimation in dichotomous scoring model is higher than politomous scoring model. By considering the deviation standard, the result in dickotomous model is more varied than in the politomous scoring model. More results are presented in Table 3 and Figure 3.

Table 3. Comparison of Mean and Standard Deviation of scoring dichotomy and Politomi

	Dikotomi	Politomus
Rerata	0.048564	-0.10475
Stdev	0.854882	0.695381

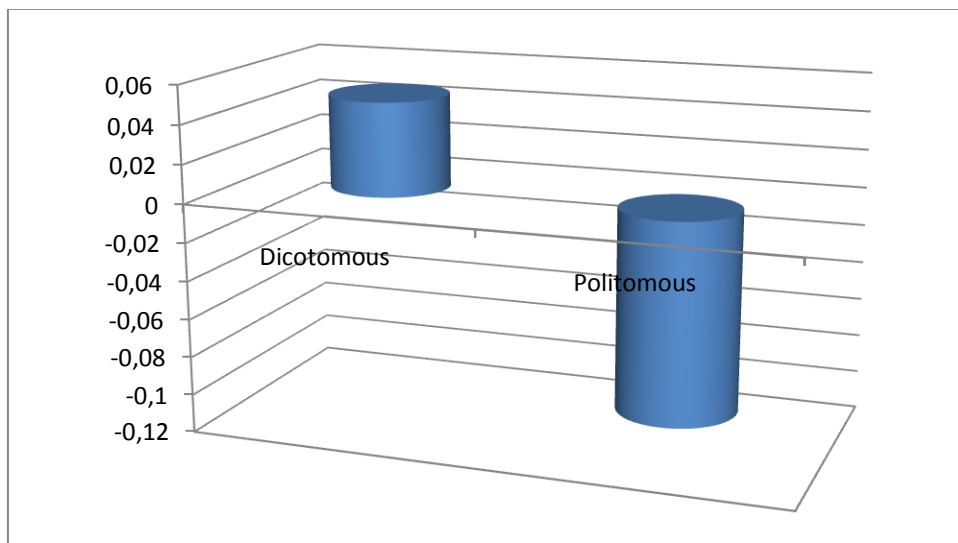


Figure 3. Ability Estimation of Testees using Dichotomous and Politomous Scoring Model

The estimation results on the politomous and dichotomous scoring model are relatively close. This is evidenced by scores on the correlation coefficient is 0.956 and determination index is 0.914. Similarly, the scatterplot of estimation using dichotomous and politomous scoring model, which shows the both scorings are correlated and close to the prediction line $y = 0.777x - 0.142$. More results are presented in Figure 4.

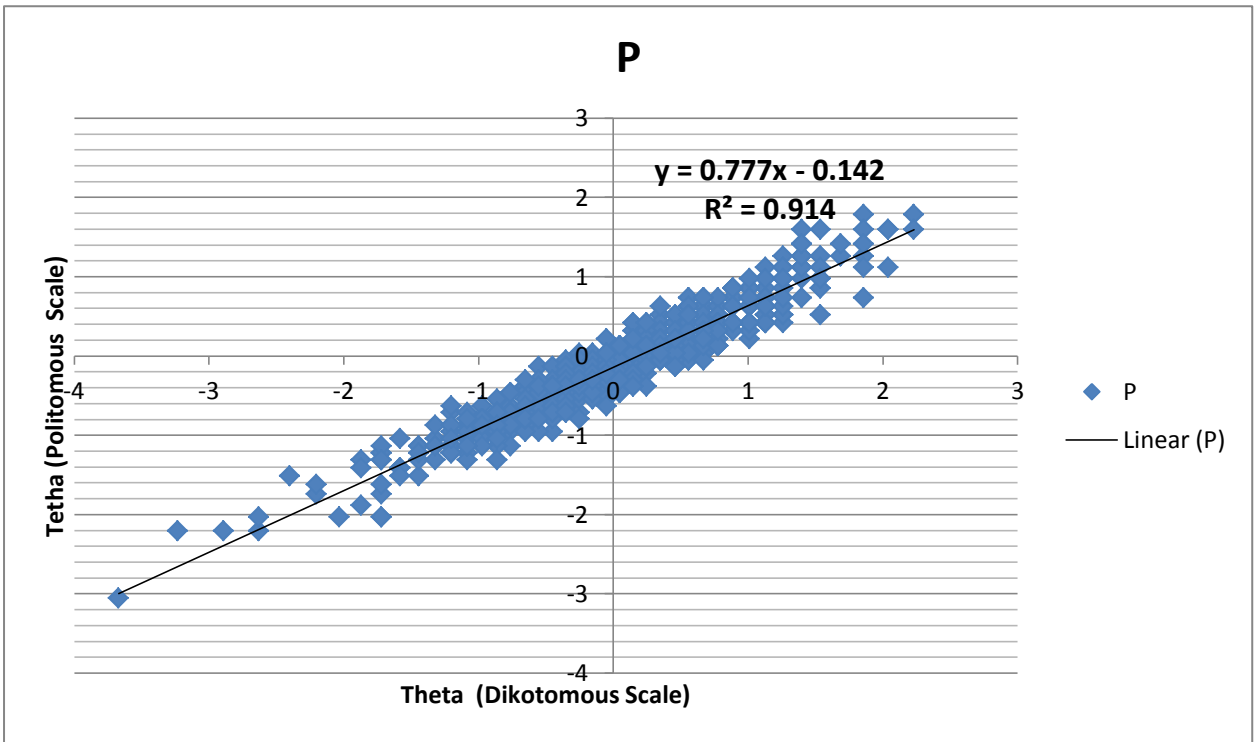


Figure 4. Relationship between Estimation Result of Testees' Ability Using Dichotomous and Politomous Scoring Model

Using the parameters in every item of text, the value of the information function (VIF) can be estimated. The estimation results are summed then. The standard error of measurement can also be estimated using the VIF. In text, VIF and SEM results presented in Figure 5 (on a dichotomous scoring model) and Figure 6 (on politomous scoring model).

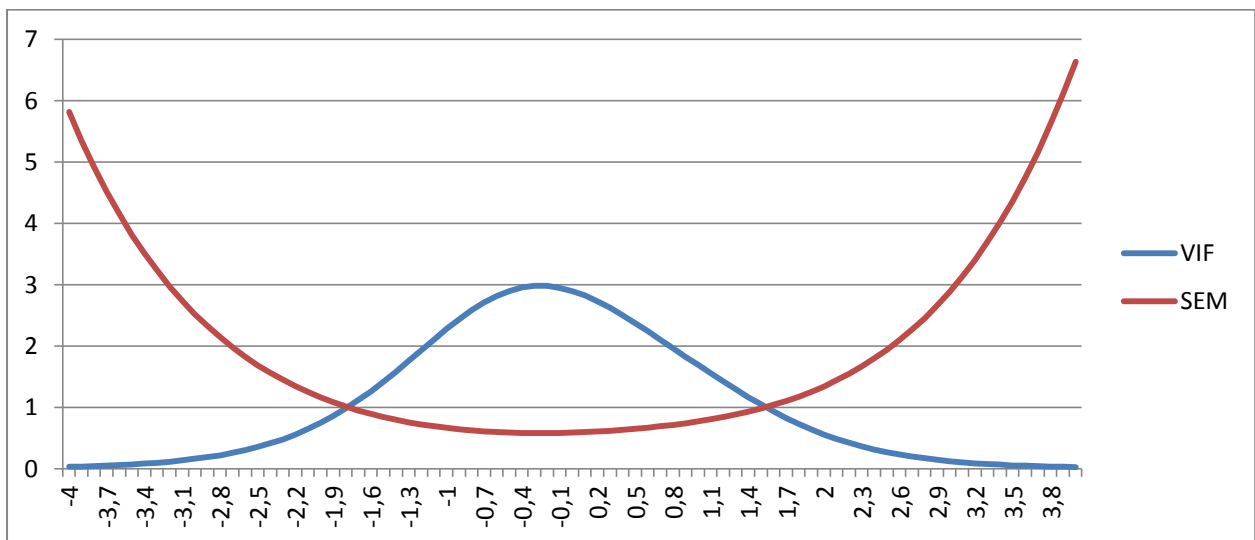


Figure 5. VIF and SEM of Text 1 (Dichotomous Scoring Model)

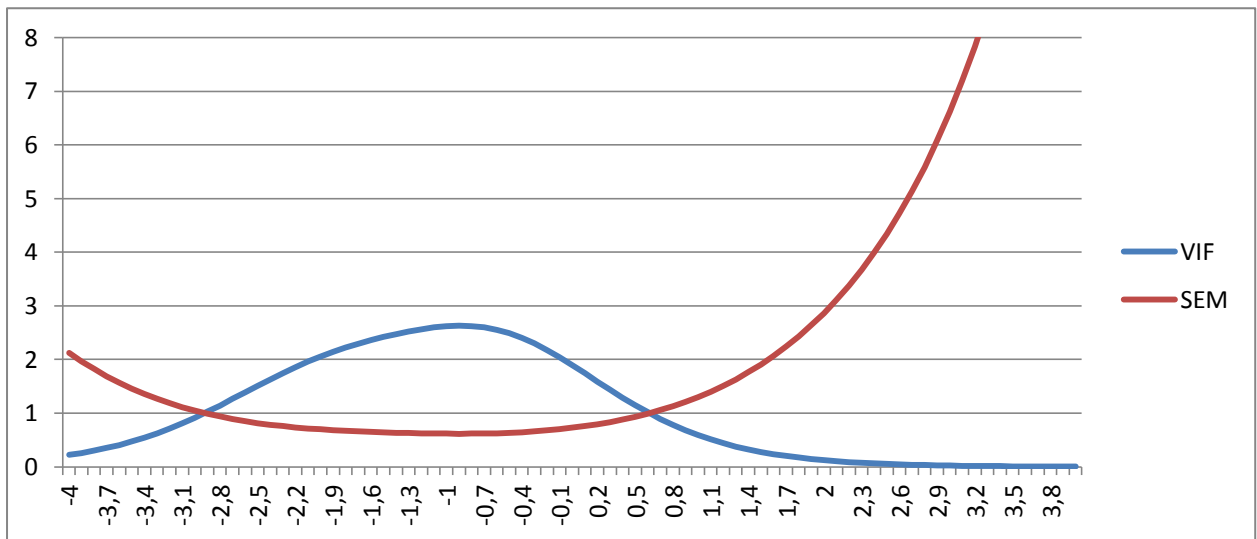


Figure 5. VIF and SEM of Text 1 (Politomous Scoring Model)

In Figure 5, shows that the maximum value of the information function is 3.0 on a scale of abilities equals to -0.3. In Figure 6, the maximum value of the information function obtained 2.63 on a scale of abilities equals to -0.8. Look at Figure 5 and Figure 6, it can be obtained that the value of the information function in dichotomous scoring model is higher than politomous scoring model. In contrast, SEM in the dichotomous scoring model lower than in politomus scoring model.

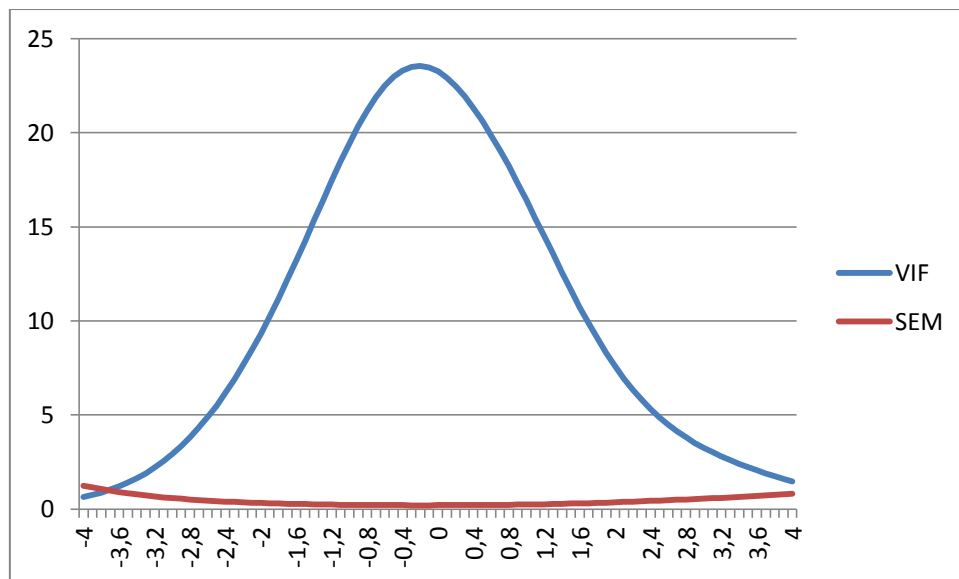
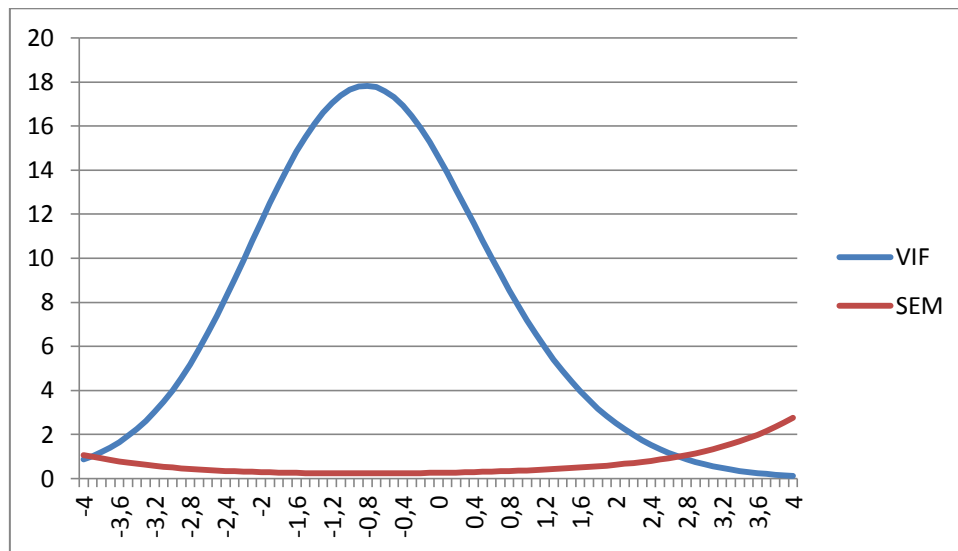


Figure 7. VIF and SEM of TOEP 1 (Dichotomous Scoring Model)

Similarly, the value of the information test function which is the total of the value of item information functions. In Figure 7, shows that the maximum value is 23.5 on a scale ability equals to -0.3. In Figure 8, the maximum value of the information function is 17.8 on a

scale ability equals to -0.9. Look at Figure 7 and Figure 8, it can be obtained that value of the test information function in the dichotomous scoring model is higher than the value of the test information functi in politomous scoring model. In contrast, the SEM of TOEP1 in dichotomous scoring model is lower than the SEM of TOEP 1 in politomous scoring model.



Gambar 8. VIF dan SEM dari TOEP 1 (penskoran dikotomi)

Conclusion

The results of analysis on one TOEP specially in the Reading subtest showed that the average item difficulty dichotomous scoring model is 0.486 with a standard deviation of 0.895 and the mean level of difficulty politomous scoring model is -0.105 with a standard deviation of 0.695. The correlations between abilities of participants using the dichotomous and the politomous scoring model is 0.94. The value of information function in the dichotomous scoring model is higher than in the politomous scoring models. These results indicate that the Reading of TOEP set 1, the dichotomous scoring model is better than the politomous scoring model.

Discussion

Considering the results of the estimation abilities using the dichotomous scoring model and the politomous scoring model, it can be obtained that the estimation ability of testees in dichotomous scoring model is not too far compared with the results the results politomous scoring model. However, the value of the information function by using the dichotomous scoring model, both the value of the function and value of the information function of test,

are higher than in politemous scoring model. That were happened, because the items of TOEP were developed from dichotomous Rasch scoring model. These results probably occurred only in the case of the analysis of the TOEPresponse data. Related to the stability of the estimation, whether the results are better in dichotomous scoring models or politemous scoring model, it is still required a simulation study. This simulation study can be considered a long test, politemous scoring models, the number of testees, and estimation methods.

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**STUDENTS' CHARACTER ASSESSMENT AS A REFERENCE IN TEACHING
LEARNING PROCESS
AT SMPK GENERASI UNGGUL KUPANG**

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Abstract

This paper raised the importance of the character identification of each students before starting teaching learning process at junior high school. As we know that, students come from different families and environments background. These forms influenced their characters into adulthood, so it is necessary to know their characters. The goal of this assessment is the character of each student can be identify in the begining when students entry the school, so the teacher can understand how to treat each student in the class based on their character. The Character identificationof each student is done by assessing the character of the new students who entered SMPK Generasi Unggul Kupang. Character assessment conducted by a test, either in writing or by interview. The result shows that each student has a different character and its influeced by their relation with their friends and also teachers. In addition, the teacher was able to understand the character of each student before continuing the learning process even further. Teachers can prepare specific measures as the approach to each student. Teachers can evaluate the character development of each student regularly. This study will support the implementation of the curriculum 2013 that emphasis on the balance in learning, so the achievement is not only determined by the academic point of view but also moral and character.

Keywords : *Character, Identification, Teacher, Curriculum 2013*

Introduction

Character assesment in schools is one of the most important aspect in order to help students to enroll a learning activity in a proper way. Therefore, every character of the students must be known by the teachers before beginning any learning activity. Looking back to the reality nowadays where students are treated as the same, especially in the matter of learning. Where in fact each of the student's characters are not the same, and so they could not be treated as the same. This is the point where a teacher's role must be applied. By knowing their characters, teachers are helped to figure out ways to treat every single one of their student in the learning activity process.

This kind of assesment is also considered as an important aspect, seeing the character is an important subject in Curriculum 2013. It will not be just a common assessment, but also

as an instrument to create a better learning activity progress, both for the students and teachers. It has been considered that every students had different characters, and it affected their behaviour in learning activity. This is why the role of a teacher is also a very important part to help every students with their own characters in a teaching and learning activity. The problem is, many teachers do not have the knowledge of their students's characters since the beginning of school, and so that teachers could not make a proper approach to the students. This is where the character assessment should be applied.

Sekolah Menengah Pertama Kristen (SMPK) *Generasi Unggul* Kupang has been doing this character assessment to the new students that applied in the school in every academic year before beginning the teaching and learning activity. Therefore, this research is proposed to find out (1) the importance of knowing every character of the students since the beginning of learning activity process, (2) the importance of character assesment before entering a learning environment, and (3) is this character assessment in SMPK *Generasi Unggul* Kupang could provide a mapping representation of the characters of the students.

Methods of Research

This research is a descriptive-qualitative research, uses an interview and documenting as its data collecting technique. interview is obtained to the Headmaster and three teachers representing each grade in SMPK *Generasi Unggul* Kupang. Data analysis procedure is (1) collecting documents related to character assessment, (2) analyzing data that had been collected, and (3) interviewing the informants.

Findings and Discussions

Character assessment needs to be done in educational institutions with the aim to help teachers to understand the character of each student , so the teacher can determine the exact learning model for all students with a different character . Application of appropriate learning model will help the students to follow the learning process more effectively , and also obtain better learning results.

Character Assessment conducted at SMPK *Generasi unggul* kupang using assessment instrument called the Best Test Profile. This assessment was made because the school saw that most teachers are frustrated with the behavior of the new learners and the difficulty in dealing with their behavior because teachers are not familiar with the new learners. Based on the background so that the schools make a character assessment instruments for each new learner , which aims to help every teacher get to know each new learners in each school year so that each teacher can determine the right approach to each student to help them follow

each lesson well . In addition , this test also aims to predict the interests, talents and potential of the new students so that the school can help to develop it.

Best Test Profile is provided to the prospective of new students every school year since 2009. The test is given in conjunction with the academic tests , as soon as the prospective new students enroll . The contents of the test is 24 groups adjectives. Each child is asked to tick one of the most adjectives in them , and one adjective most lacking in themselves , in each group of words . Each adjective in this test has symbols respectively . Each child was asked to tick symbol.

The test is then assessed by teachers in SMPK Generasi Ungull Kupang. Results obtained from these tests are 4 types of characters and their learning styles, namely ; B = Dare with kinesthetic and visual learning styles ; E = Expressive kinesthetic learning style and audio-visual ; S = Patient with audio-visual learning style ; T = Meticulous with kinesthetic and visual learning styles

The test results are then analyzed by the teachers to know the character and style of learning that is appropriate for each participant students . From the analysis found different character . In this study only 10 students were taken as the data sample. From the 10 were found to be that the patient 's character only found in 3 students . Generous character is owned by 4 students . As for the character decently only owned by one student . Some examples of this character difference is only a part of a student's character assessment results are presented to show the difference in character vary greatly among students . There are some children who have a very strong patient character , there also has a generous character is very strong.

From the character assessment instrument is ultimately about the character of each student mapping can be done from the outset by the Generasi Unggul Christian school . Given this mapping , the teachers can help students both individually and collectively find a potential , opportunity and hope that is in each of the students . When there are students who have problems in the teaching and learning process , teachers can make the right approach to help the problems of the child. Likewise, when there are learners who have problems with their attitudes and behavior , teachers can also handle it in a proper way because they already know the character of the child.

Getting to know the character of the students from the beginning is important for teachers, teachers can be used as reference for character formation and subsequent learning process . The teachers who do not know the character of their students from the beginning would have difficulty in giving direction or are wrong in giving aid . Like a doctor in

prescribing to their patients based on the analysis of the disease . Doctors can not prescribe drugs indiscriminately . Because if incorrectly can lead to death . Thus also the teachers before giving advice or any form to the students should be recognized first character. Even if you need to identify the root cause of the formation of the character of the student so that no wrong in giving action . Bad character in students that are not handled properly will continue until adulthood . It certainly hurt yourself even harm the nation because of the people who have problems in character and would be a burden to the State.

Students today are the leaders of tomorrow . If schools are educating them to be young men who have high character , Indonesian State eventually become state high character . Furthermore, one important aspect of the characters progress in school is increasing academic achievement . If a good character can be aligned with high academic Traffic will generate a fully human .

Traditionally , the character originally built in family with both the nuclear family and extended family . But many homes or families who neglect this important responsibility . The family as fully devolved to schools . unfortunately the teachers had too long ignored these things . Even if there is just rhetoric without a deep sincerity to build the character of students . The activities carried out only a mere ceremony without a clear purpose.

If the character mapping has been done then the next step is the most important thing is the teachers need to find out the approaches most appropriate to help all students based on their character . Knowing the character of the students from the beginning does not mean the case is over. Precisely this is just the beginning of a long process through which the human being is created for the sake of high character .

The actions that have been performed should be evaluated again at regular intervals. this is due to the development of students' character continues to develop with age and also of the increase of life experiences that passed. Teachers themselves must continue to learn about character development as a necessity to help each student more character without sufficient knowledge and keteladan of teachers .Educators need to further clarify which way the character of a student should be built . Good character includes three things: to know the truth, love the truth and do righteousness .

Overall test for the character assessment is good because it can help teachers to know the character of the learners . However , students tend to be less serious when taking the test , and tend to take the test at random . So that the test results are sometimes less able to describe the character of the actual students . This can be illustrated by the teacher during the learning

process has been started, which raised student behavior is not in accordance with the test results .

Conclutions and Suggestions

Based on the findings and discussions of the character assessment can be concluded that Best Test Profile is carried out in the SMPK Generasi Unggul helping teachers in the learning process due to the introduction of the character and learning style of each student from the beginning . This assessment can also be used in the implementation of the curriculum 2013 which emphasis on character formation so that teachers are familiar with the character of their students from the beginning and facilitate teachers to shape the character of each student .

Getting to know the character of the students from the beginning before starting the learning process is very important because it will be used as a reference for teachers to undertake the necessary actions in the classroom based on the character of each child . Therefore, to the character of each student can be recognized from the outset that the assessment becomes important.

Character assessment should not only be done at the beginning of school but done regularly in order to follow the development of the character of each student over time . This research can be applied in schools that have been run in curriculum 2013 or school that have not , bearing in mind the character is very important so as to facilitate the forming of students who are not only smart but have the attitude , character , good morals.

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MEASUREMENT ERROR ESTIMATION OF CUT SCORE OF ANGOFF METHOD BY BOOTSRATP METHOD

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Abstract

The purpose of the study was to determine cut score of National Examination in Accounting Subject of Package 2 and to estimate the measurement error in the Angoff. The sample were 12 SMK's in DIY purposively selected. Teachers who follow a Focus Group Discussion were 9 people consisting of 7 women and 2 men. Data obtained by documentation of a national competency exam answers Accounting of package 2 in the academic year 2011/2012. The technical analysis was divided into three stages. The first stage was the preparation. The activities at this stage included the preparation of data. The second stage was FGD, which was carried out in two rounds. The FGD participants in the first round were given a training to determine the cut score using the Angoff method. In the second round, the participants specified a cut score but they had not been given a training anymore. At the third stage, the participants estimated error measurement by using the Bootstrap method. The steps used in the Bootstrap method included the determination of the data, resampling the sample (x^*), calculating the standard error of estimation of Bootstrap. The results showed that 1) the cut scores for the Angoff was 68.22. 2) The error estimation of Angoff's cut score was 1.58 in 200 times Bootstrap.

Keywords: *Cut Score, Error Measurement Estimation, Bootstrap*

Introduction

The Indonesian government concern about the quality of education. This is evident in the policies issued by the government, especially in the allocation of education funding in the APBN, the Law of National Education System, and educational standards such as content standard, competency standard, facilities and infrastructure standard, management standard, process standard, financing standard, educators and education personnels standard, and assessment standard.

Recently, the government sets the graduation policy at every level of education. At this time, the student pass on the educational level when they reach 5.5 on the national exam. If the student does not reach 5.5, the student does not pass and have to take the exam for elementary equivalence package A, package B for junior high, and package C to high school.

Cut scores determination is not easy (Nudell, 2008). For example, before determining the cut scores, standard setters have to 1) agree about minimum competencies definition, that must be achieved by students, 2) determine the number of panelists who are involved in the standard setting. 3) determine the number of rounds, 3) determine cut score if there are

differences the cut score in each round. These variables can lead to variability in the resulting cut scores. Therefore, standard setters need to pay attention to the existing standard error on cut scores.

A number of studies is held to find cut score (eg. Alsmadi, 2007; Skagg, Hein, & Awuor, 2007; Natalina, 2010; Koffler, 1980; MacNamm & Stanley, 2006). However, a few research considered standard error in determining cut score. That impact in the cut score precision as cut of point student competencies.

Angoff method broadly used in standard setting (MacCann & Stanley, 2004). Researcher use Angoff method to find cut score and compare with another standard setting method (Yin and Schulz, 2005; Skaggs, Hein, and Awuor, 2007; Alsmadi, 2007; Brennan & Lockwood, 1980). Using Angoff method, panelists ask to estimate minimal competency probability of students who can answer items correctly.

Panelists rarely estimate of minimal competency probability preciously. Nichols, Twing & Mueller (2010) suggested that a problem in measuring process in social science is no indicator that measure the attribute directly. The accuration in estimation of minimal competency probability can be approached by Bootstrap method. The Bootstrap method is used with resample with replacement repeatedly.

Some literature suggests that resulting resample with replacement repeatedly are close to the normal distribution. By using the Bootstrap method, standard setters can calculate the standard errors. The Bootstrap method is widely applied to the statistics science for mengestimasi errors in small populations or population numbers were not known.

According to Efron, & Tibshirani (p. 45, 1993), resampel with replacement for estimating of standard error is done at least 200 times. In this study, resample of the Bootstrap would have done as many as 200, 300, 500, and 1000 times. It is meant to see the differences among Bootstrap results. Standard error is calculated based on the results of the resample.. Results calculation of the standard error will be close to the original sampel.

The Bootstrap steps for estimating of standard error are as follows (Ajmani, 2009, p. 264).

1. Determine reseach population, in this case is cutscore that generated through Focus Group Discussion
2. Take sample (x) from existing population.

3. Take resample (x^*) with replacement as many as $n = 7$ from the sample (x). Resample with replacement is hold as many as 200, 300, 500, and 1.000 times.
4. Calculate the estimation of Bootstrap standard error by formula (Efron & Tibshirani, 1993. p.47).

$$se_B = \left\{ \sum_{b=1}^B [\hat{p}^*(b) - \hat{p}^*(.)]^2 / (B - 1) \right\}^{1/2}$$

where:

se_B = Bootstrap standard error

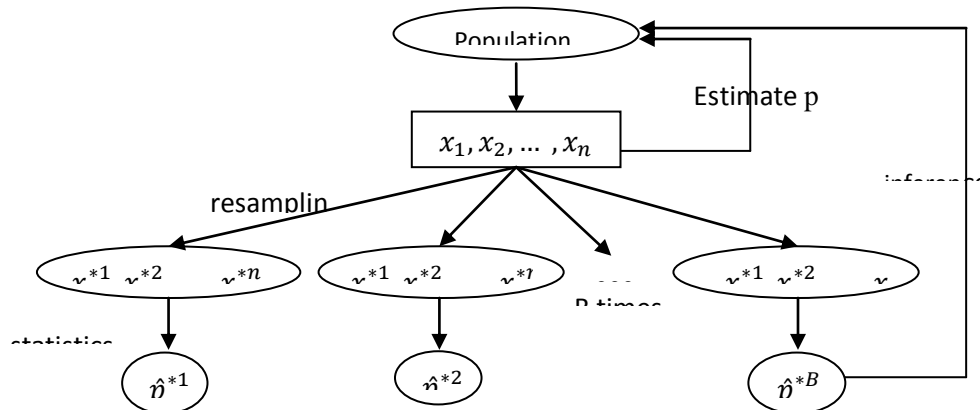
\hat{p} = parameter of population

$\hat{p}^*(.) = \sum_{b=1}^B \hat{p}^*(b) / B$ (mean of $\hat{p}_1 \dots \hat{p}_B$)

B = number of resample

The process of Bootstrap in this research is drawn in Figure 1. In Figure 1, sample (x_1, x_2, \dots, x_n) that is used in Bootstrap is derived from real population (p). Resampling with replacement is taken from the original sample (n). The star notation indicates that (x^*) is not the actual data set x , but rather a randomized, or resampled, version of x . Bootstrap is done as many B times. The next step is calculate the statistics of each sample Bootstrap standard error.

Based on the background, the proposed research question is how large standard error on the Angoff method? This research aims to estimate the measurement error in Angoff method by Bootstrap on accounting expertise field of vocational school in Yogyakarta in the academic year of 2011/2012.



Gambar 1.

This research contribute to estimate standard error that generated using Bootstrap. The other research estimate standard error by using Central Limit Theorm (MacCann, & Stanley, 2004), and generalizability Theory (Yin, & Sconing, 2008).

Reseach Method

The reseach data were students' response to the National Examination in Accounting Subject of Package 2 of accounting expertise field, study program financial of vocational school, field expertise business and management of vacational school in Yogyakarta in the academic year of 2011/2012 which are schools' data with 338 students.

The population of the reseach were cut score that are generated using Angoff method on vocational school in Yogyakarta. The sample of the research were cut score of nine vocational school that have accounting expertise field in Yogyakarta.

The reseach uses instrument of Practice Examination in Accounting Package 2 of vocational school created by National Education Standards Agency (BNSP). The question of practice examination consist of three parts namely managing journal, ledgers, and accounting cycle. In the managing journal there are 26 transaction that must be done by examinee. After the examinees answer the question in the first section, the examinee are asked to post a journal to the ledgers. In third section, examinees are asked to complete accounting cycle by made the Bank reconciliation journal, the adjustments, income statements, statements of equity, the balance sheet and cash flow, closing journal, and balance sheet after closing journal.

Technique of Data Analysis

The technique of data analysis was divided into three stages. The first stage was the preparation. The activities at this stage included the preparation of data. In this stage, researcher prepared data that will be used in standard setting meeting. The data included test items, examinee response of national examination, examinees score, cut score worksheet, material of cut score training.

The second stage was Focus Group Discussion (FGD), which was carried out in two rounds. The 12 teacher of vocational school has invited to standard setting meeting. Teacher who engaged in the FGD were nine teachers, consisting of seven women and two men. The FGD participants in the first round were given a training to determine the cut score using the Yes/No Angoff method. Procedur of cut score determination are as follows. 1) asked to teachers to review test items, 2) asked to the teacher to estimate examinee who answered test

items correctly. If amount of examinees answered test item correctly than they got score 1. If amount of examinees could not answer test item correctly, than they got score 0. 3) made average of test score. In the second round, the participants specified a cut score but they had not been given a training anymore.

At the third stage, the researcher estimated error measurement by using the Bootstrap method. The steps used in the Bootstrap method included the determination of the population, sampling the data, resampling the sample (x^*), calculating the standard error of estimation of Bootstrap. The formula to find standard error using Bootstrap as follow (Efron, & Tibshirani, 1993. p.47).

$$se_B = \left\{ \sum_{b=1}^B [\hat{p}^*(b) - \hat{p}^*(.)]^2 / (B - 1) \right\}^{1/2}$$

In this stage, researcher made resample the cut score as much as 200, 300, 500, and 1.000 times using R program serie i386 3.0.0. The syntax used to resample are as follow.

```
> getwd()
> data=read.csv("angoff.csv", header=T)
> data=angoff.vector
> data=data$Cutscore
> data
> sink("angoff.txt")
> for (i in 1:200){
+ x=b.stat(data,200,mean)
+ print(c(i,mean(x$stats), x$std.err))
+ }
> sink()
```

Researcher also made a file to compute standard error. The syntax of the file are as follow.

```
b.stat <- function(data, num, stat) {
resamples <- lapply(1:num, function(i) sample(data, replace=T))
r.stat <- sapply(resamples, stat)
std.err <- sqrt(var(r.stat))
list(std.err=std.err, resamples=resamples, stats=r.stat)
}
```

Research Finding and Discussion

Data used in data analysis are students' response toward the National Examination in Accounting Subject of Package 2 of accounting expertise field, of vocational school in Yogyakarta in the academic year of 2011/2012. There are constrain in the data collection, 1) principle of school has no saved the bundle of national examination anymore. 2) some school take the package 1 and 3 for national examination. 3) a few school are fishing out. The 12 schools that are became as data source represented: state and private school, regency in Yogyakarta, and highest, middle, and lowest catagorical school. Tabel 1 indicate the sample school.

The teachers who attended in FGD are one teacher from SMK PGRI 1 Sentolo, one teacher from SMK Tujuh Belas Bantul, one teacher from SMK Budhi Dharma Piyungan, one teacher from SMK Negeri 7 Yogyakarta, one teacher from SMK Muhammadiyah Tepus, one teacher from SMK Sanjaya Gunung Kidul, one teacher from SMK Sanjaya Pakem, one teacher from SMK YPKK 3 Sleman, dan one teacher from SMK "17" Seyegan. The nine teachers are in accordance with the specified conditions that are have been teaching for a minimum of 5 years, teaching in grade 12 and graduate of the Economic/Accounting Studi Program.

Tabel 1. School List

No	School Name	Catagory	No	School Name	Catagory
1.	SMK Ma'arif 1 Temon	Low	7.	SMK Muhammadiyah Tepus	High
2.	SMK PGRI 1 Sentolo	High	8.	SMK Sanjaya Gunung Kidul	High
3.	SMK Tujuh Belas Bantul	Low	9.	SMK Sanjaya Pakem	Middle
4.	SMK Budhi Dharma Piyungan Bantul	Middle	10	SMK Muhammadiyah Berbah	Middle
5.	SMK Negeri 1 Bantul	High	11.	SMK "17" 1 Seyegan	Low
6.	SMK Negeri 7 Yogyakarta	High	12	SMK YPKK 3 Sleman	Low

Stage I

Standard setting activities begins with preparing devices used in standard setting. This preparation includes 1) to correct a student's response of vocational school in the dichotomous form. The corrector are student of accounting education at semester 9 of Sanata Dharma University. Before correcting examinee response, the students of accounting education are trained in advance to identify perceptions. Assessment rubrics for dichotomous scoring also socialized to students. The materials distributed to standard setting participants consists of a description of standard setting, standard setting rounddown, panelists answer

sheet form, the standard of competence of graduates (SKL), vocational practice examination questions, and assessment rubrics.

Stage II

FGD conducted with 12 panelists from each sample school. Before determining cut score, panelist was given an explanation about understanding and purposing the standard setting, the instrument used, and data analysis using Angoff method. The participants also were given hard copy material. After an explanation of the standard setting material, participants practice standard setting under the guidance of researcher. The cut score are simulated using Excell program. After that, participants determine the cut score using Yes/No Angoff method.

Determination of cut score using Angoff method is conducted by gave a score in each descriptor (journal, ledgers, and accounting cycle). If examinees are able to answer the question then the examinee is given a score of 1, whereas if the examinee are not able to answer the question then examinee is given a score of 0. In the first round, cut score generated by the panelists is 68.44 and in the second round, the cut score generated by the panelists is 68,22. The cut score is shown in Tabel 2.

Tabel 2 Cut Score of Yes/No Angoff Method

	Round 1	Round 2
Panelist 1	72.00	72.00
Panelist 2	68.00	67.00
Panelist 3	72.00	73.00
Panelist 4	73.00	72.00
Panelist 5	70.00	70.00
Panelist 6	64.00	60.00
Panelist 7	54.00	60.00
Panelist 8	73.00	73.00
Panelist 9	70.00	67.00
Mean	68.44	68.22

Based on Tabel 2, it appears that the cut score generated by the panelists include high category. Panelist 6 and 7 gave the lowest cut score, i.e 60.00. while the panelist 3 and 8 gave the highest cut score, i.e 73.00. The average overall cut score was 68,22. This showed that examinees are considered to be competen if they reached score minimum 68.22 or more.

If the standard setter use the cut score 68.22 to determine pass/fail, there are 111 of 338 examinees who graduated from the national examination. Thus, there are 227 examinees who did not pass. It appears that the cut score generated in standard setting is high. It means that examinee who graduated from vocational school have a competency to manage accounting process. This understandable that the accounting field is one part of the company that holds an important role. The existing errors in one of accounting process would result in the next process and it made a company loss. Therefore, the business expected graduate of vocational school expert in their field.

Results of discussion with the teachers revealed that the time provided to complete the accounting practice examination was not proportional. The time given to complete managing journal was shorter than others (ledgers and accounting cycle). While, questions that given in managing journal was more difficult than others.

Determination of cut off score that high needs to be balanced with a good learning process, good facilities and infrastucture, and the involvement of various party in learning. in practice, sometimes, there is a disharmony between the company and the education. For example, if student do field work practice, many company divert the accounting students in other field, such as secretariat, sales force, etc. Many company assumed that finance is company confidential and anyone had not to know.

The school's education facilities and infrastructure need to be improved. Based on survey conducted by researcher, many school have no adequate facilities and infrastructure for learning well. Many school had limited class, consequently, it had no accounting laboratory. In addition, the tools of learning in vocational schools was minimal.

The lack of existing facilities and infrastructure will result in less then optimal learning and its impact on the poor quality of vocational graduates. Therefore, in addition to the teacher demanded more creative in the learning of accounting to their students. Teachers also need to introduce accounting practice and bring it in the classroom. Therefore, the teachers' creativity needs to be improved by providing a good education and training.

The government should concern about the conditions above and should increase education quality. The government should pay more attention to the quality of the schools that is in standard below category. The gap between the business and education can be minimized by the existence of coordination between the ministries concerned. The government also provide control for schools, especially vocational school either administration, teachers, the learning process through the educational distric agency.

Stage III

Cut score (x) that generated on stage II is taken resample with replacement (x*). The resampling is conducted using the R i386 3.0.0 program. Tabel 3 indicated estimation of standard error. Tabel 3 showed that second round have less standard error compared by first round.

Tabel 3 Estimasi Kesalahan Standar pada Metode *Yes/No Angoff's*

Bootstrap	Putaran 1	Putaran 2
200	1.90	1.58
300	1.91	1.63
500	1.90	1.69
1000	1.86	1.63

Estimation of standard errors obtained using Bootstrap is relatively small. Several factors are thought to be a large effect on the small standard errors is the ability of panelists in this case teacher of vocational school. Teachers who understand the students' ability are easily predict the students ability. It can be held by discussion frequently about subject or other knowledge.

The other factor thought to affect the estimating of the standard error is the number of sample. It influence in variation data. The more sample that are made on the Bootstarp resample the data will be more variation. Similarly, the less sample that is resampled, the data obtained did not have many variation.

In addition, the cut score made by teachers affected by definition and training of standard setting (Giraud, Impara, & Plake, 2005). Therefore, in conducting standard setting, the teachers have to practice and sufficient training. Understanding in standard setting well have an impact on the determination of cut score.

Conclusion and Suggestion

The finding suggest that cut score for National Examination in Accounting Subject of Package 2 was 68,22. Further, the cut score was higher than Indonesia government determined. Bootstrap could be used for estimate the cut score error. The estimation of cut score error was various depended on amount bootstrap.

There is a need for further studies of the estimation of cut score error. For example comparing error estimation of Angoff cut score and other cut score method by bootstrap method. Further studies might compare bootstrap error estimation and other method.

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THE ACTUALIZATION OF PROJECT-BASED ASSESSMENT IN ENTREPRENEURSHIP EDUCATION BASED ON LOCAL EXCELLENCE IN MEASURING SKILLS OF VOCATIONAL HIGH SCHOOL STUDENTS

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Abstract

*This study is part of a study on the development of entrepreneurship education model based on local advantages to improve the vocational skills of high school students in the city of Mataram. One purpose of this study is to obtain project-based assessment tools to measure the vocational skills of high school students on the subjects of entrepreneurship. This study uses a model of research and development Borg and Gall (1983) The main stages include: (1) a preliminary study; (2) the development of the initial product consisting of the preparation of design models, preparation of prototype product models, initial product testing through test validation and test experts is limited; and (3) test the final product in the form of pre-experiment using a static group comparison design. Data in the test phase of products are obtained by using questionnaires, focus group discussions, and implementation of project-based assessment. All the data were then analyzed by descriptive quantitative and independent sample *t* test. The results of the study are as follows: (1) assessment component covers all aspects of planning, implementation, results / products, and reporting that comes with the operational and measurable assessment rubric; (2) the expert validation test results indicate that the average score of 4.72 with a very good category; (3) the results of consistency test conducted by two assessors showed a correlation coefficient 0.934 with a probability value of 0.000. Thus a reliable project-based assessment instruments; (4) the results of the model test showed *t*count at 18.54 with a probability value of 0.000. Thus, project-based assessment instrument is recommended to be used to measure the vocational skills of high school students in the eyes of local excellence in entrepreneurship education. Based on these findings, the school and relevant agencies can use these instruments, either in the form of socialization, doubling, workshops, and implementation.*

Keywords: *Project-Based Assessment, Entrepreneurship, Vocational Skills*

Introduction

In learning process, assessment has a strategic position, because it can provide a framework for determining the learning objectives and the progress of the learning process. Assessment is used to measure learning outcomes Reigeluth and Merrill (1978; 1979) and Degeng (2013: 186) classified into three, those are effectiveness, efficiency and sense of learning. Further Reigeluth and Merrill (1978; 1979) stated that learning effectiveness can be measured by associating it with the learning objectives (competencies) and the type or characteristics of the field of study. Referring to this theory, it is in the context of entrepreneurial learning, assessment should be directed to the measurement of entrepreneurial competencies of students on entrepreneurial attitudes and behaviors, including students' vocational skills (Direktorat Pembinaan SMA, 2007: 8). This reflected that these

competencies are likely to lead to the goal and supporting procedural orientation and prerequisites of the procedural steps in conducting sequence activities (Degeng, 2013: 58), so that the assessment also lead to these obligated competencies.

However, problems arose and became one of the focus of this study was the use of assessment was not relevant to the field of study characteristics and competencies being measured, particularly on the subjects of entrepreneurship education. Sukardi et al. (2012) findings: for example, the assessment was used to focus on the limit of the written test, even in the Wildan et al. (2011) finding stated that the assessment conducted tend to to measure the lower-level cognitive aspects. Of course, this condition is not in accordance to the characteristics of entrepreneurial education that emphasizes the value of the character and behaviors of entrepreneurs (Wennekers & Thurik, 1999) included entrepreneurial skills/vocational skills (Priyanto, 2012). The characteristics of this field of study was strengthened by the some findings of research that stated that the attitude and behaviors of entrepreneurs was entrepreneurial competence which was established through entrepreneurship education (Birdthistle et al., 2007; Taatila, 2010; 2008; Sowmya et al., 2010).

In addition, as entrepreneurship education in Senior High School is one form of local content, its content is more focused on local advantages in order to develop skills of students (Direktorat Pembinaan SMA, 2007: 8). Thus, entrepreneurship education is directed to the completion of the children' social problems as dropout, unemployment, and others. Central Bureau of Statistics (BPS Indonesia, 2013), for example, noted that 9.74% of graduated Senior High School became unemployed, and it is only about 25% who pursue their study to a university, which was indicated on the Gross Enrolment Ratio of University was 18.3 (BPS Indonesia, 2013). This Scientific responsibility entrepreneurship education is in line with the thinking of social reconstruction theory on oriented problem solving of the learners, such as the less skills as proposed by Gourge S. Counts, Harold Rugg, and Theodore Brameld (McNeil, 2006: 38; Bagenstos, 1977). In terms of implementation, social reconstruction theory can be applied in the form of: problem solving oriented development of the students (White, 2002); students' potension based aim and content (McNeill, 2006: 38); learning emphasized on shared learning activities, interaction, cooperation (Joyce et al., 2001) including practice (Hung, 2002); and evaluation of learning that involves students (McNeill, 2006: 39).

Based on these problems, it is important to do the construction of entrepreneurial learning, both related to content (such as the use of local advantages), learning (learning-based joint activities, interaction, collaboration, and practice), and assessment (use of

authentic assessment). Construction of such assessment is important because the assessment conducted on to measure low level cognitive aspects by relying on the written test as the main instrument. Therefore, the focus of study is to provide directed project-based assessment tools to measure students' vocational skills. Assessment can assess the performance of the project (process) as well as the results of the practice (product) conducted by the students themselves whether conducted by students, peers, or by the teacher (Bergh et al., 2006). This assessment consists of four main parts, namely planning, implementation, product/results, and reporting (Puskur Balitbang, 2006: 36). Thus, one of the goals of this research and development, which is to produce a project-based assessment tool used to measure viable vocational skills of high school students on the subjects of entrepreneurship based on local advantages.

Research Method

This study used *research and development* method which referred to Borg and Gall (1983: 773) by conducting appropriate adjustments to the existing conditions. In addition, this model combined with the principles of constructivist-oriented design, such as the collaboration between researchers/developers with users during the development process, design and development activities were integrated, and the final model was open and flexible (Willis, 2000; Willis & Wright, 2000). At least there were some main stages in this study, namely: (1) conducted a preliminary study using survey methods (Ary et al., 2002: 375) in all Senior High Schools in the city of Mataram NTB. The data was collected by using questionnaires in the form of semantic differential, focus group discussion (FGD), and a review of documents, which were then quantitatively analyzed descriptively; (2) the development phase consists of the preparation of the model design and preparation of prototype products. Construction of a prototype model of the product was done in a participatory manner involving research subjects. Especially for the assessment using project-based assessment (Bergh et al., 2006) which has four aspects of assessment, namely: planning, implementation, results/products, and reporting; and (3) the stage of testing the effectiveness of the model was done through initial product testing and final product testing. Initial product testing was done through expert validation test of Education Research and Evaluation. The consistency test of the assessment was carried out by comparing the test results of the assessment of vocational skills by two assessors, as suggested by Gronlund and Waugh (2009: 65). The final test of the product was done through field trials in the form of pre experiments using static group comparison design (Borg & Gall, 1983: 680; Creswell, 2009: 241). To reduce the weaknesses of this design, researchers tried to match the two

classes in terms of intelligence, interest in entrepreneurship, the same infrastructure, the ability and sincerity teachers, allocation of time and learning schedule.

Results

The explanation the results of the study is focused on the construction of the assessment instruments. The survey found that the assessment instruments constructed by teachers in entrepreneurship education in the city of Mataram SMA is not relevant to the characteristics of the subjects and competencies being measured, such as vocational skills of students. The study revealed that the assessment of learning is still focused on written test. In addition, tests were developed more directed at the cognitive level of knowledge and understanding. There are few teachers who developed non-assessment tests, such as project appraisal, performance, portfolio, and the like.

Referring to results of the needs analysis and principles of social reconstruction, the entrepreneurial learning was indicated local skills/regional production skills, like crafting gold/silver/pearl to be the main content. This content became an instrument of social problem-solving of graduated students from Senior High School, so the goal is emphasized on motoric skills (vocational skills). The implication for assessment was the uses of the assessment of measuring students' vocational skills, such as project-based. This assessment was conducted to know the achievement of learning objectives, efficiency, and attractiveness of teaching as thinking Reigeluth and Merrill (1978; 1979). In addition, the uses of project-based assessment becomes more relevant because the structure of the content in entrepreneurship education based local advantages showed more procedural relationship of the steps in carrying out production activities. Based on the analysis of the problems and needs as well as referring to the social reconstruction theory, the researchers collaboratively established the use of project-based assessment to measure the vocational skills in producing jewelery gold/silver/pearl. The design project-based assessment is visualized in Table 1 below.

Table 1. Description of The Design Project-Based Assessment Entrepreneurship Subject-Based on Local Excellence

No.	Item	Description
1	Planning	Planning included the task project done by student, time planning, the division of tasks among group members, preparation of materials and practice tools/Completion of the documentation tools during practice.
2	Implementation	The Implementation, included: the use of precision tools, precision use of the practice, how to practice, the accuracy of the

		order of production practices, and timeliness during practice.
3	Products / Results	The results of the practice of real product / project completion aspects included: the truth of the resulting product, neatness, cleanliness, fineness products, precision measurement, and the strength of the product installation.
4	Reporting	Related to the accuracy of systematic project reports, completeness of reporting, mastery of the material, communicative presentation, use of media presentation, and data support.

Source: Primary Data Processing

Components of the project based on the above assessment was equipped with an assessment rubric that included a detailed description of the types of specific performance and the criteria that will be used to assess student projects. Assessment rubrics were arranged in the form of a Likert scale that has three options, namely: good (score 3), adequate (score 2), and medium (score 1).

Expert validation test results indicated that the product-based assessment project is very good. The results of the assessment validation obtained an average score of 4.72 in the interval 1-5 in the excellent category. These results reflected that all aspects of assessment tools, either related to the planning, implementation, product/results, or reporting was adequate, included assessment rubric. Overall, the component was feasible assessment used to measure entrepreneurial competencies (skills of vocational students).

Furthermore, for the instrument reliability, the product test was then conducted using project based assessment tools. Through assessment by two assessors, as suggested by Gronlund and Waugh (2009: 65). The scores from both assessors are correlated to identify the consistency of assessment instruments. The test results indicated that project-based assessment tools were used consistently and recommended to be used to measure students' vocational skills on the o entrepreneurship subjects. Test results can be seen in Table 2 below.

Table 2. Summary of Test Results Consistency Project-Based Assessment Instruments

Instrument	Evaluator	Mean	Sd.	r value	Sig.	Conclusion
Based Assessment Project	1	87.83	5.109	.934	.000	Consistent
	2	88.13	4.077			

Source: Primary Data Processing

The test of final product is carried out through pre experiments using static group comparison design. The results of statistical tests (independent-samples t test) effect of the

use of project-based assessment of vocational skills visualized in Table 3. Prior to testing the effectiveness, first tested in the form of requirements analysis tests of normality and homogeneity. The results of the analysis of normality shows the Kolmogorov scale Smirnovhitung value of 1.183 with a probability value of $0.112 > 0.05$. Thus, the data of vocational skills of students in both classes are normally distributed. The results of the homogeneity tests show magnitude of F values of 0.285 with a probability value of $0.595 > 0.05$. It was concluded that both classes variance is homogeneous.

Table 3. Results of t Test Using Project-Based Assessment of Vocational Students Skills

Class / Group	N	Mean	Sd.	Value t	Df	Sig.
Experiment	40	88.13	4.07	18.54	78	.000
Static	40	70.33	4.49			

Source: Primary Data Processing

The data in Table 3, it can be concluded that there are significant differences between vocational skills of the experimental class than that of static class. Vocational skills higher than the experimental class. Thus, the uses of project-based assessment instrument to measure the vocational skills of high school students in the eyes of local excellence in entrepreneurship education. This difference can be understood, because the assessment of learning in the experimental class was adjusted to the competencies measured. Additionally, in the assessment process involv students in the planning and evaluation aspects based on principles of social reconstruction.

Discussion

Entrepreneurship education in Senior High School, which was one form of local content that aimed to equip students with the skills through the use of local potential including local advantages (Direktorat Pembinaan SMA, 2007: 3). Referring to this aims, the entrepreneurship education focused on skill formation, so the goal was likely to lead to the goal and supporting oriented procedural prerequisites (Reigeluth and Merrill, 1979; Degeng, 2013: 58). In the context of learning outcomes according to Gagne and Briggs (1979: 51), the goal was likely to lead to the capability of motoric skills. Thus, entrepreneurship education was directed towards the formation of skills for students in managing the local advantage in order to obtain provisions for independent living after Senior High School graduation.

Observing these characteristics, the assessment should ideally emphasize on the use of authentic assessment, such as project-based assessment, performance, products, and so on. However, the results of preliminary studies clearly illustrate that the devices used less in

accordance with the demands of the entrepreneurial substance. This has inconsistency of the impact of entrepreneurship education on students learning outcomes (Packham et al., 2010; Frank et al., 2005; Jones et al., 2008). This difference by Cheng et al. (2009) caused by content differences, learning, and assessment used. This inconsistency triggered the reconstruction on the subjects of entrepreneurship education, particularly in the aspects of assessment. This reconstruction produced project-based assessment tool for entrepreneurship education subjects of local advantages based on the theory of social reconstruction.

The resulting product can not be separated the theoretical social reconstruction. Berger and Luckmann (1990: xv) as the main character in the social sciences (sociology) believed that the ontology paradigm of the social construction of reality as a social construction which was created by the individual to the social world around them. The theory of social reconstruction was then applied to education pioneered by George S. Counts, Harold Rugg, and Theodore Brameld (Oliva, 1992; McNeil, 2006: 38; Bagenstos, 1977; Stanley, 1981). Principles of social reconstruction has great impacts on tradition of social constructivism in psychology initiated by Vigotsky (Schunk, 2012: 337) and often being referred in conducting research (Deulen, 2013; Hung, 2002).

The application of this theoretical construction of the device resulting in entrepreneurship education that can be seen from two sides, which is a process of learning and assessment. First, one of the applications of this theory of learning was that learning is not only done in a collaboration, interaction, and cooperation in building knowledge based on reality or social problems, but also done through the practice directly. Practice was done outside the classroom with artisans on how to produce jewellery ring and bracelet cross pearl. This practice became a tool or a solution to social problems, such as less of skill that have an impact on unemployment. This process was proven by the acquisition of learning outcomes in the form of Senior High School vocational skills. This was consistent with the findings of Hung (2002), which stated that social reconstruction based learning could improve student learning outcomes, because learning is not only constructed through the interaction between ideas and the ideas that they had with the social reality, but a child's ability to interpret reality in the form of social practice. Vigotsky (Schunk, 2012: 338) also stated that students will be able to raise their competence (including vocational skills) on each of their zone of proximal development after getting a help from an adult or a friend. Such assistance can be given through practice at an early stage, then slowly reduced until the student is able to practice by themselves. Much earlier, Stanley (1981) in a study of the socio-oriented education recommend to educators to help students recognize social change and social problems not only through the process of interaction, but also through the process of conducting an investigation in a

community practice. Thus, if the reconstruction of social learning is a process of interaction and cooperation, then the activity is a tool to change practices/solutions in society.

Second, the implications of the learning process was the uses of real evidence-based assessment of learning. To measure the students' practical abilities, then the uses of the written test was less precise because it could not reveal the student's skills. Thus, the proper uses of project-based assessment used as measuring processes as well as products of student learning outcomes. The outcomes assessment was carried out to identify the achievement of learning objectives and assessment process to know the achievement of efficiency and attractiveness of teaching as stated by Reigeluth and Merrill (1978; 1979). The results of this study demonstrated the feasibility of the uses of project-based assessment to measure the vocational skills of high school students in the local entrepreneurship education. This findings reinforced previous findings that the project-based assessment much empirical support through several studies (Bergh et al., 2006; Doppelt, 2003). Doppelt is findings (2003), for example, stated that the project-based assessment can be effective in measuring the competence and skills of the students as it provides real experiences during the completion of the project. This was also supported by the research findings of Werth (2009) which indicates that project-based assessment is very significant in helping students develop new policing skills, demonstrating how information learned in class applies to field work, aiding in the recall of class material, developing problem-solving skills, and learning the skills needed to work in law enforcement groups in the field.

Conclusions and Sugestions

Based on the above explanation, it can be concluded that: (1) assessment instruments developed by teachers in Entrepreneurship at SMA Kota Mataram is less relevant to the characteristics of the subjects and competencies being measured, such as vocational skills of students; (2) one of the products developed is the assessment based project relying on the theory of social reconstruction. Assessment component covered aspects of planning, implementation, results/products, and reporting that comes with the assessment rubric operational and measurable; (3) the results of the validation test experts obtained an average score of 4.72 with a very good category; (4) the consistency of test results based on an assessment by two assessors showed a correlation coefficient 0.934 with a probability value of 0.000. Thus project-based assessment is a reliable instrument; (4) The results of the model test showed t-count at 18.54 with a probability value of 0.000. Thus, project-based assessment instrument used to measure the worth of vocational skills of high school students in the eyes of local excellence in entrepreneurship education.

Based on these findings, then: (1) the school can take those advantages of these products. It can be through socialization, duplication products, internal workshop for teachers of entrepreneurship education, through the implementation of classroom action research, through the implementation of Lesson Study, and others; (2) Policy Makers (Department of Education) can also use it. It can be done through multiplication for all schools, *training of trainers* (TOT) for supervisor, facilitating school made training programs or workshops, facilitated through the implementation of PTK, and others; (3) other researchers can follow up these findings, either through the uses of different methods, the extension of the device components of assessment, the effectiveness of different test parameters, the expansion of the subject, the test on non-formal educational institutions, and others.

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THE EFFECTIVENESS OF USING INSTRUMENT AND RUBRIC OF CREATIVE THINKING SKILL-BASED ASSESSMENT PROJECT IN THE LEARNING OF CONSUMER EDUCATION

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Abstract

The purpose of this research was to determine (1) the effectiveness of the use of the instruments and rubrics of creative thinking skills-based assessment project in the learning of consumer education, (2) the aspect of the ability of creative thinking skills that is already possessed by students after learning consumer education using instruments and rubrics of assessment project, and (3) the opinion of students about the learning of consumer education using the instruments and rubrics of creative thinking skills-based assessment project.

The research was held using the type of survey with the evaluation approach of students' study results. It was conducted in the first semester of the academic year 2014/2015 at the Study Program of Three Years Diploma of Clothing Technique of Yogyakarta State University as many as 34 students. A set of questions and rubrics for the pre-test, post-test and task of creative thinking skills-based assessment project. The data was analysed using quantitative descriptive statistical techniques.

The results showed that the instruments and rubrics of assessment project were effectively able to develop creative thinking skills of students by 88.24%, the score is above 80% of students achieved a score above 75 competent equivalent to a score of B+ (75-79), which includes: the ability to fluently generate new ideas (fluency), the ability to suggest a variety of approaches to the problem-solving (flexibility), the ability to spark ideas in an original way (originality), the ability to describe something in detail (decomposition), and the ability to review things from a different perspective of those already known by many people (reformulation). The aspects of fluency, originality, and the decomposition are included in the high category, whereas the flexibility and reformulation aspects are in the middle category. The result shows that the students' opinions on the use of instruments and rubrics of creative thinking skills-based assessment project in learning consumer education are in the excellent category (26 students (76.47%)) and 8 (23.52%) are in good category.

Keywords: *instruments, assesment project, and creative thinking*

A. Introduction

One of learning qualities is determined by the quality of the assessment used by educators in their learning process. The assessment implemented by educators can help them in understanding the strengths and the weaknesses experienced by their students in their learning materials as well as in their critical, systematical, logical, and creative way of thinking. Thus, the educators will have a reference to make an effective decision in their learning process. This will also give information to the students about their learning progress

so that they can improve their learning behavior. Therefore, it is necessary to develop an educational program which improves qualified assessment with a set of instruments and rubrics for mastery the material and develop the critical, systematical, logical, and creative thinking skill. The more qualified an assessment activity in a learning, the more better the educators' understanding of their students' strengths and weaknesses in learning the material and in improving their critical and creative thinking skill.

This is in line with Clement and Lohead (in Steven, 1991:...) who state that an educator has to teach his/her students how to think instead of what to think. Guilford (in Munandar (1999:...)) adds that creativity to think is an ability to see various possible solutions to a problem. This thought is now still less attention in learning process. Therefore, problem solving in a learning process should be viewed entirely as a process and involves learners in the stages of creative thinking process.

The importance of assessment in learning has been explicitly emphasized in the regulation of Minister of National Education No. 20 of 2007 on Education Assessment Standards. In section E for assessment by educators, noted that the assessment of learning outcomes by educators has to be done on an ongoing basis, aims to monitor the process and progress of learners, as well as to improve the effectiveness of learning activities. Assessment in learning can be applied through a formative assessment to monitor students' learning competence outcomes when the learning process takes place as well as a summative assessment to determine achievement of the learning outcomes. Gareis & Grant (2008) argue that a formative assessment is an assessment conducted during the learning process, used to make a learning decision, focused on a separate knowledge or a required skill, typically associated with daily decisions about teaching and learning, the results used by both educators and learners, and can be done by observation, discussion, guided practice in the classroom, homework assignments, and quizzes. Thus, improving a formative assessment means improving students' learning as well as improving students' understanding effectively. In addition, the information given from a formative assessment can be used to increase the learning process. Formative assessment that conducted during the learning process and provides feedback to educators and students is useful to guide the learning to the improvement of learning (Moore & Stanley, 2010).

The implementation of authentic assessment is one of the pillars in implementing the 2013 curriculum because classroom assessments need to be authentic, using a variety of assessment methods and techniques in accordance with the objectives and processes as well as the experiences of learners (Depdiknas, 2013). Formative assessment is used by educators to monitor the process of mastering learning materials of students, and can do so by applying

authentic assessment in the form of project assessment of assignment. The effort to integrate activity of measuring learning outcomes of all learning process in formative assessment can be applied in authentic way. Authentic assessment is used in order for students not only understand the materials learned but also act and produce something as a form of understanding of the materials learned (Suhardi dkk, 2003). Project assessment instruments-based learning enables students to study, to plan, to design, and to reflect of creating something in line with their passion.

Assessing students' creative thinking skill needs an authentic assessment instead of *paper and pencil test* or project assessment. Learning with project-based assessment enables students to study, plan, design, and reflect the creation of the final project work in accordance with the problems of their field (Doppelt, 2000). Applying assessment project needs instruments and rubrics as a complement of an assessment project. These instruments and rubrics should be developed based on students' needs and objected to assess every creative thinking skill of students. The rubric of assessment project that is developed to measure the multidimensional skills, i.e. the skill of logical reasoning and empirical experience, the criteria of assignment project indicator in an assessment project should be made at the initial stage. Based on Zainul (2008), there are some important things need to be considered in determining a rubric. Those are a) specification in writing down all of the key elements from performance and b) the chronological performance defining for each element such as start from writing down the performance quality of those the worst, the best, and such. Performance intelligibility and compatibility is important for a good assessment project.

Reality shows that many students have poor thinking ability. They are accustomed to think by rote. Most learning activities at school only focus on training students to put on knowledge, to rote, and to have an ability to think logically or convergent thinking (the ability of finding the most appropriate answer to a problem given, based on the information available). This will cause low development of the creativity of learners. Thus, when students face a problem, they will get difficulty to find other alternative solutions.

Educators are hoped to be able to complete their learning by applying the skill of creative thinking for every concept, especially which relates to environment. Guilford in Munandar (1986) said that creative thinking as an ability to see various possible solutions of a problem is a form of thought that receives less attention in formal education. Therefore, solving a problem must be viewed in their entirety as a process and involve it in the stages of the process of creative thinking.

Thinking skills in learning should be improved because it is a cognitive strategy that is always evolving and can be learnt and be taught. Creative thinking can also foster

perseverance, self-discipline, and a full practice, including mental activities such as: 1) asking question, 2) considering new uncommon information and ideas with an open mind, 3) building linkages, particularly between different things, 4) linking various things freely, 5) applying imagination in every situation to produce something new and different, and 6) listening to intuition (Costa, 2006).

The weak thinking skill of students can not be separated from the behavior of educators in implementing the learning process. According to Stiggins (1995), an effective, efficient, and productive learning needs to be accompanied by assessment with its good and meaningful instruments and rubrics. Authentic assessment in assessment process (formative) is one of the alternative solutions in assessing the learning progress of students comprehensively and objectively as well as more emphasize on the development of a more accurate assessment tool that can reflect and measure what is assessed (Hart, 1994).

Fuchs (Zainul, 2008) gives opinion that one of the assessments that can improve students' learning process is the project assessment because it helps educators in making decisions during the learning process. According to Stiggins (1994) project assessment has some reasons for educators to do, such as the ability of learners that cannot be detected writtenly i.e. skill and creativity, and it provides wider opportunities for educators to analyze the ability of learners totaly, and educators can see the ability of their learners during the learning process without waiting for the end.

Consumer Education Learning in Higher Education, formative assessment in the form of authentic assessment of assignment project is used to obtain information of the strengths and the weaknesses of learners. It is because the characteristics of the course material apply the concepts in life behavior as a consumer and criticizes various problems caused by consumption activity. The course material learnt by students need to understand the essence of the concept of consumer education about managing personal finances, making buying decisions, and becoming good and right citizens. Therefore, we need a capability to obtain, select, and cultivate the essence of the concept of consumer education as a form of information.

Those abilities require logical, systematical, critical, and creative thinking. Therefore, it needs educational programs that can develop the ability to think logically, systematically, critically, and creatively. According to Dedi Supriya (1997) indicator of the characteristics of creative thinking is as follows: 1) fluency is the ability to generate a lot of ideas, 2) flexibility is the ability to express a variety of approaches or solutions to a problem, 3) originality is the ability to spark ideas in original ways, 4) elaboration is the ability to explain something in

detail, 5) redefinition is the ability to review an issue from the perspective of something different to what is already known to many people.

Many daily life problems emerge because of an inappropriate buying decision making process, of an inappropriate finance management, or of consumptive behaviour. Oftentimes, problems of consumption activities recur because of consumer ignorance in doing consumption activities. If students get difficulty in mastering the concept and get no help, they will get difficulty and have no awareness to apply the concept in their daily life. If the concept of course material is not linked to the students' consumption experiences and does not creatively criticize the common consumption problems through assignments of assessment project (instruments and rubrics), students' learning achievement will be low and the internalization of life values that is accompanied will also be low. Based on the above description, the writer thinks that there is a need to do a study of the effectiveness of the implementation of creative thinking skill-based instruments and rubrics as an assessment project in the learning of consumer education.

Related to that idea, the writer proposes some problems as follows: (1) how effective the use of instruments and rubrics of assessment project to improve learners' creative thinking skill in the learning of consumer education, (2) what aspects of creative thinking abilities do the students have after experiencing a consumer education using assessment instruments and rubrics assessment project, and (3) how are the students' opinions about the application of the assessment project-based instruments and rubrics used by educators in learning consumer education to develop their creative thinking skills ability. This study is hoped to be useful for lecturers, students, and the world of science, particularly the field of assessment and learning in vocational education, particularly the field of fashion in college, both theoretically and practically.

B. Method of Study

This study used an evaluation approach for the learning outcomes which was described with the aim to establish the effectiveness of the use of the instruments and rubrics of students' creative thinking skills-based assessment project. The measurement of the effectiveness of learning was associated with the achievement of learning objectives. The index of learning effectiveness was determined through two main things: 1) the level of the percentage of students who reach the level of goals mastery and 2) the average percentage of objectives mastery by all students. Criteria for achievement of learning outcomes at the level/standard of excellent/optimum, if a majority (76%–99%) of the lessons can be mastered by learners. In the opinion of Kemp (1985: 230) a level of precision that can be tolerated as a

measure of the effectiveness of achieving the goal if 80% of students achieving a score of 75 on the minimum criteria to achieve the goals set.

The object of this study was the students of D3 Clothing in odd semester of the academic year 2014/2015 at the Department of Food and Clothing Technical Education (PTBB) FT UNY. Data collection was conducted in August–October 2014. The research sample which was used in purposive sampling was 34 new students who were taking courses of Consumer Education.

The data in this study is in the form of quantitative and qualitative. Quantitative data includes the assessment result of the understanding of the learning material (pre-test, post-test, and project assignment) and the skill of creative thinking. The technique used in this study is test, project assignment, and questionnaire. The data of the learning outcomes and creative thinking skill of the students was achieved through assessment instruments and rubrics in the form of questions/essay for pre-test and post-test, and consumer problem-based assignment of performance project which is suitable with the learning objectives and competences that should be achieved. The instruments of this study includes questions/creative thinking skill-based assignment, sheet of assessment, and assessment rubrics contain of assessment criteria and scoring standard. The data of students' opinion was achieved from questionnaire.

This study describes the object studied through the sample data as it is, without making analysis and conclusions apply to the sample or the population applicable to general. Analysis of data on the learning outcomes, creative thinking skills, and students' opinion was done by using descriptive qualitative and quantitative techniques to the presentation of the data in the form of a table.

C. Study Result and Discussion

This study was conducted to find out the effectiveness of the use of instruments and rubrics of assessment project to achieve the learning outcomes and to develop students' creative thinking skill in the learning of consumer education. This study also analyzes students' opinion on the implementation of problem-based consumer education learning using instruments and rubrics of assessment project to develop creative thinking skill.

1. The Effectiveness of the Use of Instruments and Rubrics of Assessment Project for the Achievement of the Students' Creative Thinking Skill-based Learning Outcomes

Based on the data, the creative thinking skill-based instruments and rubrics used in the learning of consumer education on applying consumer rights and responsibilities is useful. Pre-test result in Table 1 shows that most students are still in the lower limit of competent score that is below the score of 76 (B +) of the conversion value in colleges. Results of pre-test scores showed 33 people (97.06%) students is still below the limit of competent only 1 student who has achieved a score of 76 which is the limit of minimum competency. The data also shows that 31 (91.18%) of students have achieved scores more than 76 (the conversion value in colleges reached a score of B (71–75)), and there are 3 (8.82%) of the students were under the score limit competent. It can be interpreted that in the consumer education learning there occur a development of materials understanding related to creative thinking skills if the students use creative thinking skills-based instruments and rubric in solving consumer problem.

Data in Table 1 shows us that creative thinking skill-based instruments and rubrics used as assessment project in the learning of consumer education on consumer problems is useful. Performance result from assessment project shows that most of students have been at the upper limit of competent scores of above 76 (B +) of the conversion value in colleges. The results of these scores showed 33 (97.06%) students were in the upper competent and only 1 student who has not achieved a score value of 76 which is the limit of minimum competency. Following is the description of the achievement of creative thinking skills-based consumer education competence based on the results of the pre-test, post-test, and performance assessment project.

Table 1. The Achievement of Creative Thinking Skill-Based Consumer Education Competence

No.	Pre-test	Post-test	Project Assignment	Final Score	Explanation
1	65	85	80	77	More than good
2	63	78	79	73	Good
3	75	88	80	81	Very good
4	65	84	82	77	More than good
5	66	80	82	76	More than good
6	64	82	83	76	More than good
7	48	74	80	67	Goodish

8	52	72	74	66	Goodish
9	65	81	82	76	More than good
10	60	86	82	76	More than good
11	59	87	83	76	More than good
12	67	80	84	77	More than good
13	62	84	81	76	More than good
14	60	85	83	76	More than good
15	48	70	82	67	Goodish
16	59	86	82	76	More than good
17	68	82	80	77	More than good
18	60	83	84	76	More than good
19	68	85	82	78	More than good
20	63	85	83	77	More than good
21	60	83	84	76	More than good
22	67	86	88	80	Very good
23	69	83	80	77	More than good
24	63	88	80	77	More than good
25	68	82	81	77	More than good
26	60	87	82	76	More than good
27	74	91	83	83	Very good
28	70	90	79	80	Very good
29	61	86	82	76	More than good
30	69	86	80	78	More than good
31	72	87	84	81	Very good
32	59	87	82	76	More than good
33	68	86	84	79	More than good
34	64	85	83	77	More than good

The above table shows that the overall results of the study of consumer education for the achievement of competence application of rights and responsibilities in consumer protection based on the problem, showing mastery of materials based on creative thinking skills of 30 (88.24%) of students have achieved scores above ≥ 75 which is the limit of minimum competence when viewed from the conversion value in colleges reached a score of B (71-75) or the achievement of learning outcomes at the

level/standard of excellent/optimum, if a majority (76%-99%) of subjects taught can be mastered by learners. There are only 4 (11.76%) students who have not reached the limit competence in learning scores taken. This in line with Paul and Elder in Inch et al. (2006) who state that the critical and creative idea contains implications which are the result of reasoning and thinking. Critical and creative thinking is not a single intention but is a process to produce something. It clearly describes that the achievement of students' creative thinking skills-based consumer education competence is effective by using instruments and rubric of assessment project.

2. Indicator Achievement of Students' Ability of Creative Thinking Skill Based on The Achievement of the Learning Result of Consumer Education

The following study result is to identify the mastery indicator of creative thinking skill by students. The mastery of creative thinking skill is based on the acquisition score of the average of the pre-test results, project performance, and post-test in following the learning of consumer education, about the competence mastery of solving consumer problems as a result of lack of awareness to implement the rights and responsibilities as a consumer protection when do consumption activities. Achievement profil of the final score of the creative thinking skills indicator in the form of class average scores is presented in Table 2.

Table 2. The Class Average Achievement of Creative Thinking Skill Based on the Achievement of Consumer Education Learning Result

No.	Creative Thinking Skill Indicator	Class Average				Explanation
		Pre-test	Pos-test	Project	Average	
1	Fluency	2.2	2.6	2.8	2.5	High
2	Flexibility	1.9	2.1	2.3	2.1	Medium
3	Originality	2.2	2.4	2.6	2.4	High
4	Elaboration	2.1	2.6	2.7	2.5	High
5	Redefinition	1.4	2.0	2.5	2	Medium

Note: High: $\geq 2,2 - 3$, Medium: $\geq 1,4 - 2,2$, Low: $1,00 - 1,4$

From Table 2 above, it can be seen that the average of each indicator of the aspect of creative thinking skill in pre-test result is in the medium and low criteria. The aspect of redefinition is in the low criterion which means that students' ability to observe a problem based on different perspectives with those of known by people in general is categorized as low. The pos-test result shows that students' creative thinking skill is in

the criteria of high and medium. The medium category is in the aspect of redefinition which means that the ability to observe a problem based on different perspectives with those of known by people in general is categorized as medium.

Table 2 shows the average result of each indicator to reveal the ability of creative thinking skill in the form of doing project assignment of paper of consumer problems caused by the lack of awareness in applying rights and responsibilities in doing consumption activities. Based on each indicator score of the ability of creative thinking, all are in high category. Thus, it can be concluded that students' creative thinking skill in the indicator of fluency aspect is categorized as high, of flexibility is categorized as high, of originality is categorized as high, of elaboration is categorized as high, and of redefinition is categorized as high. This finding supports Rustaman, et al (2005) who said that the process of learning and teaching by doing performance increases students' success in learning.

The achievement of the aspect of creative thinking skill in the above table also shows that the average of each indicator of the aspect of creative thinking skill in the final score of consumer education material is in the high and medium criteria. If the score is compared with the assignment completion in the assessment project, it can be seen that there a decreasing score. This is caused by the average calculation which invokes the score of pre-test, post-test, and assessment project assignment. However, the result has been categorized as high and medium. Based on the mastery of each indicator of creative thinking skill aspect, fluency is categorized as high, flexibility is categorized as medium, originality is categorized as high, elaboration is categorized as high, and redefinition is categorized as medium. Compared to the completion of assignment in project assessment, there is a change to a bit descend. It is because the average calculation which includes the achievement score of pre-test, post-test, and assessment project assignment. However, the result in general has been categorized as high and medium.

3. Students' Opinion on the Implementation of Instruments and Rubrics of Creative Thinking Skill-Based Assessment Project in Learning

The explanation of students' opinion on the implementation of the learning of problems-based consumer education by implementing instruments and rubrics of assessment project in formative assessment to develop the students' creative thinking skill is presented in the following table.

Table 3. The Average Class Score of Students' Opinion on the Implementation of

Instruments and Rubrics of Creative Thinking Skill-Based Assessment Project in the Learning of Consumer Education

No	Opinion Aspect	Ideal Score	Class Average Score	Explanation
1	Happy and enthusiastic in following the learning and completing the tests/assignments given	4.00	3,5	Completely agree
2	More understand and command the learning objectives and competences to gain		3,6	Completely agree
3	More understand and command the learning material		3,4	Agree
4	Exercise and increase the ability to think creatively		3,7	Completely agree
5	Exercise and increase the finding of creative ideas to give solutions		3,5	Completely agree
6	Increase the motivation to learn		3,4	Agree
7	Exercise to seize initiative and to make decision rightly and correctly		3,3	Agree
8	Improve and increase the quality of thinking in the learning of giving solutions		3,5	Completely agree
9	Active in following the learning		3,5	Completely agree
10	More increase self-confidence in the learning		3,5	Completely agree
11	More increase the independence in learning		3,5	Completely agree
12	More able to express problems faced in learning		3,4	Agree
13	More able to detect the weakness and strength in learning			3,6

Note:

≥3,25 - 4 : Completely agree

≥2,5 - 3,25 : Agree

≥1,75 - 2,5 : Less agree

1 - 1,75 : Not agree

Based on the analysis of questionnaire, in general, students give positive opinions on the use of instruments and rubrics of creative thinking skill-based assessment project for the learning of problems-based consumer education caused by the lack of awareness in applying rights and responsibilities in consumption activities. 9 of 13 opinion aspects (69%) shows complete agreement to implement instruments and rubrics of assessment project in the learning of problems-based consumer education to support the development of students' ability to think creatively. 4 opinion aspects (31%) are answered "agree" to the use of instruments and rubrics of assessment project to support

the development of students' creative thinking skill. Fun learning situation encourages students' interest and motivation to learn (Roth in Wulan, 2003).

The above data collecting if described by classifying students' opinion on the implementation of learning using instruments and rubrics of assessment project in problems-based consumer education to develop the students' creative thinking skill is seen as follow.

Table 4. The Classification of Students' Opinions on the Learning by Implementing Alternative Assessment

No	Criteria	Score Range	Frequency
1	Very good	>42,25 - 52	26 (76,47%)
2	Good	>32,5 - ≤ 42,25	8 (23,52%)
3	Not good	>22,75 - ≤ 32,5	-
4	Very not good	13 - ≤ 22,75	-

From the data analysis, it is found that the result of the average calculation of students' opinions on the use of instruments and rubrics of assessment project in the learning of problems-based consumer education to develop students' creative thinking skill is 45,79. If it is converted in the table of the classification of students' opinions, it can be concluded that students give very good opinion on the use of instruments and rubrics of assessment project to support the achievement of learning competence and to develop their creative thinking skill.

D. Conclusion

1. The score of learning result viewed from the average of pre-test, post-test, and assessment project assignment contributes to the effectiveness of the use of instruments and rubrics of assessment project in the learning of students' creative thinking skill-based consumer education. This shows that creative thinking skill-based material mastery is 30 (88.24%) students have achieved score of above ≥ 75 which is the minimum competence limit of score conversion in Higher Education of B (71 – 75) or the achievement of learning outcomes at the level/extent splendidly/optimal, if a majority (76% – 99%) of the lessons can be mastered by learners. There are only 4 (11.76%) students who have not reached the competence score limit in the learning they taken.
2. The achievement from indicators of creative thinking skills aspects based on the average score of the pre-test, post-test, and the project assessment assignment shows that on

average, each indicator aspect of creative thinking skills in final score of the learning of consumer education materials is at high and moderate criteria. Based on the mastery of each indicator of the aspects of creative thinking skills, the aspect of fluency (the ability to generate many ideas) is include in high category, 2) flexibility (the ability to express a variety of approaches or solutions to a problem) is in medium category, 3) originality (the ability to spark ideas in original ways) is in high category, 4) elaboration (the ability to explain something in detail) is included in high category, 5) redefinition (the ability to review the issue from the perspective of something different to what is already known to many people) is in medium category.

3. Based on the analysis of questionnaire, in general, students give positive opinion on the use of creative thinking skill-based instruments and rubrics of assessment project in the learning of problems-based consumer education caused by the lack of awareness in applying rights and responsibilities in doing consumption activities. 9 of 13 opinion aspects (69 %) are very agree on implementing instruments and rubrics of assessment project in the learning of problems-based consumer education and support to develop the students' ability of creative thinking skill. There are 4 opinion aspects (31 %) who are agree that instruments and rubrics of assessment project support the development of students' creative thinking skill.

E. Suggestions

1. Implementing instruments and rubrics of assessment project in the problem solving-based learning activities of consumer education. Educators/lecturers are demanded to develop themselves, especially in the aspect of applying creative thinking skill-based instruments and rubrics on the life problems caused by the lack of awareness of rights, responsibilities, and consumer protection.
2. Instruments and rubrics of assessment project are very sangat effective in the achievement of students' creative thinking skill, especially consumer problems-based consumer education subject. Thus, there is a need to apply these to other subjects.
3. The implementation of instruments and rubrics of assessment project is very important in the learning of consumer education in every other material learning. It is because every material has its own characteristic of various daily life problems caused by consumptive behaviour, so that students will be motivated to develop their creative thinking skill in finding solutions for a problem. This will be a tool to develop the learning and education quality.

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PROJECT WORK USED IN A COMPREHENSIVE ASSESSMENT TO MEASURE COMPETENCES OF UNDERGRADUATE ENGINEERING STUDENTS

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Abstract

Assessment of student learning outcomes is not only based institutional criteria, but also based on professional criteria. Several general criteria of learning outcomes have been in Indonesian Qualification Framework (KKNI) and National Educational Standard of Higher Education (Permendikbud 49/2014). This paper shows an authentic assessment model to measure comprehensively competences of undergraduate engineering students based on the two criteria. The method used to develop the assessment model is mainly based on papers produced by researches in applying various assessment models in engineering education, one of them was Kano's Model of Customer Needs. The comprehensive assessment model developed has two main parts. One part contains what and how students should work and produce a product. Another part is about what and how lectures should prepare, organize and deliver the instrument during assessment process in classrooms/workplaces. The object used in this assessment model is the final project work which demonstrates the student achievement in mastering the learning objectives (an ability to identify, formulate and solve engineering problems). The final marking of learning outcomes are separated in four categories: exceeds expectations, meets expectations, need improvements and unacceptable. These four categories are then converted into four grades, as stated in the Standard, : A, B,C, and D.

Keywords: qualification framework, undergraduate student, final project, comprehensive assessment

A. Introduction

The question of how to improve our higher education quality is a hot issue especially after Indonesian Government spent a huge of money to pay incentives for professional teachers and lecturers. The Government has launched national standar of higher education (Permendikbud No. 49/2014). In this Standard, it is stated clearly that learning outcomes of any educational institutions should meet the Indonesian Qualification Framework (IQF) consisting nine levels of qualification as shown in Figure 1. All the levels have four components: 1). moral and ethics; 2) work competences; 3) knowledge comprehensions; and 4) autonomy and responsibility. Therefore higher education institutions should reset their educational goals which are met the National Standard and IQF.

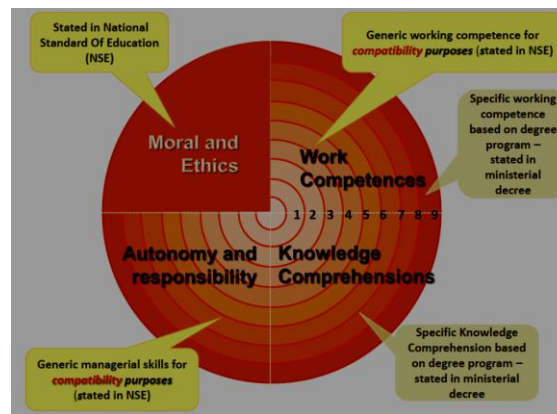


Figure 1. Indonesian Qualification Framework

Improving the higher education quality, for example in engineering, it means increasing the graduate (engineer) competences. According to [1] in preparing engineering students for the 21st century, they must be equipped to be global engineers who are technically versatile (multi-disciplinary), able to solve problems from a systems-level perspective, effective communicators, function in diverse ethnic teams and demonstrate social responsibility. The quality of graduate competences can be improved by redesigning curricula to provide a proper learning environment for students to develop their competences. In addition, improving student's competences can be obtained by developing an effective assessment plan but with the flexibility to adapted for a variety of settings and purposes [2].

Most undergraduate engineering programs uses project works as the final examination. It is because educational programs for undergraduate engineering students are put more emphasis on practical abilities. This project-oriented approach is designed to improve the practical ability of students; to give the opportunity to explore and solve problems with a real application; to deepen their understanding of the course; and promote multidisciplinary work [3]. In addition cooperation with industries is established to get real world applications in technology.

This paper shows an authentic assessment model to measure comprehensively competences of undergraduate engineering students based on Indonesian Qualification Framework (KKNI) and National Standard of Higher Education. A case study is also presented to illustrate how to use the project-oriented approach to measure undergraduate engineering student competences. At the end of this paper, it will be a discussion of the importance of establishing collaborations among universities, educational researchers and industries.

B. Learning Outcomes and Assessment of Final Project Work

It has been clearly requires in the National Standard that graduates of undergraduate program demonstrate four components of learning outcomes: 1) moral and ethics, stated in the National Standard; 2) work competences (generic working competences for compatibility purposes, stated in the National Standard and specific working competence based on degree program, stated in ministerial decree); 3) knowledge competences (specific knowledge comprehension based on degree program, stated in ministerial decree); and 4) autonomy and responsibility (generic managerial skills for compatibility purposes, stated in the National Standard). There are ten criteria in moral and ethics: devoted to God and shows religious attitude; uphold the human values; contribute to improve quality of societal-live; nationalist; appreciate to diversity; tolerance; having social empathy; and having responsibility and entrepreneurship.

The generic working competences for compatibility purposes, stated in the National Standard, consists of nine criteria: 1) an ability of apply logical, critical, systematic thinking; 2) an ability to show performance independently, qualified and measurable; 3) an ability to review application of science and technology; 4) an ability to construct scientific description as final project; 5) an ability to make accurate decisions based valid data and information; 6) an ability to develop and maintain networking; 7) an ability to be responsible for his/her jobs; 8) an ability to do self evaluation; 9) an ability to compile, store, secure and discover data.

General criteria of student outcomes for baccalaureate level program, stated in Accreditation Board for Engineering and Technology (ABET) criterion 3, engineering programs must demonstrate that their graduates have an ability: 1) to apply knowledge of mathematics, science, and engineering; 2) to design and conduct experiments, as well as to analyze and interpret data; 3) to design a system, component, or process to meet desired needs; 4) to function on multidisciplinary teams; 5) to identify, formulate, and solve engineering problems; 6) an understanding of professional and ethical responsibility; 7) to communicate effectively; 8) the broad education necessary to understand the impact of engineering solution in global and societal context; a recognition of the need for, and ability to engage in, life-long learning; 9) a knowledge of contemporary issues; and 10) to use the technique, skills, and modern engineering tools necessary for engineering practice.

Both above criteria are similar where student performances are not judged in term of classes passed, but based on outcomes-based assessment. To shift the focus of evaluation to 'student outcomes assessment', institution must take the following four steps: 1) define their distinctive mission; 2) design a curriculum to help students achieve these goals; 3) assess

student learning outcomes according to both institutional and professional criteria, and 4) create a culture of continuous improvement to better align steps (1) and (2) [4].

To do a such ‘student outcomes assessment’, lecturers in engineering study program are then develop specific measurements to assess how well students succeeded in demonstrating through their various projects that they meet the criteria. One step of evaluation at the end of study which represents the culmination of the student learning process is the final year project work. The project work is a complex event, where students have to use their previously knowledge and personal skills, and its assessment has a major influence on decisions regarding the student’s readiness to graduate. An overview of how the final year project is assessed form various sources and how the final mark is obtained is shown in Figure 2 [5].

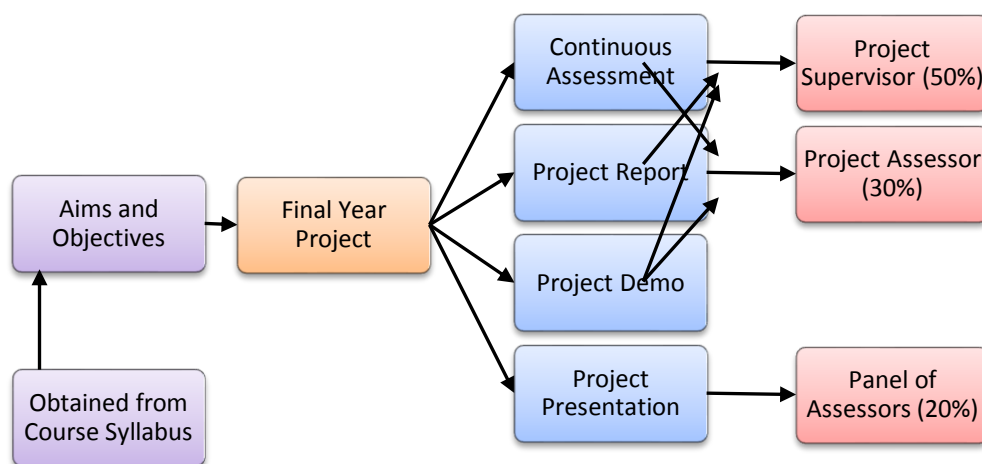


Figure 2. Assessment of Final Year Project

It is seen that in Fig. 2, assessment of the final project consists of four sources of document: 1) continuous assessment; 2) project report; 3) project demonstration; and 4) project presentation. The continuous assessment is project implementation assessment of four general outcomes: 1) formulation of design problem; 2) utilization of problem solving skills; 3) extension of knowledge; and 4) project management. Whereas, the project report is graded according to five general outcomes: 1) organization; 2) content; 3) relevance; 4) writing style and grammar; and 5) presentation of material.

The project demonstration is a live demonstration of the project to both the supervisor and the assessor. Students prepare supporting materials, such as diagrams and manual, to

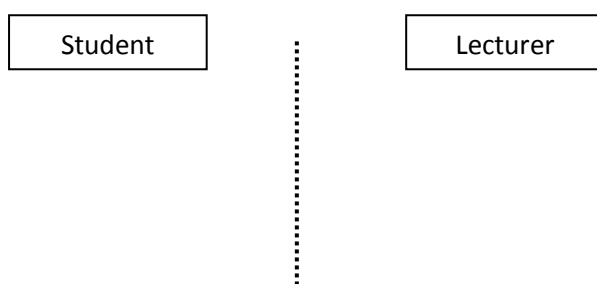
assist with any explanation in answering any questions that may be asked. The assessment during the project implementation, of the project report and of the project demonstration are carried out by the project supervisor and assessor. The amount contributed by the supervisor to the final mark of the project is 50%, and by the assessor is 30%, respectively.

Students give oral presentations to the panel of assessor. These oral presentations are a very important part assessment of students competences in communication skills. In this stage, students demonstrate their ability to transfer information in a manner that is interesting, informative, accurate and concise. Five specific learning outcomes are used to grade the presentation: 1) relevance; 2) accuracy; 3) organization, preparation, and effectiveness delivery; 4) style, pacing and body language; 5) time management. The amount contributed by the panel of assessors to the final mark of the project is 20%.

To get better quality of outcomes learning assessment in the final project course, it needs specific descriptions of what students should do and lecturers should do. Figure 3 shows deployment flow chart of quality assessment process [7]. It is seen that prior to the project work, lecturers prepare assignment and define expectations. Based on these assignment and expectations, students, then, prepare the project and go through this process, finally ends with assessment.

There are six stages that lecturers must follow to implement assessment procedure of the final project work [6].

1. Definition of (i) the learning outcomes associated with the final project work (ii) a set of objective descriptors for each of them;
2. Definition of (i) the moment (milestone) of assessment, (ii) the specific assessment action that must be performed at each milestone and (iii) the agents that will carry out the assessment;
3. Assignment of descriptors to each assessment action;
4. Definition of the levels of compliance with each descriptor, clearly and objectively establishing the level of competence that student must demonstrate that he/she possesses;
5. Drafting of assessment reports that the assessment agents must complete; and
6. Definition of the marking criteria to be used to assign the final mark for the final project on the basis of the results reflected in the assessment report.



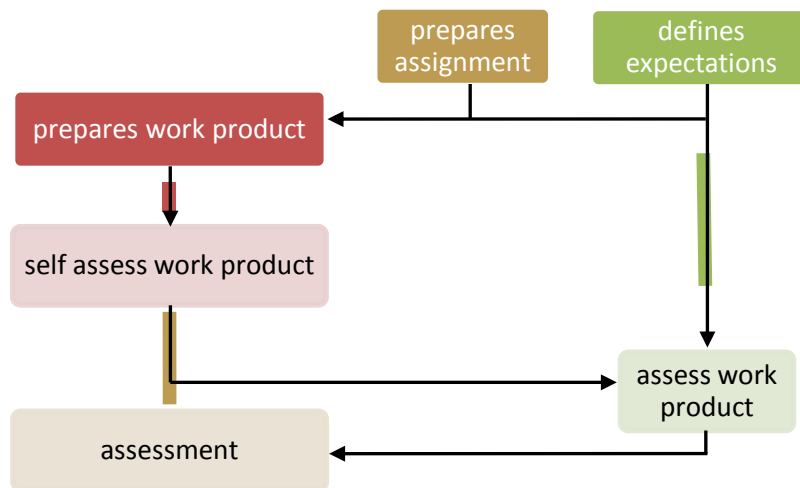


Figure 3. Flow Chart of Quality Assessment Process

There are several different grading methods used to assess students' learning outcomes in the final project course in engineering. Based on the way of any customer reacts to a product, i.e. they are either excited, satisfied, or disappointed. Then, these three categories are expressed into exceeds expectation (exciting), meets expectations (sufficing), and needs improvement (disappointing). Converting these three grades of customer reactions into four: 1) a course grade of A is assigned to students who demonstrate that they consistently exceed/above expectations; 2) a course grade of B is assigned to students who demonstrate that they consistently meet expectations; 3) a course grade of C is assigned to students who fail improve some of work that need improvement; 4) a course grade of D is assigned to students who have a substantial work that was not complete [7].

C. Conclusion and Recommendation

The final project works are widely used by engineering education programs to assess student learning outcomes. This project involves students and lecturers/supervisor to actively work together start from the beginning. First, lecturers set up assignment and expectations that will be used by students to prepare and make planning chart for the project implementation. Along with the student works on the project, supervisor monitor regularly the progress made by the student in achieving the project objectives. The student submits progress report to both the supervisor and assessor.

At the end of the work, the student demonstrates the project to the supervisor and assessor. This live presentation gives opportunity to student to show his/her knowledge and skills and what have been reached. In case of the project does not work properly or not reach

the original objectives, it is essential that student provides a good explanation of problems he/she encountered.

Assessment of the final project will reach peak stage at the oral presentation to panel assessors. This stage is very important part for student achievement, because at the same time all abilities in personality, knowledge and skills areas will be assessed. So, assessment of the final project work is a comprehensive assessment. Contribution of each agent in grading the final project course could be arrange as follows: 50% comes form the supervisor, 30% comes from the assessor and 20% comes from the panel of assessors.

There are four grades of the final project course: 1) a course grade of A is assigned to students who demonstrate that they consistently exceed/above expectations; 2) a course grade of B is assigned to students who demonstrate that they consistently meet expectations; 3) a course grade of C is assigned to students who fail improve some of work that need improvement; 4) a course grade of D is assigned to students who have a substantial work that was not complete.

Learning outcomes assessment requires a clear outcome criteria in every stages. Students, supervisors and assessors should have the same perceptions on to what extent minimum objectives must reached for each grades of course.

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THE DEVELOPMENT OF A SET OF INSTRUMENT FOR STUDENT PERFORMANCE ASSESSMENT IN THE PHYSICS LABORATORY WORK SUBJECT OF JUNIOR HIGH SCHOOL

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Abstract

This study aims to develop a set of instrument for the measurement of the laboratory work ability performance on physical subjects of junior high school students to measure the writing the report lab work' ability performance on physics subjects. This research was conducted through three stages, namely: the initial instrument development, the try out, and interpretation of the measurement result. The initial development stage included instrument writing, reviewing and validating of the blue print of the instrument, items, and assessment guidelines. The content validation was carried out by the measurement experts, physical education specialists, and teachers physics through forum group discussion (FGD). The instrument that had been validated was tried out to 54 students by involving three raters. Interpretation of the measurement results be described using the total score as the basis for the categorization of assessment. The results of the development a set of instrument for the measurement of the preparation of laboratory reports ability performance on physical subjects of junior high school students, aspects that measured include: statement of the problem, experimental design, data collection and display, data analysis, and conclusion. The reliability index of the instrument try out is at the excellent category of 0.858. The results of measurement showed that the preparation lab report ability performance on physics subjects scores are dominantly in the second and third categories out of the four categories. Thus, the writing of lab work reports ability performance of physical subjects of junior high school students are not satisfactory.

Keywords: *Performance Assessment, Lab Work Reports, Physics Subject.*

Introduction

Peraturan Menteri Pendidikan dan Kebudayaan RI Number 66 Year 2013 concerning assessment standards states that the assessment of learning outcomes by educators conducted on an ongoing basis is intended to monitor processes and progress of the students and to enhance learning effectiveness. Assessment in the field of education by educators is absolutely necessary to continuously monitor progress in students' ability. Therefore, assessment should be preceded by identifying indicators of learning outcomes and then continued with the application of an assessment technique that is relevant to the learning model that is used.

According to Sterling (2005: p. 33), effective assessment should be related to the ways the learning activities are carried out, and the results can be used to indicate the learning outcomes. The learning objectives one of them can be achieved through an assessment cycle that consists of diagnostic assessment, formative assessment, summative assessment, and

confirmatory assessment. The diagnostic assessment is made before a course begins. The goal is to find out what students already know about the concepts to be discussed in a course. Formative assessment is made throughout the course and this type of assessment should be done in each face to face meeting in the form of short items to monitor progress that students make. Summative assessment is done at the end of a course to assess whether students have learned about the concepts taught in the course. Confirmatory assessment is made a while after a course has ended to test knowledge retention.

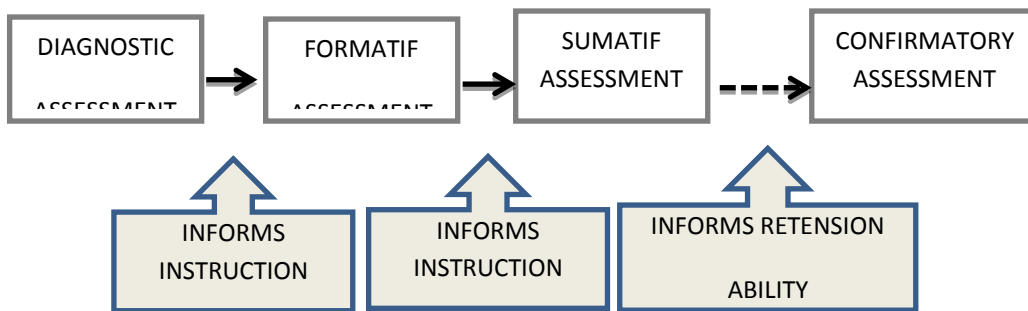


Figure 1. The Learning Assessment Cycle

Glencoe science (t.t.: p.3) split features of educational assessment into two, namely traditional assessment features and performance assessment features. The traditional assessment features include basic knowledge, knowledge processes, content of the knowledge, and problem solving. The performance assessment features include basic knowledge, group learning, self-assessment, application of skills, creative designs, authentic application, creative products, and application of all the skills that the students have mastered. Traditional assessment is a type of testing through the method of paper and pencil test, for examples, multiple choice, true-false, and matching. Another form of this paper and pencil test method is to ask testees to write down their own responses, such as in open-ended questions (essay), either short essays or free essays.

Quellmalz & Schank (1999: p. 2) state that performance assessment is generally intended to examine the knowledge and deep understanding of the students regarding the concepts and strategies of investigations, to make them actively think, and to measure their skills in communicating their understanding. This performance assessment method, according to Ruiz-Primo & Shavelson (1996: p. 1047) and Shavelson. et. al. (1992: p. 23), consists of: (1) direct observation, (2) notebooks, (3) computer simulation, and (4) paper and pencil test.

The 2013 Curriculum (Kurikulum 2013) puts an emphasis on performance assessment to determine students' achievement of competences which include knowledge, skills, and attitudes. The focus is on their successful learning outcomes which meet the specified

competence standards. The impacts that may arise are that teachers can enrich ideas to help make the most of students' ability to think. Based on the preliminary survey conducted in junior high schools (SMP) in DIY, it is revealed that physics practicum has not been assessed using this performance assessment. This is because of the unavailability of such an assessment instruments. Thus, research on the development of an assessment instrument which measures students' performance on the inquiry-based physics lab work which meets the validity and reliability as an alternative assessment format is necessary. Based on the foregoing, the objectives of the present study can be formulated as follows: (1) To develop a performance assessment instrument that meets the requirements of validity and reliability to measure Junior High School students' ability in writing the report of their lab work physics, and (2) To describe the ability of the students in the research site in writing the report of their physics lab work.

Research Method

This research employed a quantitative approach. The research subject consisted of Junior High School students and physics teachers as a rater. The research sample consisted of the students of SMP Negeri 15 Yogyakarta Class VII-B and VII-F with the physics teachers of Grades VII, VIII, and IX of the school as raters.

The stages to develop the performance assessment instrument to measure the ability to write the report of physics practicum referred to instrument development procedures proposed by Oriondo & Dallo-Antonio (1984: p. 34). Those stages of instrument development include: planning assessment, trying out the instrument, establishing instrument validity and reliability, and interpreting the assessment scores.

The stage of *planning assessment* began with arranging the learning continuum in the ability to write the report of physics practicum as the basis to develop the blueprint for the development of the assessment instrument. The blue print for the development of the performance assessment instrument for physics practicum reports covers a number of aspects of assessment, namely: identification of reports, statement of the problems, the experimental design, data collection and display, data analysis, as well as conclusions and suggestions. Preparation of the items to be assessed was based on the formulated blue print of the instrument development. The performance assessment instrument to measure junior high school students' ability to write the report of physics practicum consists of as many as 24 assessment items. The checklist model was used as the assessment format.

The content validity of this performance assessment instrument to measure the ability to write the report of physics lab work was obtained through *Focus Group Discussion (FGD)*

which involved measurement experts and physics teachers. Based on the results of the FGD, it is suggested that: (1) all the aspects of assessment, and assessment items developed by the researcher met the criteria of fit for use as an assessment instrument, (2) the performance assessment instrument try out was conducted at SMP Negeri 15 Yogyakarta with the students of Class VII-B and VII-F as the respondents, (3) the materials were about temperature and calor because these materials were discussed at the time of the research was conducted, and (4) raters that participated in this research consisted of one physics teacher of Grade VII, one physics teacher of Grade VIII, and one physics teacher of Grade IX as the representative of each grade.

The reliability of this performance assessment instrument to measure the ability to write the report of physics practicum was obtained using the following methods of estimating reliability: *interclass correlation coefficients (ICC)* and *Cronbach's alpha coefficient*. Criteria for the assessment instrument to have good reliability are if the $ICC \geq 0.60$ and the Cronbach's alpha coefficient ≥ 0.70 . The relationship between the ICC coefficient and the Cronbach's alpha coefficient (α) is formulated as follows.

$$ICC = \frac{MS_{people} - MS_{residual}}{MS_{people} + (df_{people} \times MS_{residual})}$$

$$\alpha = \frac{k \times ICC}{1 + (k-1) \times ICC} \text{ where } k = \text{the number of raters.}$$

Interpretation of the score obtained from the performance assessment for the ability to write the report of physics practicum was made based on the attained criterion scores of the students in the research site. The scoring was done by trained raters consisting of three physics teachers and the results of the assessment by the researcher served as the benchmark. The scoring was done by putting a V sign in the column "Yes" when the sub-aspect being assessed is indicated in the physics lab work report notebook. The total score is obtained by summing all the (V) signs in the column "Yes". The criterion score was calculated using the following formula:

$$Score\ Criteria = \frac{Total\ Score}{Sum\ of\ Items} \times 100\%$$

The criteria to obtain a score of 4, 3, 2, and 1 are that if $\geq 86\%$, $(85-70)\%$, $(69-56)\%$, and $\leq 55\%$ of the elements in the performance assessment can be done by the students, respectively. Qualitatively, the scores by 4, 3, 2, and 1 each have the following meaning: 4 = satisfactory, 3 = weak, 2 = inadequate, and 1 = unsatisfactory. The summary of the results for the assessment of the Junior High School students' ability to write the report of physics lab

work are presented in frequency distribution and percentage according to the scores of criteria of achievement.

Findings and Discussion

The results of the performance assessment instrument development for junior high school students' ability to write the report of physics practicum that had been validated by the experts through FGD are presented in Table 1 below.

Table 1.
Aspects and Sub-aspects of the Ability to Write the Physics lab work Report

No	Laboratory report Abilities	Assessment Point		
	Elements of Performance assessment	Points Possible		Criteria Score
	Identification of report	Yes	No	
1.	The title clearly the independent and dependent variable	<input type="radio"/>	<input type="radio"/>	4 ○
2.	Name of experimenters is given	<input type="radio"/>	<input type="radio"/>	
	Statement of the problem			
3.	The background for the problem is summarized	<input type="radio"/>	<input type="radio"/>	3 ○
4.	Relevant literature is cited	<input type="radio"/>	<input type="radio"/>	2 ○
5.	The hypothesis is stated clearly	<input type="radio"/>	<input type="radio"/>	1 ○
6.	It predicts the influence of the independent variable on the dependen variable.	<input type="radio"/>	<input type="radio"/>	
	Experimental Design			
7.	The prosedur for controlling and measuring variables through repeated trials is easy to follow.	<input type="radio"/>	<input type="radio"/>	
8.	The experiment procedure is complete and clear enough that another person could carry it out	<input type="radio"/>	<input type="radio"/>	
9.	The experimental design tests the prediction	<input type="radio"/>	<input type="radio"/>	
10.	A compele list of required materials is provided	<input type="radio"/>	<input type="radio"/>	
	Data collection and display			
11.	Appropriate tools and materials are selected to collect the data	<input type="radio"/>	<input type="radio"/>	
12.	The data table included the appropriate data.	<input type="radio"/>	<input type="radio"/>	
	Data for the for the independent and dependent variables are clearly shown.			
13.	An appropriate type og graph is used. The independent variable is put on the x- axis and the dependent variable is put on the y-axis	<input type="radio"/>	<input type="radio"/>	

14.	The graph should reflect any uncertainty of measurement.	<input type="radio"/>	<input type="radio"/>	
Data analysis				
15.	The analysis includes all the data.	<input type="radio"/>	<input type="radio"/>	
16.	The relationship between the dependent and the independent variables is clearly described.			
17.	The analysis includes appropriate mathematics procedure			
18.	The analysis includes appropriate statistical procedures.	<input type="radio"/>	<input type="radio"/>	
19.	The analysis is accurate and thoughtful	<input type="radio"/>	<input type="radio"/>	
Conclusion and suggestion				
20.	The hypothesis is evaluated clearly	<input type="radio"/>	<input type="radio"/>	
21.	Conclusions are reasonable given the observations made and the observer's prior knowledge.	<input type="radio"/>	<input type="radio"/>	
22.	Conclusions are explained and justified based on the observer's prior knowledge	<input type="radio"/>	<input type="radio"/>	
23.	Recommendations are made for further study.	<input type="radio"/>	<input type="radio"/>	
24.	References in the bibliography are make properly	<input type="radio"/>	<input type="radio"/>	
TOTAL SCORE				

This performance assessment instrument for the ability to write the report physics practicum had been tried out to 54 Grade VII students of SMP Negeri 15 Yogyakarta. The trial involved three raters consisting of three physics teacher each from Grades VII, VIII, and IX. The materials in this assessment were *Temperature and Calor*. The assessment data gathered during the try-out were analyzed using the methods of estimating reliability, namely *interclass correlation coefficients* (ICC) and *Cronbach's alpha coefficients* with 95% confidence interval and the following results were obtained: ICC = 0.688 and Cronbach's Alpha (α) coefficient = 0.858, meaning that the resulting estimated reliability coefficient of the instrument belongs to a good category. This implies that this performance assessment instrument for the ability of junior high school students to write the report of physics practicum already has good inter-rater reliability.

Table 2.
Estimated Reliability of the Instrument

MS_p	MS_r	k	df	ICC	α-Cronbach
0.613	0.111	3	2	0.602	0.819

The results of the performance assessment for the ability to write the report of physics practicum of Grade VIII students of SMP Negeri 15 Yogyakarta with the scoring criteria

from 1 to 4 are presented in Table 3. Based on the frequency and percentage of the attained scores, it can be concluded that the ability to write the report of physics practicum of Grade VIII students of SMP Negeri 15 Yogyakarta belongs to the unsatisfactory category.

Table 3.
Results for the Measurement of the Ability to Write the Physics lab work Report

Criteria score	Frequency	Percent
1= unsatisfactory	1	1.9
2= inadequate	20	37.0
3=weak	33	61.1
4=satisfactory	0	0.0

Conclusions and Suggestions

Conclusions

Based on the research findings, the following conclusions can be made:

1. In relation to the performance assessment instrument for junior high school students' ability to write the report of physics practicum, the following can be concluded: (a) The aspects of assessment covered the ability to: identify the report, express the problems, employ the experimental design, collect and display the data, analyze the data, as well as draw conclusions and suggestions. (b) The format of assessment employed the checklist model consisting with 24 items of assessment. (c) The content validity of the instrument was obtained through Focus Group Discussion. (d) Qualitative estimation of the reliability of the instrument is considered good.
2. The ability of the students of SMP Negeri 15 Yogyakarta in writing their physics lab work report is considered unsatisfactory.

Suggestions

Based on the concluded findings of the research, the following suggestions can be made:

1. It is important to conduct training in how to develop a performance assessment instrument for the ability to write the report of physics practicum intended for physics teachers that are not members of the FGD.
2. Physics teachers in Junior High Schools can employ this performance assessment instrument for the ability to write the report of physics practicum which results can be used as learning assessment.

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DEVELOP MODEL TASC TO IMPROVE HIGHER ORDER THINKING SKILLS IN CREATIVE TEACHING

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Abstract

The new curriculum requires learning paradigm transformation, from the monotonous and conventional learning (teacher centered) into active learning (student centered), innovative, creative, and requires transformation from lower order thinking skills into higher order thinking skills. Higher order thinking skills are part of 21st century skills. One alternative to improve higher order thinking skills is to develop a learning model TASC (Thinking Actively in a Social Context) that can be applied by teachers for senior years students to improve higher order thinking skills. Actually, TASC is a commonly used model for early years students in social and language subjects. The latest survey conducted by Belle Wallace in 2007 showed more than 10,000 classes in the UK have used the TASC to improve the ability of problem solving and thinking skills of students. This research is focussing to develop model of TASC using development model 4-D type, which begins with a needs assessment in several high schools in Yogyakarta. This research will conducted in January 2015 through February 2015. Based on the results of the needs assessment then developed the new breakthroughs model of TASC in science subjects for senior years students that believed can increase the higher order thinking skills in creative teaching.

Keywords: higher order thinking skills, TASC model, development model type 4-D

INTRODUCTION

Thinking skills is defined as a person's ability to process all the information both in solving a problem, planning, or creating something (Editor, 2006: 3). Humans are born with thinking skills, thinking skills born through a process called learning. Through thinking and learning students get a more complete understanding and can even infer something meaningful. If the higher order thinking skills of students are under the average then this becomes a major problem that must be solved immediately.

As a step to determine the quality of students in aspects of science for senior years students, their performance at the national or international level can be seen as a benchmark. Achievement at the national level which disclosed the results of research by Edi Istiyono (2014) show that higher order thinking skills of students in 11th grade of High School in Yogyakarta is not satisfactory, ie 49% of students are below average skills. While the achievement at the international level, according to data Program of International Student Assessment (PISA), the science aspect of Indonesia was ranked 38th in a row in 2000 and 2003 with a score of 393 and 395, and ranked 50th in 2006 with a score of 393. It shows that the average Indonesian science achievement scores are significantly below the international average score set at 500. the same thing is also demonstrated by an international study into the cognitive abilities of students in math and science that TIMSS (Trends in Mathematics and Science study) held by the IEA (International Association for the Evaluation of Educational Achievement). The results of TIMSS 2011 in science showed Indonesia scored

406 where this value is below the international average is 500. According to the two achievements at the international level, it is clear that students' higher order thinking skills still need to be improved.

Based on the analysis of need assessment through student questionnaire at six schools in Yogyakarta with the intermediate level categories based on the ratings of the National Exam in 2014, showed that the average percentage of the higher order thinking skills of students in 10th and 11th grade MIA is approximately 71.38%. Ideally the average percentage of the higher order thinking skills in the range of 80%. Other than that, the results of the analysis of needs assessment through questionnaires of teachers, namely 1) In the preparation of indicators of learning, 100% of teachers believe that identifying basic competence to construct a model is important and 82% of teachers had to apply model-based thinking skills, inquiry and problem solving that is a basic of TASC model; 2) In the implementation of learning indicators, 97.8% of teachers have applied a scientific approach in the learning process and they often use a variety of learning models to simplify the understanding of the students in understanding the subject matter; 3) In reflecting on learning indicators, 100% of teachers agreed to motivate students to reflect on the attitude of knowledge into everyday life; 4) Application-oriented learning in higher order thinking ability has been adopted by 83.7% of teachers but only 26% of teachers already know TASC model; 5) 100% of the teachers are willing to apply the learning model TASC.

Most of the research in the education journal only apply TASC model in social or Language subjects. Actually, if it is investigated more deeply, this model very well when applied in the science subject for senior years students because the TASC based on Vygotsky's constructivist theory which states that intellectual ability is not just based on experience alone but also of social interaction as its main proponent

THINKING ACTIVELY IN A SOCIAL CONTEXT (TASC)

Thinking Actively in a Social Context (TASC) is a learning model developed by Belle Wallace. Wallace (2000) said that TASC is universal, it means that can be used for a variety of learning, inclusive, to help the process of problem solving, as well as stimulate thinking skills. TASC is based on the brain's ability to receive and forward stimuli through the nervous system that affects the success of learning.

Sekar, P.K (2014: 7) claims that TASC has four forming elements which are the basis of the ability to think and problem-solving. Thinking, thinking is a dynamic process that is continually made by students, aims to enable students to continue to develop the capacity to think, especially higher order thinking skills. Actively, aims to enable students to actively understand, figure out, and the expression of their learning experiences. Social, as social beings, this model aims to enable students to undertake interaction, share knowledge, and work together so that all students have equal opportunities in learning and knowledge that obtained are more varied. Context, by learning to build thinking skills and problem solving aims to enable students to have a strong basic concepts and set of real experience experienced by students in the learning environment. Anything that includes the ability to think effectively contained in the model which are presented in the form of TASC problem solving wheel. Before using TASC, first students were given a description of the wheel which is the flow of the problem solving of TASC. This is intended to allow students to remember and apply the methods that they design themselves. The scheme of the wheel which is the logic of TASC as follows:



Figure 1.
Troubleshooting TASC wheel pattern (Sekar, PK, 2014: 6)

HIGHER ORDER THINKING SKILLS

Many expert opinion classifying which includes higher order thinking skills. Experts who laid the foundation of the theory of higher order thinking skills, among others, Piaget, Bruner, Bloom, Gagne, Marzano, Glaser, Vygotsky, and Haladyna. According to the revised Bloom, which includes higher order thinking capabilities include analyzes (C4), evaluating (C5), and create (C6) with a note that already mastered the ability to remembering (C1), understanding (C2), and applying (C3). Ability to analyze (C4) according to Krathwohl is the ability to separate the knowledge into sections and then identify the parts that relate to each other. The ability to evaluate (C5) is the ability to match the knowledge which obtained or works made with a criteria (Krathwohl, 2002: 214-215). The three categories of higher order thinking (C4, C5, and C6) generally appears when triggered by cause such a face a new problem, the uncertainty of something, or a dilemma. One way to stimulate students' higher order thinking skills is the way its exposes students to a question and the unusual task they received previously. This is where the teacher plays an active role in facilitating and stimulating students. Success or failure is influenced by the ability of students to apply and modify the way of thinking (King, Goodson, & Rohani, 2009: 1-20).

RESEARCH METHOD

Development model of this research adapted from 4-D type developed by Thiagarajan (1974) namely, define phase, design, develop, disseminate with little change in phase due to disseminate the resulting products only to one school, but did not dismiss if there are other schools that are interested in using this product. Broadly speaking, the development procedure described as follows.

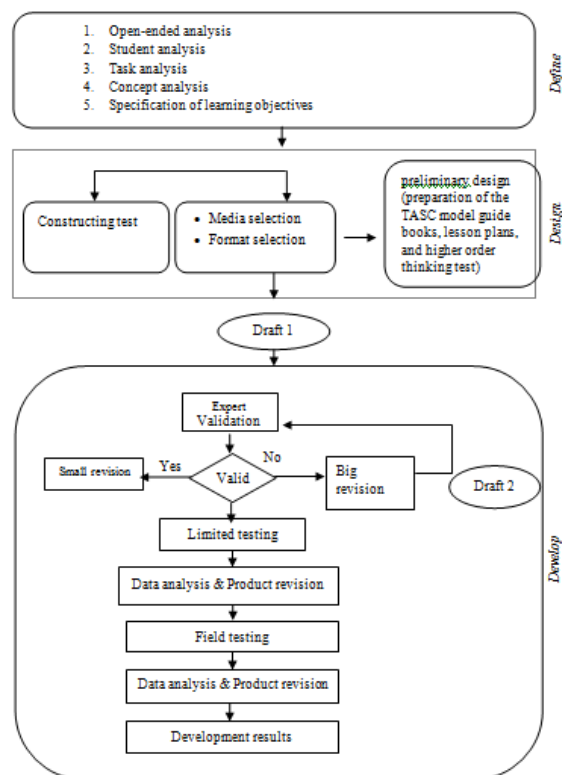


Figure 2
Stages of Product Development

Trials design in this research consisted of three stages: expert validation (expert judgment), limited testing, and field testing.

1. Subjects

The subjects were students in 11th grade of SMAN 6 Yogyakarta which consists of three classes, 11th grade of MIA 1, 11th grade of MIA 2, and 11th grade of MIA 3. Subject test in the first stage or a small-scale testing involving 10 students of XI MIA 1. While the second phase of the testing subject or field testing involving two classes consists of 60 students from 11th grade of MIA 2 and 11th grade of MIA 3 were conducted in January 2015 through February 2015.

2. Techniques and Instrument

Data obtained from this study is qualitative and quantitative data. Quantitative data obtained from the scores given by the validator, the teacher assessment scores, student assessment scores on the learning model Thinking Actively in a Social Context (TASC), a score from implemented learning, as well as higher order thinking skills student test scores. Qualitative data obtained from the quantitative data conversion. Data collection instrument in this study consisted of (1) validation sheet, (2) practicality assessment sheet by teachers and students, (4) observation of the implemented syntax sheet, and (5) higher order thinking test. The data obtained were used to determine the validity, practicality and effectiveness of the developed product. All of these three criteria refers to the criteria of product quality proposed by Nieveen (1999).

3. Data Analysis Techniques

The results of the data analysis obtained from experts and practitioners are used to determine the validity of the resulting product in terms of theoretical and consistency among the components of the developed product. The results of the data analysis from field testing are used as a basis to determine the practicality and effectiveness of the

developed products. For this purpose it is necessary to see conversion table. Conversion table is made by convert the assessment scores from experts, teachers/practitioners, and students become standard scale of five grades. For this purpose used benchmark adapted from Saifuddin Azwar (2010: 163) as presented in the following table.

Tabel 1
Converting Qualitative to Quantitative Data

Interval	Criteria
$Mi + 1,5SBi < M$	excellent
$Mi + 0,5SBi < M \leq Mi + 1,5SBi$	good
$Mi - 0,5SBi < M \leq Mi + 0,5SBi$	good enough
$Mi - 1,5SBi < M \leq Mi - 0,5SBi$	low
$M \leq Mi - 1,5SBi$	bad

Explanation:

M = Actual score

Mi = $1/2$ (maximum score + minimum score)

Mi = $1/6$ (maximum score + minimum score)

Before performing experiments using the control class and the experimental class, firstly the data from first semester exam results of students analyzed to determine whether students' skills before treatment between the experimental class and the control class together are the same (for controlling variables). Then performed the prerequisite test of Kolmogorof-Smirnov to see normality and Levene's to see homogeneity. Both of these prerequisites test using statistical software with SPSS 21. Gain scores (positive difference score between pretest and posttest) of higher order thinking skills is used to determine whether there is an increased higher order thinking skills after learning process using TASC model.

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THE EFFECT OF NUMBER'S ALTERNATIVE ANSWERS ON PARTIAL CREDIT MODEL (PCM) TOWARD ESTIMATION RESULT PARAMETERS OF POLITOMUS ITEM TEST

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Abstract

Item response theory is a review toward the test and item score based on related assumptions among parameters of the test item which reflecting the answers of the test items and the capabilities of participants. There are two terms known in IRT, they are dichotomous and politomus, the scoring through politomus on item response theory approach can be analyzed with the Partial Credit Model (PCM). This study uses a simulation method with politomus data (0,1,2,3) and politomus (0,1,2,3,4) with fixed number of examinees and the items. The number of examinees and items are determined by the simulation method. Politomus simulation data are generated using the Win-Gen program. Simulations carried out four times with different number of examinees, ie, $N = 600$ and $N = 500$, and the number of item = 10. Simulation result shows that the number of alternative answers have different correlations. Therefore, an analysis of the two alternative answers can be used as a basis for consideration in choosing alternative answers will be used.

Keywords: IRT, Politomus, PCM, Number of Alternative Answers

Introduction

Measurement is a process that must be implemented in an effort to improve the quality of education. Therefore, the process of preparing a tool or instrument used in the measurement should be carried out optimally, in order to provide valid and reliable results. The measurement of the instruments that have been made will be used as a basis for decision making with regard to development of learners and the learning process that have been implemented. That conditions are appropriate to the context. The measurement itself is defined as a number-determining activity for an object with systematic way (Djemari Mardapi, 2008:2).

Systematic procedure which includes the activities of collecting, analyzing, and interpreting the information that can be used to make inferences about the characteristics of a person or object is called assessment. In particular for education, Groundlound & Linn (2009: 28) define assessment is a general term that includes the full range of procedures used to gain information about student learning (observations, ratings of performances or projects, paper-and-pencil tests) and the formation of value judgments concerning learning progress. Assessment of learning outcomes which conducted continuously by the teacher to monitor

the process, progress, and improvement of the results by using an instrumental test or non-test.

In fact, some teachers do not understand the procedure or test preparation applications in the class. Based on that situation, it is necessary to do study on the various references and theories that have been submitted by the the expert of measurement until it can be used as foundation for the teacher. There are two instrument of the analysis to be note, they are qualitative analysis and quantitative analysis. Quantitative analysis uses classical test theory approach and modern test theory, known as the IRT.

In classical test theory approach, the calculation is done by sum overall score obtained by the students. This approach is not necessarily appropriate, because the level of difficulty of each step is not taken into account. One of alternative approach that can be used on the item response theory approach for politomus scoring is the Partial Credit Model (PCM). The partial credit model is an extension of the Rasch model for dichotomously scored test data to outcomes recorded in more than two ordered response categories. One approach to the analysis of polychotomously scored data is to group the ordered response categories and to carry out multiple dichotomous analyses. A preferable approach is to implement a model for ordered response categories directly. The partial credit model is a general polychotomous item response model belonging to the Rasch family of measurement models (Master & Keeves. eds, 1999:98). The scope of PCM in this paper focused on the effect of the number of alternative answers (alternatives 4 and 5) in partial credit model towards the results of parameter estimation on politomus item.

Method

This study used a simulation method conducted using politomus data at (0,1,2,3) and politomus (0,1,2,3,4) where the amount of participants and length of the test are fixed at first. Politomus simulation data is generated using the Win-Gen program. The simulation was performed four times with different sample sizes, the simulaton I (10 items with 500 participants and four scoring category for the answers), simulation II (10 items with 500 participants and five scoring category for the answers), III (10 items with 600 participants and 4 scoring category for the answers), and I (10 item with a 600 participants and 4 scoring category for the answers). Each simulation is calculated in term of correlations and compared with obtained results.

The instrument used: Wingen, Parscale, Microsoft Excel and Notepad. Wingen used to generate the data, Parscale used to analyze the generation items of Wingen, Microsoft Excel are used to analyze the Parscale results and find correlation of the obtained results and Notepad used in fixing the rules of data which will be analyzed.

Discussion

A test is denned as an instrument or systematic procedure for observing and describing one or more characteristics of a student using either a numerical scale or a classification scheme (Nitko & Broolhart, 2011:5). The test also can be interpreted as a response to question with the aim of measuring the level of a person's ability or reveal certain aspects of the person as a subject of the test. The test is one of the tools to perform measurement and to collect the characteristics of an object (Eko, 2013:57). According to the expert the quality of the test is very important to measure the ability of a person or reveal certain aspects of the person as a subject of the test.

Base on the scoring system, test can be categorized into two, namely the objective test and a subjective test (Eko, 2013: 57). Objective tests usually consist of two categories of scoring answer which commonly referred as dichotomous item response. On the other hand, the subjective test which consist of more than two response categories is called as polytomus item response.

The dichotomous model is designed for the analysis of test items for which only two levels of outcome are defined ($x = 0$ and $x = 1$) (Master & Keeves. Eds, 1999:104). Dichotomous scoring models cannot be used to find errors made by students, for all the wrong option was given a score of 0. In fact, the mistakes made by students can vary. To be able to find mistakes made by students, needed scoring politomus. The polytomous model is designed for the analysis of test items that have more than two categories (DeMars, 2010:22). Several models have been proposed and used for polytomous items: Samejima's Graded Response (GR) model and Muraki's Generalized Partial Credit (GPC) model, a generalization of Master's Partial Credit (PC) model.

According to Linden & Hambleton Eds, (1997 : 101) the Partial Credit Model (PCM) is a unidimensional model for the analysis of responses recorded in two or more ordered categories. Another point of view said that The partial credit model is an extension of the Rasch model for dichotomously scored test data to outcomes recorded in more than two ordered response categories (Master & Keeves. eds, 1999:98).

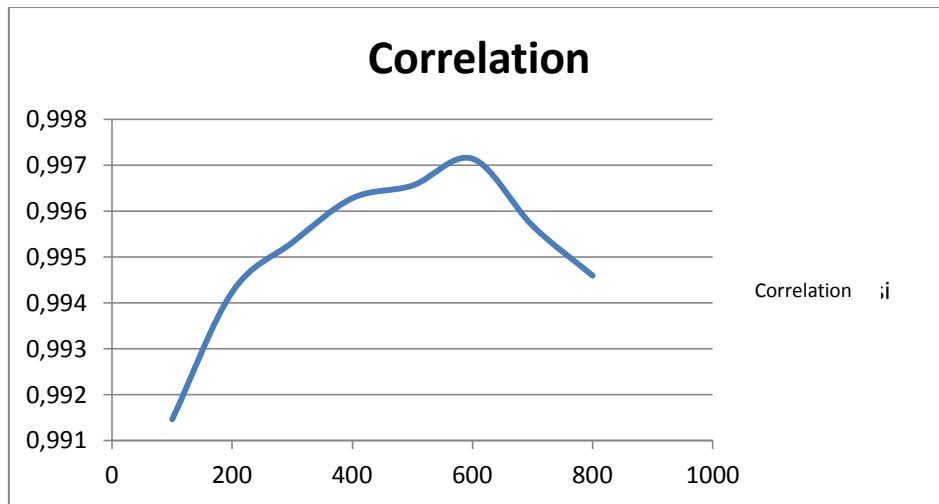
Two of those opinions revealed that the scoring category on the PCM indicates the number of steps that have to complete correctly. Higher score category shows greater ability than a lower score categories. In PCM, if an items has two categories, then it is become included into Rasch equations model. As a result, the PCM can be applied to politomus and dichotomous items. This paper will focus on politomus items with 4 and 5 categories using fixed number of N and the items .

The basis for determining the number of N in the simulation is very important, therefore the author at the beginning of the discussion will briefly describe the relevant number of N in the simulation. Simulation result on the number of N towards the items politomus estimation of *partial credit* model, as follows:

Table 1
Correlation based on the number of N

The number of N	Correlation
100	0.991458
200	0.994236
300	0.995314
400	0.996281
500	0.996556
600	0.997139
700	0.995677
800	0.99459

These results indicate that the high number of N is not always analogous with the *correlation*. It is clear from the table above that the number of $N = 600$ has the highest correlation while in another N score the value has declined but will climb back on certain number of N . By considering that way, the author use $N = 600$ as a basis and 600 and another $N = 500$ for comparison. The clarification of the correlation level are showed by the following graphic:



Graphic 1

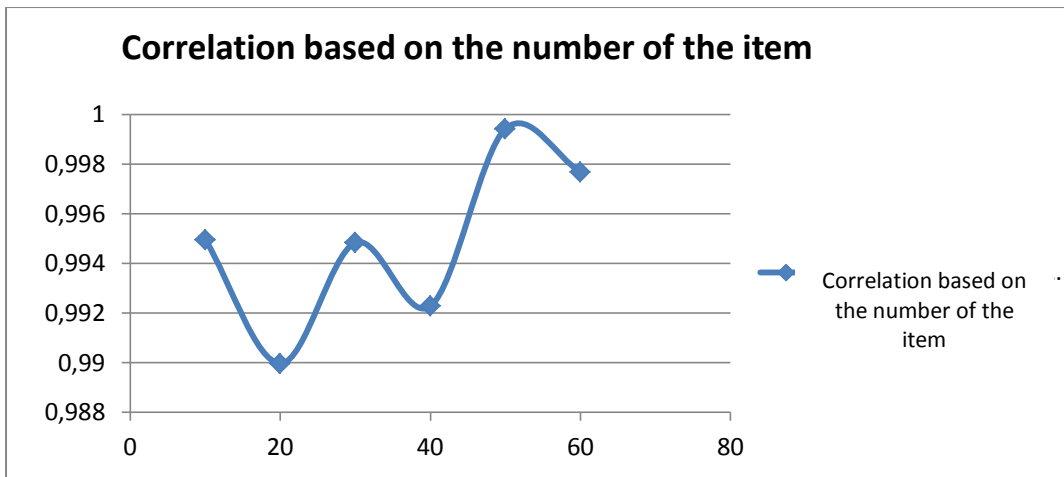
Correlation based on 'N' number

In addition to the basis for determining the number of "N", the author also describes the basis for determining the number of the items. The simulation results of correlation from the number of test items by the number "N" and the same number of alternative answers are presented in the following table:

Table 2.
Correlation based on the number of item

Number of items	Correlation
10	0.994953
20	0.9899689
30	0.994835
40	0.992281
50	0.999423
60	0.997684

From Table 2 it can be seen that the number of items 20 have the lowest correlation and the number of item of 50 have the highest correlation, while the number of item of 10 have a correlation in between 50 and 20 (precisely in the middle of all the simulation results shown in the table). This is the basis of simulation which using the 10 item of questions. In practical way, the process is showed by the following graphic:



Graphic 2
Correlation based on the amount of the item

Effect of the number's of alternative answers (4 and 5) on the PCM toward the Results of Estimation on Politomus Item Test Parameter.

1) Simulation Result 1

The first simulation results will be summarized in the two tables below, namely, table 3 and 4

Table 3

The true parameter result on the number's of alternative answer 4 with N=500

1	PCM	4	-1.001	-0.785	1.735
2	PCM	4	0.582	1.001	1.265
3	PCM	4	-0.506	0.66	1.655
4	PCM	4	-0.014	0.478	0.875
5	PCM	4	-1.576	-0.673	1.313
6	PCM	4	-1.847	-1.096	0.413
7	PCM	4	-1.638	-0.497	-0.178
8	PCM	4	-1.955	-0.036	1.151
9	PCM	4	-1.341	-1.133	1.87
10	PCM	4	-1.064	-0.216	0.237

Table 4

The parameter estimation result on the number's of alternative answer 4 with N=500

ITEM	BLOCK	SLOPE	S.E.	LOCATION	S.E.	GUESSING	S.E.
1	1	0.59	0.017	-0.121	0.077	0	0
2	2	0.59	0.017	0.814	0.074	0	0
3	3	0.59	0.017	0.567	0.075	0	0
4	4	0.59	0.017	0.388	0.071	0	0
5	5	0.59	0.017	-0.422	0.077	0	0
6	6	0.59	0.017	-1.045	0.078	0	0
7	7	0.59	0.017	-0.917	0.074	0	0

8	8	0.59	0.017	-0.337	0.077	0	0
9	9	0.59	0.017	-0.307	0.081	0	0
10	10	0.59	0.017	-0.558	0.072	0	0

Table 3 shows the results of the parameters for N = 500 and the number's of 4 alternative answers, the results will be analyzed by finding the average value from three right-hand column. The average is correlated with the "LOCATION" column in Table 4 to produce a correlation of 0.996718.

2) Simulation Result 2

The second simulation results will be summarized in the two tables below, namely, table 5 and 6

Table 5

The true parameter result on the number's of alternative answer 5 with N=500

1	PCM	5	-1.001	-0.785	0.422	1.735
2	PCM	5	0.582	1.001	1.265	1.687
3	PCM	5	-1.133	-0.506	0.66	1.655
4	PCM	5	-0.014	0.282	0.478	0.875
5	PCM	5	-1.576	-0.673	0.996	1.313
6	PCM	5	-1.847	-1.117	-1.096	0.413
7	PCM	5	-1.638	-0.919	-0.497	-0.178
8	PCM	5	-1.955	-0.036	1.151	1.878
9	PCM	5	-1.341	-1.133	-0.259	1.87
10	PCM	5	-1.064	-0.216	0.237	0.848

Table 6

The parameter estimation result on the number's of alternative answer 5 with N=500

ITEM	BLOCK	SLOPE	S.E.	LOCATION	S.E.	GUESSING	S.E.
1	1	0.603	0.018	-0.001	0.068	0	0
2	2	0.603	0.018	0.974	0.069	0	0
3	3	0.603	0.018	0.133	0.068	0	0
4	4	0.603	0.018	0.331	0.064	0	0
5	5	0.603	0.018	-0.062	0.068	0	0
6	6	0.603	0.018	-1.094	0.071	0	0
7	7	0.603	0.018	-0.933	0.067	0	0
8	8	0.603	0.018	0.123	0.07	0	0
9	9	0.603	0.018	-0.313	0.07	0	0
10	10	0.603	0.018	-0.223	0.065	0	0

Table 5 shows the results of the parameters for N = 500 and the number of 5 alternative answers, the results will be analyzed by finding the average value from four right-hand column. The average is correlated with the “LOCATION” column in Table 6 to produce a correlation of 0.996857.

3) Simulation Result 3

The third simulation results will be summarized in the two tables below, namely, table 7 and 8

Table 7

The true parameter result on the number's of alternative answer 4 with N=600

1	PCM	4	-1.001	-0.785	1.735
2	PCM	4	0.582	1.001	1.265
3	PCM	4	-0.506	0.66	1.655
4	PCM	4	-0.014	0.478	0.875
5	PCM	4	-1.576	-0.673	1.313
6	PCM	4	-1.847	-1.096	0.413
7	PCM	4	-1.638	-0.497	-0.178
8	PCM	4	-1.955	-0.036	1.151
9	PCM	4	-1.341	-1.133	1.87
10	PCM	4	-1.064	-0.216	0.237

Table 8

The parameter estimation result on the number's of alternative answer 4 with N=600

ITEM	BLOCK	SLOPE	S.E.	LOCATION	S.E.	GUESSING	S.E.
1	1	0.582	0.016	-0.16	0.071	0	0
2	2	0.582	0.016	0.823	0.068	0	0
3	3	0.582	0.016	0.567	0.069	0	0
4	4	0.582	0.016	0.367	0.065	0	0
5	5	0.582	0.016	-0.488	0.072	0	0
6	6	0.582	0.016	-1.064	0.072	0	0
7	7	0.582	0.016	-0.919	0.068	0	0
8	8	0.582	0.016	-0.326	0.07	0	0
9	9	0.582	0.016	-0.339	0.074	0	0
10	10	0.582	0.016	-0.502	0.066	0	0

Table 7 shows the results of the parameters for N = 600 and the number's of 4 alternative answers, the results will be analyzed by finding the average value from three right-hand column. The average is correlated with the “LOCATION” column in Table 8 to produce a correlation of 0.997139.

4) Simulation Result 4

The fourth simulation results will be summarized in the two tables below, namely, table 9 and

Table 9
The true parameter result on the number's of alternative answer 5 with N=600

1	PCM	5	-1.001	-0.785	0.422	1.735	0.09275
2	PCM	5	0.582	1.001	1.265	1.687	1.13375
3	PCM	5	-1.133	-0.506	0.66	1.655	0.169
4	PCM	5	-0.014	0.282	0.478	0.875	0.40525
5	PCM	5	-1.576	-0.673	0.996	1.313	0.015
6	PCM	5	-1.847	-1.117	-1.096	0.413	-0.91175
7	PCM	5	-1.638	-0.919	-0.497	-0.178	-0.808
8	PCM	5	-1.955	-0.036	1.151	1.878	0.2595
9	PCM	5	-1.341	-1.133	-0.259	1.87	-0.21575
10	PCM	5	-1.064	-0.216	0.237	0.848	-0.04875

Table 10
The parameter estimation result on the number's of alternative answer 5 with N=600

ITEM	BLOCK	SLOPE	S.E.	LOCATION	S.E.	GUESSING	S.E.
1	1	0.59	0.016	-0.02	0.063	0	0
2	2	0.59	0.016	0.996	0.064	0	0
3	3	0.59	0.016	0.129	0.063	0	0
4	4	0.59	0.016	0.316	0.059	0	0
5	5	0.59	0.016	-0.11	0.063	0	0
6	6	0.59	0.016	-1.132	0.066	0	0
7	7	0.59	0.016	-0.949	0.062	0	0
8	8	0.59	0.016	0.152	0.065	0	0
9	9	0.59	0.016	-0.342	0.064	0	0
10	10	0.59	0.016	-0.187	0.059	0	0

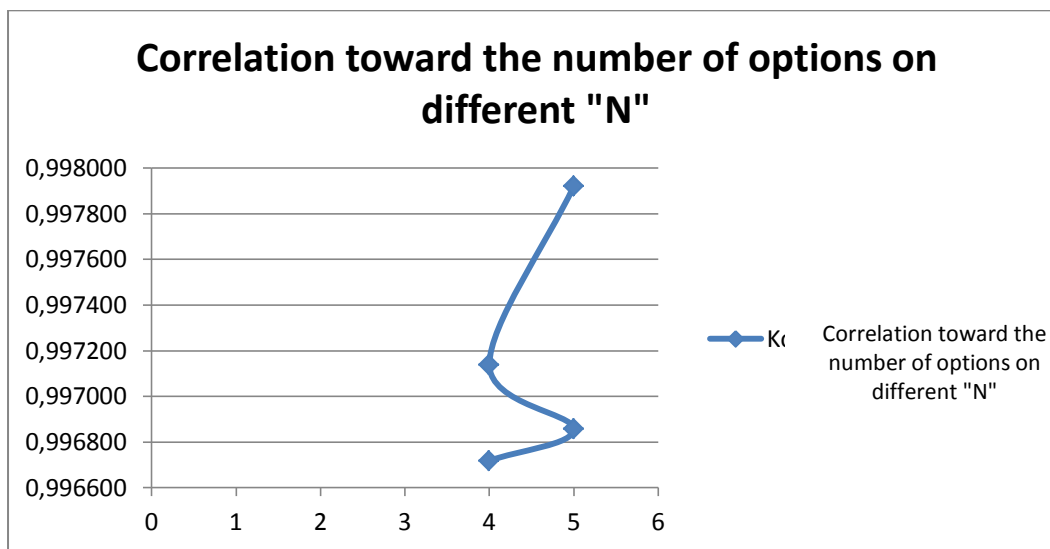
Table 9 shows the results of the parameters for N = 600 and the number's of 5 alternative answers, the results will be analyzed by finding the average value from four right-hand column. The average is correlated with the "LOCATION" column in Table 10 to produce a correlation of 0.997922.

The table below is about simulation results of the effect on the amount of alternative answers (4 and 5) of PCM toward estimation results of politomus item test parameter .

Table 11
Correlation result based on "N" number and options

"N" Number	Options	Correlation
600	5	0.997922
600	4	0.997139
500	5	0.996857
500	4	0.996718

The results presented in Table 11 indicate that the number of option 5 has a higher correlation compared with the number 4 on any choice of N as evidenced from the different number of N, that is N = 500 and N = 600 which lead to the same conclusion. So the number of alternative answers of 5 is more recommended to be used. To clarify the correlation based on the number of optional answer with different amount of “N” is depicted in the following graph:



Graphic 3
Correlation toward the number of options on different "N"

Conclusion and Suggestion

Dichotomous scoring models cannot be used to find the mistake made by students, because all the wrong answer was given a score of 0. In fact, the mistakes made by students were vary. To be able to find mistakes made by students, politomus scoring was required. In politomus items, the number of alternative answers could also contribute an effect. The simulation results showed that the number of alternative answers of 5 were better than the number of alternative answers of 4 which indicated from the resulting correlations. The results of this simulation can be used as a consideration for teachers in making questions using a 4 or 5 alternative answers on PCM. PCM model is suitable to be applied on achievement tests, for instance, in Math or Physics that require stage of problem identification until final solution and also for questionnaire which using the likert scale or personality scale.

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THE CONTENT VALIDITY OF THE TEACHER APTITUDE INSTRUMENT

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Abstract

The concept of teacher aptitude has been derived from the three-ring concepts theory by Renzulli. The teacher aptitude consists of three dimensionals, there are creativity pedagogy, pedagogical commitment, and emotional intelligence. The purpose of this study was to determine the content validity of each dimension of the teacher aptitude concept. The determination of the content's validity was implemented using focus group discussion by seven experts, they were two education experts, two measurement experts, two psychologists, and a linguist. Instrument was assessed using the assessment form. The gradation assessing are excellent, good, adequate, less, and very less. The content validity was analyzed by the Aiken's formula. The result of the analysis showed that the index content validity of teacher aptitude construct were 0.835, $p = 0.024$, creativity pedagogy has content validity index of 0.847, $p = 0.019$, commitment pedagogy has content validity index of 0.842, $p = 0.021$, and emotional intelligence has a content validity index of 0.85, $p = 0.018$. This means that the construct validity of teacher aptitude instrument has a good content validity.

Keyword: *Content Validity, Pedagogy Creativity, Pedagogy Commitment, Emotional Intelligence.*

Introduction

Implementation of the Law number 20 in 2003 about educational system, law number 14 in 2014, government regulation number 19 in 2005 requires that teacher have the ability ideal among other aptitudes, interests, calls the soul, and idealism. The result of research by Block (2008) showed that mentions the role of the teacher is very great in the changing world. Sudarnoto (2009) mentions that the teacher is a crucial factor in the success of education as assessed student achieve. Dicky (2011) mentions that the graduate education of primary school teachers are not ready to teach to all levels of classes, still needs a few more years of teaching experience. The result of research that has been done by Alkharusi (2011) indicated that inservice teachers had a lower level of knowledge, a higher level of perceived skilfulness, and a more favourable attitude toward educational measurement than preservice teachers. Research by Fokkens-Bruinsma (2012) showed that affective commitment was predicted by the motivations of teaching ability, working with children, prior teaching and learning experiences, and time for family, as well as satisfaction with the choice of teaching and perceived task demand. Macklem (1990) said that the aptitude test is a good predictor of future achievement. Character, personality, and aptitude fatigue will affect teachers teaching process in the classroom. Aptitude is a variable that has a significant contribution to the

achievement of learning in the future. Now, the teacher aptitude instrument did not available. This reasearch will create the teacher aptitude instrument that it can be applied in Indonesia.

Constructs of teacher aptitude instrument was developed based on the theory of the threering giftedness concepts by Renzulli (1986). The three ring concept by Renzulli's theory consists of three dimensions: the ability above average, creativity, and commitment. The ability above average can be substitution by intelligence. Renzulli (no year), while there are eight intelligences by Gardner (2006). Intrapersonal intelligence and interpersonal intelligence is an important factor in education (MLPTS, 1992; Suryadi, 2009). Both of these are included in the intelligence of emotional intelligence (Chan, 2008; Gardner, 1993; Goleman, 2006; Salovey, 2004; Sigmar, 2010). Thus the construct of teacher aptitude instrument consist of three dimensions, namely creativity pedagogy, pedagogical commitment, and emotional intelligence.

Creativity is the process of feeling and observing the problem, making guesses about the short comings of this problem, assess, and test the conjecture or hypothesis, then change and test it again, and finally preparing the results. Aspects of product creativity emphasize that what comes out of the processof creativity is something new, original (Torrance, 1969). The hall mark of creativity is a new product. New products in this case can be either developmentor completely different from existing products. New product development process is required divergent thinking (Kaufman, 2008; Purwanto, 2008). The thoughtof peoplecame up witha fairly new idea or with a number of alternative ideas, and then he said to the creative. (DeBono, 1998). The characteristics associated with the ability to think creatively is fluency, flexibility, originality (Elliot, 2000; Munandar, 1999), (Kim, 2006) added elaboration into the creativity concept.

Work commitments reflect the level of identification and involvement of the individual in his work and devotion to the job. Commitment to the task or task commitment teacher is a teacher's commitment to the completion of tasks that boreh is responsibilities include the ability or capacity, motivation, work discipline, and task orientation (Greenberg, 1993). Binding themselves to the task or task commitment is to approach the task as a form of internal motivation that drives a person to be diligent and tenaciousin their work, despite of the many obstacle (Munandar, 1999) The pedagogy commitment is the degree of teacher pedagogical positive, effective bond between the teacher and the school community (Crosswell, 1997) consists off our dimensions, namely motivation to the task, the discipline of the assignment, the responsibility for the task, and thetenacity of the task.

The emotional intelligence as a subset of social intelligence that involves the ability to monitor their own and others' feelings and emotions, to discriminate among them, and use this information to guide one's thinking and actions (Patton, 1977). The emotional intelligence consists of the ability to recognize emotions, emotional self-management skills, ability to motivate themselves, the ability to recognize emotions in others, and the ability to build relationships with others (Goleman, 2006).

The research problems are construct of teacher aptitude instrument, and the content validity of the teacher aptitude instrument. The aim of the research is to determine of construct content validity of the teacher aptitude instrument. The result of this research can contribute in educational as a selection of student teachers.

Research Method

This research include development research that has be done by Gable (1986). The phase research development were predevelopment, development, and application model. The pre development research phase has be done explore the theory concept, literature, and the results of relevant research. The construct of teacher aptitude instrument has 3 dimensions, that were pedagogy creativity, pedagogy commitment, and emotional intelligency. The pedagogy creativity consists of 4 indicators, that each indicator consists of 8 items. The pedagogy commitment consists of 4 indicators, that each indicator consists of 8 items. The emotional intelligency consists of 5 indicators, that each indicator consists of 8 items. Thus each instrument consists of 32 items, 32 items, and 40 items respectively. I have get a mature concept of the teacher aptitude instrument. The instrument model has exposed to focus group discussion. The teacher aptitude instrument has be validated by seven experts. There are two measurement experts, two educators, two psychologist, and linguistics. The experts judgement has evaluated by form that containt of 5 options. There are excellent, good, adequate, less, much less. The excellent be scored 5, good be scored 4, adequate be score 3, less be scored 2, and much less be score 1. The result of scoring by experts judgement be analysed by Aiken's formula (Aiken, 1980).

Result and Discussion

The results of this study are presented below. Each result will be explained directly.

Table 1. The validity index of the construct teacher aptitude instrument

Dimension	Indikator	S	iv	z	p
Pedagogy creativity	Fluency	24	0.857	2.539	0.016
	flexibility	23	0.821	2.272	0.030
	Originality	25	0.893	2.806	0.008
	Elaboration	22	0.786	2.004	0.054
commitment	Motivation	25	0.893	2.806	0.008
	responsibility	24	0.857	2.539	0.016
	Discipline	23	0.821	2.272	0.030
	Tenacity	24	0.857	2.539	0.016
Emotional intelligency	to recognize emotions	22	0.786	2.004	0.054
	emotional self- management skills	23	0.821	2.272	0.030
	ability to motivate themselves	23	0.821	2.272	0.030
	Empathy	23	0.821	2.272	0.030
	Social relationship	23	0.821	2.272	0.030
Average		23.385	0.835	2.375	0.024

In Table 1, there are two indicators of the construct validity of the probability of validity index of more than 5 %, i.e. the elaboration and Recognize emotion. The probability of each indicator is 5.4%. Overall probability of teacher talent construct instruments 2.4%, including both $p < 5\%$. The probability of two indicators showed more than 5%, can be caused because there is a score of 3 is given by the validator third, while the six validator provide scoring 4 and 5.

Table 2. The content validity index of the pedagogy creativity

Item	S	iv	z	p
1	24	0.857	2.539	0.016
2	23	0.821	2.272	0.030
3	23	0.821	2.272	0.030
4	24	0.857	2.539	0.016
5	25	0.893	2.806	0.008
6	23	0.821	2.272	0.030
7	23	0.821	2.272	0.030
8	25	0.893	2.806	0.008
9	24	0.857	2.539	0.016
10	23	0.821	2.272	0.030
11	24	0.857	2.539	0.016
12	26	0.929	3.074	0.004
13	25	0.893	2.806	0.008

14	25	0.893	2.806	0.008
15	24	0.857	2.539	0.016
16	24	0.857	2.539	0.016
17	23	0.821	2.272	0.030
18	23	0.821	2.272	0.030
19	23	0.821	2.272	0.030
20	23	0.821	2.272	0.030
21	23	0.821	2.272	0.030
22	22	0.786	2.004	0.054
23	23	0.821	2.272	0.030
24	24	0.857	2.539	0.016
25	25	0.893	2.806	0.008
26	25	0.893	2.806	0.008
27	23	0.821	2.272	0.030
28	23	0.821	2.272	0.030
29	24	0.857	2.539	0.016
30	24	0.857	2.539	0.016
31	23	0.821	2.272	0.030
32	23	0.821	2.272	0.030
	23.719	0.847	2.464	0.019

In Table 2, the validity of pedagogical creativity instrument consisting of 32 items of questions, there is one that has a probability of $p > 5\%$. Item number 22 has a probability of 5.4%. The probability of item number 22 is because the validator third scoring 2. Overall, pedagogical creativity has content validity content validity of 0.847 with a probability of $p = 0.019$. thus including both pedagogical creativity.

Table 3. The content validity index of the pedagogy commitment

Item no.	S	iv	z	p
1	24	0.857	2.539	0.016
2	23	0.821	2.272	0.030
3	24	0.857	2.539	0.016
4	23	0.821	2.272	0.030
5	23	0.821	2.272	0.030
6	24	0.857	2.539	0.016
7	23	0.821	2.272	0.030
8	22	0.786	2.004	0.054
9	21	0.750	1.737	0.088
10	23	0.821	2.272	0.030
11	24	0.857	2.539	0.016
12	24	0.857	2.539	0.016
13	24	0.857	2.539	0.016
14	23	0.821	2.272	0.030

15	23	0.821	2.272	0.030
16	23	0.821	2.272	0.030
17	24	0.857	2.539	0.016
18	24	0.857	2.539	0.016
19	25	0.893	2.806	0.008
20	24	0.857	2.539	0.016
21	24	0.857	2.539	0.016
22	23	0.821	2.272	0.030
23	24	0.857	2.539	0.016
24	25	0.893	2.806	0.008
25	24	0.857	2.539	0.016
26	22	0.786	2.004	0.054
27	23	0.821	2.272	0.030
28	23	0.821	2.272	0.030
29	23	0.821	2.272	0.030
30	25	0.893	2.806	0.008
31	25	0.893	2.806	0.008
32	25	0.893	2.806	0.008
	23.563	0.842	2.422	0.021

In Table 3, the content validity pedagogical commitment, item numbers 8, 9, and 26 have more than 5% probability. Overall index of the validity of pedagogical commitment is 0.842 with a probability of 0.021

Table 4. The content validity index of the emotional intelligency

Item no.	S	iv	z	p
1	24	0.857	2.539	0.016
2	24	0.857	2.539	0.016
3	24	0.857	2.539	0.016
4	23	0.821	2.272	0.030
5	23	0.821	2.272	0.030
6	22	0.786	2.004	0.054
7	22	0.786	2.004	0.054
8	23	0.821	2.272	0.030
9	24	0.857	2.539	0.016
10	25	0.893	2.806	0.008
11	24	0.857	2.539	0.016
12	24	0.857	2.539	0.016
13	23	0.821	2.272	0.030
14	26	0.929	3.074	0.004
15	23	0.821	2.272	0.030
16	24	0.857	2.539	0.016
17	24	0.857	2.539	0.016
18	25	0.893	2.806	0.008

19	23	0.821	2.272	0.030
20	24	0.857	2.539	0.016
21	23	0.821	2.272	0.030
22	24	0.857	2.539	0.016
23	25	0.893	2.806	0.008
24	24	0.857	2.539	0.016
25	25	0.893	2.806	0.008
26	25	0.893	2.806	0.008
27	24	0.857	2.539	0.016
28	24	0.857	2.539	0.016
29	25	0.893	2.806	0.008
30	24	0.857	2.539	0.016
31	24	0.857	2.539	0.016
32	24	0.857	2.539	0.016
33	24	0.857	2.539	0.016
34	23	0.821	2.272	0.030
35	24	0.857	2.539	0.016
36	23	0.821	2.272	0.030
37	24	0.857	2.539	0.016
38	24	0.857	2.539	0.016
39	23	0.821	2.272	0.030
40	24	0.857	2.539	0.016
	23.850	0.852	2.499	0.018

In Table 4, the content validity of emotional intelligence instrument as a whole is 0.852 with a probability of $p=0.018$. But there are two items that have content validity index value is less good because $p>5\%$. These items are numbers 6 and 7.

Conclusion and Suggestion

The Teacher aptitude instrument, overall that has good content validity index. Thus the teacher aptitude instruments can be done to test for testing the model. It is recommended for expert justification should be no shared understanding of the instrument of accession of teacher aptitude, and that the score be obtain balanced scoring.

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DEVELOPING COGNITIVE DIAGNOSTIC TESTS ON LEARNING OF SCIENCE

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Abstract

A cognitive diagnostic test is required in learning activities to diagnose the ability and students' weaknesses through the stage of thinking. With diagnostic test is expected to the aim of learning that have not been known by the students can be identified and known the problems. The purpose of this study is to develop a diagnostic test of cognitive science and to obtain characteristics of cognitive diagnostic test in science subjects. The research used the development of diagnostic tests. The trials conducted in seven schools that have with high category, medium and low school category. Test subjects of the seventh grade students were 484. Development of data analysis based on descriptive cognitive diagnostic test done through Focus Group Discussion (FGD). Selection of test items is to obtain fit tests using the Quest program. Through FGD produces Learning Continuum, grating test, test specifications and item 28 in the form of multiple choices with reasons. By using the Quest program obtained 27 items fit is to see that the items are in a vertical line or have infit MNSQ between 0.77 until 1.30. Instrument reliability value is 0.74. The research instrument is compliant with the statistical Fit with an average value of infit MNSQ 1.01 with a standard deviation 0.09.

Keywords: *Diagnostic Tests, Cognitive, Science*

Introduction

The use of current diagnostic tests is very crucial because the teachers will be informed about the level of students' learning difficulties. Therefore, teachers can provide appropriate support and in accordance with what is required by the students when students have difficulty. Currently, students' failure is often considered normal and seen as normal. This can be seen by the many problems of education in Indonesia. One of these problems involve students is as follows the high rate of repeat and a lot of students who drop out of school, especially at the secondary school level, it still reflects the presence of a variety of issues related to inadequate quality of education.

According to Ridwan Efendi (2010) Indonesia has three times participated only for the grade eight students of junior high school (eighth grade students of SMP / MTs) in TIMSS (Trends of International on Mathematics and Science Study) in 1999, 2003, and 2007. The achievement of eighth grade students in Indonesia to three times participation in TIMSS is in the bottom than the achievement level of students in several countries in Asia (Hong Kong, Japan, Korea, Taiwan, Malaysia, Thailand). The average score Indonesian student

science achievement in TIMSS 1999, 2003, and 2007 respectively are 435, 420, and 433. With the scores of students Indonesia ranks 32 out of 38 countries (1999), ranked 37 of 46 countries (the 2003), and ranked 35 of 49 countries (2007). The average score on the TIMSS 2007 Indonesian students is lower from the average score of 500, and only reach the Low International Benchmark. With these achievements, the average Indonesian students are only able to recognize some basic facts but have not been able to communicate and combine the various topics of science, especially, applying the concepts of complex and abstract.

Science, according to Titus (1959: 78) contains three definitions are as numerous scientific disciplines, as a group of knowledge, and as methods. Besides, it is also confirmed that science is a series of related to concepts and developed from the results of experiments and observations. According to Hungerford, Volk & Ramsey (1986: 8) science is 1) the process of obtaining information through empirical methods; 2) information is obtained and arranged through the investigation logically and systematically, 3) a combination of critical thinking processes that produce reliable information and valid.

Diagnostic tests are needed in learning as well as in learning science. Diagnostic tests according to Ebel (1979: 375) are designed to determine the specific deficiencies or failure in learning in some subjects or lessons such as reading and arithmetic. A similar opinion was expressed by Gronlund states that the diagnostic test is a test designed to determine the cause of failure in teaching learners. Diagnostic tests have two main functions, namely: 1) In identifying the problems or difficulties experienced by students, 2) follow-up plan in the form of efforts to solving the corresponding problems or difficulties that have been identified.

Weeden, Winter & Bbroundfoot (2002: 20) states that the diagnostic tests are test to find out indication how far the difference between prior knowledge and skills expected is or tests is used to identify specific problems experienced by students. Embretson (2002: 221-222) suggests two reasons why it is necessary to develop cognitive psychology in the development of the tests. It is because: 1) The concept of construct validity gave little space on the cognitive theory in the development of the tests. 2) Development of tests is not accustomed to using a procedure involving cognitive theory. Mehrens & Lehmann (1973: 410) argues that the diagnostic tests are part of the achievement tests, diagnostic tests as well as from the obtained value is an achievement or student learning outcomes. However, as the main purpose of diagnostic tests do not see the students' achievement but to know the difficulties faced by students. The results of the diagnostic tests provide information on concepts that already exist or have not been understood. The concept is not understood well due to the occurrence of misconceptions one experienced by students. According to Mehrens

& Lehmann (1973: 410) in developing diagnostic tests must offer two assumptions: 1) The test is able to analyze the skills or knowledge to be included in the component skills or knowledge, and 2) Item test developed is able to measure the skills or knowledge. Diagnostic tests are used in the diagnostic assessments is good if it does not just reveal the students' understanding of the meaning of the lesson. The test can show and map out the weaknesses of students and knowledge that is not steady. Gorin (2007: 174) states that diagnostic tests should be able to uncover why students responded as they did. Diagnostic tests are more specific and more detailed. Ultimately, the diagnostic tests are tests that are used to determine student weaknesses. In developing diagnostic tests, the first step is to define the scope of the concept creating test items. Determination of scope in tune with the concept of the subject to be diagnosed in order to test items actually measure what it intends to measure.

A measurement model that is used in developing diagnostic tests on the learning of science is the Partial Credit Model (PCM). PCM was chosen to evaluate the data obtained through testing instrument diagnostic tests of cognitive science subjects in SMP. Partial Credit Model (PCM) is one of the Polytomus IRT models that is developed by Masters (1982) based on the model of Rasch dichotomous response of grain into models response polytomus. PCM as an extension of the Rasch model 1-PL models can use a sample that is not as big as when doing the calibration data is polytomus in model 2-PL or 3-PL (Keeves & Masters, 1999, 12-13).

The aim of this research is to develop a diagnostic test of cognitive science and to obtain characteristics of cognitive diagnostic test in science subjects.

Methods

This study uses diagnostic tests development research. Five-step development of diagnostic tests aimed at cognitive assessment according to Nichols (1994: 587) is 1) Based on the construction of the substantive theory. Substantive theory is the basis for the development of a test based on the research or review of research. 2) Selection of design. Design of measurement are used to construct items that can respond either by the person taking the test is based on knowledge, specific skills or other characteristics according to the theory. 3) Administration of the test. Administration of the test covers several aspects of the format item, the technology used to make the assay, the environmental situation at the time of testing, and so on. 4) Scoring results of the test is the determination of the value of tests which have been carried out. 5) Revision, the process of adjustment between theories and models, whether the tests were developed to support the theory or not.

The step of this research is from the beginning to the end of the activity. It can be seen in the following figure.

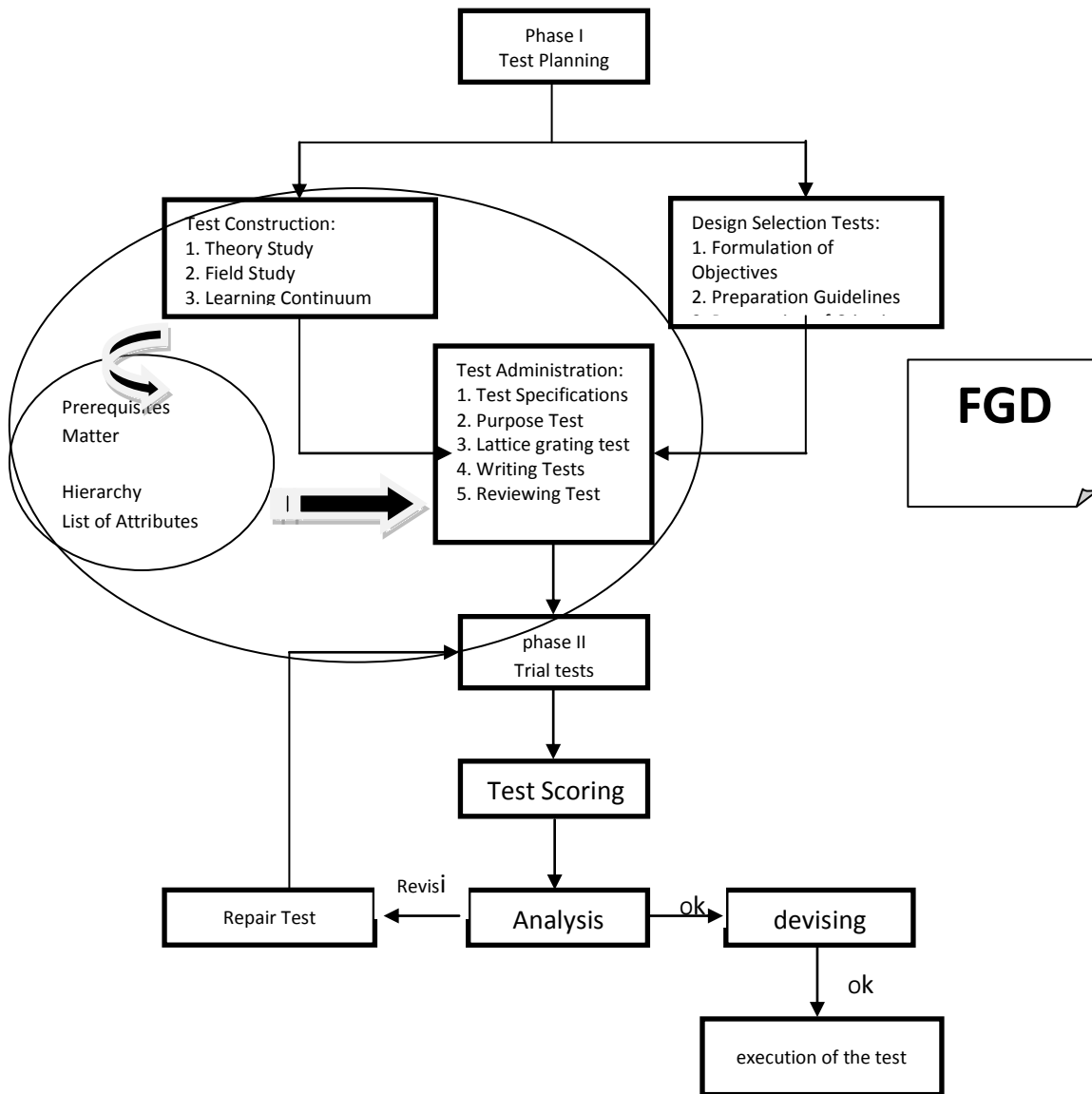


Figure 1. Research Desain

The research trials conducted in seven schools that have with high category, medium and low school category. Test subjects of the seventh grade students were 484. Development of data analysis based on descriptive cognitive diagnostic test done through Focus Group Discussion (FGD). To determine the quality of the instruments is done through validation empirically, valid item in the IRT models is used to assess the success of the calibration in an

effort to determine the fit of data to the model. If the item is declared fit to the model valid means of measurement (Wright & Masters, 1982: 114). Selection of test items to get fit tests was performed with poltomus Rasch Model, the Partial Credit Model (PCM) with the help of the Quest program. The Limit of one item is declared fit to the model if it has infit MNSQ between 0.77 up to 1:30 (Adam & Khoo, 1996). Fit statistics on program requirements quest, that is, if the value of the average infit MNSQ approaching 1.0 with a standard deviation of 0.00. If the data is shown to fit the models, means evident that all items measure the same construct (unidimensional).

Results and Discussion

The development of diagnostic tests instruments implemented in accordance with the lines of inquiry. At the planning stage the test starts with constructing substantive theories. At this stage also the formulation of the concept of mastery learning continuum materials science in SMP. Learning continuum that is made in order to describe the development and enhancement of the ability of learners to master the concepts of physics science started from the basic concepts to the rest of concept. Continuum formulation of learning through workshop that is followed by evaluation experts, education experts and 6 school teachers who are members of the IPA MGMPs Sleman having regard to the concept map. The next step is the selection of the design that is used to make items that can be responded construction either by candidates based on knowledge, specific skills or other characteristics according to the theory. At this stage of the draft prepared cognitive diagnostic instruments implemented in three activities, namely: the preparation of the formulation of objectives, preparation of guidelines for assessment and preparation of the assessment criteria. Develop test specifications (Item Specification) contains descriptions tests that show characteristics that must be possessed cognitive diagnostic tests. Preparation of test specifications include determining the purpose of the test, making the test grating, determine the shape of the test and determine the length of the test. The instrument is structured diagnostic tests on the material of heat by 28 items, with a selection of multiple choices answers created hierarchy.

Results of diagnostic tests of cognitive development in the first phase were analyzed by FGD. At this stage 18 followed by FGD participants consisting of measurement experts, cognitive psychology, science, education Physics, peers and junior high school teachers who are members of MGMPs Sleman. In FGD generating activities continuum Learning Subjects science in SMP calorific material consisting of 57 points, Heat Hierarchy material, test

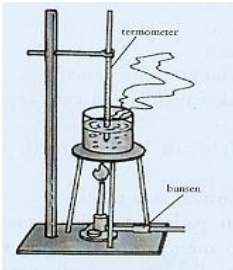
specifications, and test grating cognitive diagnostic test instruments in the form of multiple choices with reasons. Content validity of 4 experts is presented in the following table.

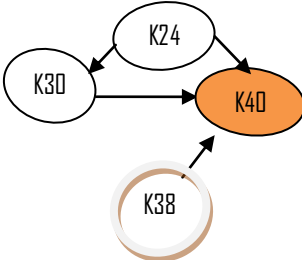
Table 1. Results of Focus Group Discussion

Contens	Not Good	Less	Good	Very Good
Learning Continuum	-	-	25%	75%
Prerequisites Matter Hierarchy	-	-	75%	25%
Grating test	-	-	50%	50%
Test specifications	-	-	-	100%
alternative Answers	-	-	25%	75%
Diagnostic information	-	-	50%	50%
Forms Questions	-	-	50%	50%
Answer sheet and answer key	-	-	-	100%

The overall instrument validation results the experts have good and excellent value. After the contents of the instrument validated by experts, then the instrument was tested in 484 junior high school students in seven schools in Sleman. Here's an example of cognitive diagnostic test specifications at number 16.

Table 2. Specification Tests in Item number 16

Type of School	: Junior High School	Allocation of Time	: 80 minutes (for all item)
Subject	: Sains	Form of Matter	: Multiple Choice by reason
Class	: VII	Author	: Team
Learning Continuum	: Explain the meaning of latent heat		
Type of Knowledge	: Factual		
Cognitive processes	: Comprehension		
Question	: Consider the following heat usage graph!		
			
	If the water temperature has reached 100 ° C and kept heated, then there is		

<p>Alternative Answers:</p> <p>A. The temperature of the water rises and the water mass is reduced B. The temperature of the water rises and the water condenses C. The temperature of the water remains and the water evaporates D. The temperature of the water rises and the water boils</p>
<p>Diagnostic information answer</p> <p>A. Answer incorrect Students can not master the material K 24 (a score of 2)</p> <p>B. Answer incorrect Students can not master the material K24 and K30 (a score of 1)</p> <p>C. The right answer (a score of 4) Students can master the material K40</p> <p>D. Answer incorrect (a score of 3) Students can not master the material K38</p>
<p>Image hierarchy Material prerequisite learning continuum</p>  <pre> graph TD K24((K24)) --> K30((K30)) K24((K24)) --> K40((K40)) K30((K30)) --> K40((K40)) K38((K38)) --> K40((K40)) style K40 fill:#f96 </pre> <p>Remarks:</p> <p>K24: Explaining the effect of heat in changing temperatures and states of matter K30: Mention the change occurring states of matter from liquid to gas K38: Distinguishing melting point, boiling point and vapor K40: Explain latent heat</p>

The data have been collected in empirically validate using PCM through the Quest program. Selection grains with the Quest program is used to get the value of item difficulty and test fit. In this study the number of items is 28 items, but in the process of doubling the instrument contained a typing error on the matter so that both questions and answer options are not appropriate. So the question is analyzed totaled 27. In this study, there is one person who answered the question correctly students all, if we follow the logistic curve, the students who received a score of correct all or any of all did not participate analyzed. so that the data analyzed in this study is data from trials sebyek by 483 students.

The overall results of the analysis with the Quest program are presented in the following table.

Table 3
 Estimation Results Item (i) Cognitive Diagnostic Test Subjects Physics Science and
 Estimated Student SMP (N) according to the Partial Credit Model Politomus

No	Information	item Estimates	Case Estimates
1	Mean & SD	0,01±0,54	0,97±0,40
2	Mean & SD (adjusted)	0,01±0,46	0,97±0,35
3	Reliability of estimate	0,71	0,74
4	Internal Consistency		0,71
5	Mean & SD infit MNSQ	1,01±0,09	1,02±0,30
6	Mean & SD outfit MNSQ	1,03±0,17	1,03±0,71
7	Mean & SD infit t	0,15±1,71	0,02±1,05
8	Mean & SD outfit t	0,16±1,71	0,12±0,77
9	cases with zero scores	0	0
10	cases with perfect scores	0	0

Note : N = 483 L = 27 Probability Level= .50

The Limit of one item is declared fit to the model if it has infit MNSQ between 0.77 up to 1,30 (Adam & Khoo, 1996). Requirements Fit statistics is on the Quest program, that is, if the value of the average infit MNSQ approaching 1.0 with a standard deviation of 0.00. Cognitive diagnostic tests instruments in science subjects have the number of items that were analyzed by 27 grains. From the results of the analysis showed that all items fit. In this study, all the items are in a vertical line or have infit MNSQ between 0.77 until 1.30. The research instrument is compliant statistics Fit on a quest program with an average value infit MNSQ 1.01 with a standard deviation of 0.09. Reliability values sampled in this study is 0.71. According to Wright & Masters (1982) the value of an item based on the estimated reliability is called reliability sample. Thus, the higher the value, the more items that fit with the model. While the reliability of the test in this study was obtained of 0.74 is by looking at the value of reliability based on the estimated case or testy. Reliability values based on the estimated case / test is called reliability test (Wright & Masters, 1982). The reliability of a test of 0.74 provides information that measurements using cognitive diagnostic test instrument on science lessons provide consistent results. The higher the reliability of the test, the more samples for tests that provide information that is expected, and vice versa. The lower of the value the less reliability of the test sample is to test the expected information. In this research, one student can answer all of the questions correctly. The level of difficulty of items in this study are presented in the following graph.

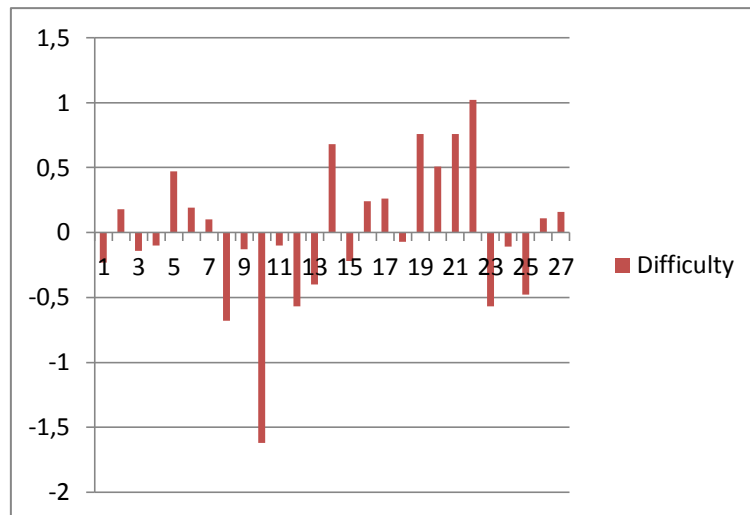


Figure 2.
Item Difficulty

Items good report if the index of difficulty (b) is between $-2.0 < b < 2.0$ (Hambelton & Swaminathan, 1985: 36). Based on the analysis, item difficulty of diagnostic tests of cognitive science subjects is in the interval -1.62 to 1.02. This means that as many as 27 items of diagnostic tests of cognitive science this is all good. In the figure it can be seen that the most difficult problem is the question about the number 22 and the easiest is the matter of the number 10.

Conclusion

The study successfully prepared learning continuum, grating test, test specifications and develop cognitive diagnostic tests instruments in the form of multiple choices with reasons. The options granted are based on a hierarchy of prerequisite material. Tests were successfully developed consisting of 28 items, and which can be analyzed is 27 items. By using gained 27 Quest program items that fit by looking that the items are in a vertical line or have infit MNSQ between 0.77 until 1.30. The reliability value of 0.74 tests provides information that measurements using cognitive diagnostic tests instruments in science lessons provide consistent results. The research instrument is compliant Fit statistics on the Quest program, which is the average value of infit MNSQ 1.01 with a standard deviation of 0.09.

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DIAGNOSTIC MODEL OF STUDENT LEARNING DIFFICULTIES BASED ON NATIONAL EXAM

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Abstract

The objective of this study is to develop a diagnostic model of student learning difficulties based on a national exam. To see its performance, the introduced model was tested on data collected from six State Senior High Schools. For the implementation of the model in improving student achievement, 24 teachers were involved in the study. The student sample for the large-scale tryout consisted of 945 students from six State Senior High Schools and was selected using the purposive sampling. The research instruments consisted of a test, an evaluation sheet, and item analysis cards. Based on the assessment of experts and practitioners, the results showed that the model can be used to identify the student learning difficulties. Applied on Indonesian national exams 2014, the model indicated that students got difficulty in understanding the competencies and indicators of the national curriculum in all tested subjects. Moreover, the analysis of test item shows that students experienced difficulties mostly in the subjects; Indonesian, Sciences, English, and Mathematics. In future, this work can be extended to diagnose student learning difficulties based on any formal test in school.

Keywords: *Diagnostic Model; National Exam; Learning Difficulties*

Introduction

The national examination is a system of standardised evaluation, especially at the primary and secondary education level. In Indonesia, for example, a national instrument to judge the quality and equality of education between regions is done by the National Education Standards, based on the mandate of the Law of the Republic of Indonesia, Number 20, 2003. This law stated that a national examination is to be used to control the quality of national education evaluation as a form of accountability for education providers to the parties concerned. Further it stated that the evaluation be conducted by an independent agency, be periodic, thorough, transparent, and systematic to assess the achievement of national education standards and the monitoring process. So the evaluation should be done on an ongoing basis. Monitoring the evaluation process, if done continuously and sustainably, will eventually result in an improved education process (Anderson, 2003)

Efforts to reform the quality of education are done in various ways, one of which begins with the determination of a standard process (Berliner, 2005). The effort to raise standards is expected to encourage an improvement in the quality of education both

nationally and regionally. Determining education standards involves the determination of the limit grade (*cut-off score*) for graduation exam results. A person is said to have graduated/are competent when they have passed the limit score a limit value between students who have mastered certain competencies and students who have not mastered certain competencies. If it happens on the national exams or at the school level; then this serves to separate the value of the boundary between the students who pass and do not pass the so-called boundary benchmark, known as standard setting.

The benefits of setting and standard-setting a pass level in the exam is to get the boundary of each subject in accordance with the demands of its minimum competencies. With the same standard for each subject as the achievement of minimum standards of competence, the monitoring of the achievement of national quality education is easy to determine (Birbaum, 1997).

Various attempts have been made to improve the results of a national exam. These attempts range from the provision of facilities and infrastructure to the implementation of effective teaching and learning processes that motivate student to actively learn. An alternative approach is a diagnostic one, to detect and analyse what the barriers are to learning.

Diagnosis is a term adopted from medicine. According to Thorndike and Hagen (Muhibbin, 2002), diagnosis can be interpreted as: (a) efforts to find a weakness or identify the disease process (*weakness, disease*) that is experienced by a person through testing and a thorough study of the symptoms (*symtoms*), (b) a careful study of the facts of a case to find a characteristic or errors and so on is essential, and (c) the decision reached after a careful study of the above symptoms or facts about something.

Based on the above three terms of diagnosis, it can be concluded that the concept of diagnosis, implicitly covers the concept of prognosis. Thus, the process of diagnosis is not just to identify the type and characteristics as well as the background of a weakness or a specific disease, but also it implies an attempt to extrapolate and suggest actions to solve the problem. So, the diagnosis of activities directed at solving the problems that occur in learning, is referred to as a diagnosis of learning difficulties. It is possible to diagnose and identify learning difficulties symptoms, look for the factors that cause them and seek to solve the problem.

Diagnosis of learning difficulties is a procedure in solving learning difficulties. The procedure consists of systematically arranged steps. According to Satterly (2006), the stages of diagnosing students' learning difficulties are the answers to the following questions: (1) *Who are the pupils having trouble?*; (2) *Where are the errors located?*; (3) *Why are the errors occurring?* (4) *What remedies are suggested?* and (5) *How can errors be prevented?*

Satterly suggests the following phases of activity, namely: (1) Identifying students suspected of having learning difficulties, (2) Recognize students' learning difficulties through behavior analysis, (3) Recognize students' learning difficulties through the analysis of their learning achievement, (4) Identify the learning difficulties, and (5) Identify the factors that cause learning difficulties.

To identify students who have difficulty learning: first, analyze their academic achievement. In terms of student achievement, students show they are experiencing difficulty when: (1) the value of learning outcomes (formative test, summative test, report cards, national exam) is lower than the corresponding average value of the class, (2) the performance achieved is now lower than before; and (3) the achievement is under their actual ability. Secondly, analyze the behavior associated with the learning process. Analysis of the behavior of the students suspected of having learning difficulties is done by: First, compare the behavior concerned with the behavior of other students from the same grade level or; Second, compare the behavior concerned with the behavior expected by the institution. Thirdly, analyze the social relationship. The intensity of social interaction with a group of students can be identified by sociometry. With sociometry, we can recognize those who have been isolated from their groups. This symptom is one of the learning difficulty indicators.

In order to provide an effective supervision to students who have the difficulties, a teacher should recognize the causes of the problem. Learning difficulties can be discovered through the behavioral analysis; for example, the time to complete their assignment, their presence and persistence in following their lessons, their participation in a group task, and their ability to work in a group and their social adjustment.

The deadline of assignments or the time limit of tests can assist teachers in identifying learning difficulties. By recording time needed for each student to complete his/her assignment, teacher will know which students can complete before the time limit, on time, or longer than that. Then, the time extension is compared with the extension frequency in the group.

In relating to the presence and persistence to follow the lesson in class, those students who are not hard-working, anxious, or absent can be considered as having learning difficulties. For some subjects, students are required to be able to communicate and interact with others, such as giving opinions, presenting argument. Through their participation in their group, we can identify students who have difficulties in learning process. Those who are not able to work collectively, do not trust, and do not believe in others in their group can be also assumed having learning difficulties.

Syamsuddin (2003) recorded and analyzed his notes during learning process and then interpreted the results in terms of learning difficulties. One can use the reference criterion to interpret such notes, which is often called the standard or norm reference. The steps to use criterion reference are as follows: (1) determine the minimum passing grade, (2) compare his/her score with the passing grade for each student, (3) identify students who get grades below the passing grade as those with learning difficulties, and (4) determine the priority for assistance based on the gap of their scores from the passing grade. Those with large difference must get more assistance.

If the reference norm is used, the average score of group serves a benchmark for the score of each student. The steps are as follows. (1) calculate the average of class score, (2) identify students with the grades below the class average, and (3) determine the assistance priority.

Once learning difficulties have been identified, next step is to review or to find out the difficulties, namely, (1) which subjects they have experienced the difficulties, (2) which aspects of the learning objectives they get the difficulties, (3) which part or section in the subjects the difficulties occur, and (4) which aspects of learning process they get problem.

Next stage is to identify the causes of learning difficulties. All factors considered to contribute in the learning difficulties should be revealed. Most experts have considered this as the most difficult stage since the causes of learning difficulties are very complex. Therefore, it is not possible to understood completely but it can be only expected to look more dominant factors of learning difficulties that others (Hellen 2002).

The techniques to determine factors of learning difficulties can be done in various ways, including 1) observation, 2) interview, 3) questionnaire, 4) attitude scaling, 5) test, and

6) a medical examination if the difficulty is related to a disease or a physical and psychological disorder.

Thus, there are several signs from students as the symptoms of learning difficulties. Therefore, teachers should understand and are able to identify students with learning difficulties (Hettie and Timperley, 2007). There are a number of steps that teacher can apply to detect learning difficulties experienced by students. These steps include (1) observe unexpected behavior of students during classes, (2) examine students' audio-visual, in particular those with learning difficulties, (3) interview parents to find out the possibility that family may cause learning difficulties.

In this preliminary research, we develop a diagnostic model which can be used to identify student learning difficulties based on national exams. The results can be useful to improve the learning process in classes so that students can have a better achievement in next year national exam. The developed diagnostic model can detect student's difficulties in answering national exam, including which subjects the students get difficulties and which subjects they have understood. With the application of this model, teachers can use the results of national exam to have some remedial of learning process in schools. At the end, it is expected to improve student's achievement in the following national exam.

The main objective of this study is to develop a diagnostic model of student learning difficulties based on a national exam. To see its performance, the introduced model was tested on data obtained from six State Senior High Schools. For the implementation of the model in improving student achievement, 24 teachers were involved in the study.

Method

The procedure used in this study basically refers to those developed by Brog and Gall (1989) and Plomp (1997). However, several stages are modified to adjust the purposes and the objectives of this research. The stages of the model development can be described as follows; (1) collecting preliminary information and examining some requirements, (2) developing the model, (3) testing the model, (4) evaluating the results, (5) implementing the model in classroom, and (6) disseminating the result.

On the development stage of model, two trials were carried out in limited and expanded base. Samples were obtained from the results of national test, in this case national

test packets conducted in Mei 2014 for junior high school. There were four types of test packets; Mathematics, Science, Indonesian, and English.

For the remedial purpose which was based on the results of the diagnostic of learning difficulties, students in grade nine from six junior high schools; SMP Negeri 1 Kendari, SMP Negeri 2 Kendari, SMP Negeri 4 Kendari, SMP Negeri 5 Kendari, SMP Negeri 9 Kendari, and SMP Negeri 10 Kendari, were selected. For the implementation of the model in improving student achievement, 24 teachers were involved in the study. The instruments of this study were the documentation, answer sheets, and questionnaires. Quantitative data in the form of recorded student's answers were analyzed using the software BIGSTEP (Edwards, 2009).

Result and Discussions

1. Model Validation

Based on the assessment carried out by the experts and practitioners, 87% of them stated that the procedures and the steps were valid or reliable to be used to detect the student difficulty in answering the questions in national examination.

The procedures and steps to diagnose student learning difficulties including the remedial are as follows.

1. Analyze questions of national exam by determining the basic competency as well as which indicators (items) chosen to be in the national exam.
2. Perform analysis to determine which parameters affecting on the difficulty level of the national exam.
3. Identify which items in the national exam considered difficult by step 2 and the map the items based on the basic competency of the curriculum.
4. Formulate remedial according to the basic competency and indicators based on the items considered difficult in the national exam.
5. Perform testing on the items considered difficult in the national exam based on step 3 to students.
6. Discuss the materials considered difficult.
7. Formulate questions which are the same difficult level, indicators, and basic competency as those in the national exam and, then they are tested to the students.
8. Formulate a test which is similar to the test of national exam with the same basic competency, but the different indicators and it is tested to students.

9. Form students in group based on levels, ranging from the lowest level (Level 1) to high level (Level 4).

With the procedure, we found that the difficulties occurred on which competency and indicators most students failed to give correct answers.

2. Competencies and Indicators are Not Yet Mastered by Students

Based on the analysis of national exam, the results indicated that students have not comprehended a number of basic competencies and indicators. These competencies were found in all tested subjects in the national exam; Mathematics, Science, Indonesian, and English. The details of the competencies and indicators are outlined as follows.

Mathematics

A number of competencies and indicators in mathematics have not comprehended by students as shown in Table 1. From two competencies tested in national exam, there were four indicators that have not been comprehended by students. These questions with those indicators were categorized difficult. Such questions generally measure the level of student understanding and ability to apply the indicators.

Table 1.
Competencies and Indicators that students did not comprehend in Mathematics

No.	Competence	Indicator
1	Applying the concept of arithmetic operations and number properties such as comparison, exponential number, root number, social arithmetic, and sequences, into problem solving.	<ul style="list-style-type: none"> Solving problems which relate to comparison. Solving problems which relate to sequences and series.
2	Understanding the concept of algebraic operations, linear equations, inequality, line, set, relation, function, systems of linear equations, and their application in problem solving .	<ul style="list-style-type: none"> Solving problems relating to linear equations. Determining gradient, line.

Sciences

In sciences, Table 2 showed that there were a number of not-comprehended competencies and indicators. Three indicators from two competencies tested were still not

comprehended by students. These questions with those indicators were categorized difficult. Such questions generally measure the level of student understanding and their ability to apply the indicators.

Table 2.
Competencies and Indicators that students did not comprehend
in Science

No.	Competence	Indicator
1	Applying the concept of substance and heat as well as its usefulness in everyday life	<ul style="list-style-type: none"> Determine the amount of calories in the process of change in temperature or states of matter, changes in the implementation of daily life.
2	Understanding the concept of electricity and magnetism as well as its application in everyday life	<ul style="list-style-type: none"> Determine the dynamic electrical quantities in a series (series/parallel, or Ohm's Law Kirchoff's Law) as well as its application in everyday life
		<ul style="list-style-type: none"> Explaining electromagnetic induction events as well as its application on transformer

Indonesian

The result indicated that a number of competencies and indicators for Indonesian subjects were not mastered by students, see Table 3. From two groups of competence tested, there were seven indicators that have not been mastered by students. The questions tested on that indicators were categorized difficult and they generally measured the level of understanding and the capability to apply.

Table 3.
Competencies and Indicators that students did not comprehend
on Indonesian

No.	Competence	Indicator
1	Reading and understanding a variety of texts not literary (biography, articles, news, advertising, table/diagrams, charts, graphic, maps, floor plans), various literature (poetry, an anthology of poems, short stories, a book of short stories, children's story, children's story books, teen novels, novels force's 20-30, and drama)	<ul style="list-style-type: none"> • Equation determines the content of the story • Conclude paragraph • Identifying intrinsic elements of poetry
2	Writing and editing text non literary using a various and effective vocabularies in the form of diaries, personal letters, official letters, narratives and short messages, reports, announcements, instructions, summaries, news text, slogans/posters, advertisement, reviews, and essays, letters to editor, text to speech, and scientific works; writing literary texts in the form of poetry, rhymes, fairy tales, short stories, and drama.	<ul style="list-style-type: none"> • Writing report/announcements/reviews • Writing slogan in context • Writing editing sentences, spelling/punctuation, word choice • Completing poetry

English

Table 4 describes the competencies and indicators that were tested but they were not mastered by students for English. From the two groups of competence tested, there were three indicators that were not been dominated by students. The questions with these indicators were categorized difficult and they generally measured the level of understanding and the capabilities for application.

Table 4.
Competencies and Indicators that students did not comprehend
in English

No.	Competence	Indicator
1	Reading. Understanding the meaning in short written discourse either functional text or simple form of descriptive essays (descriptive, procedures, and reports) and narrative and recount- in the context of everyday life.	<ul style="list-style-type: none"> Determine a general overview / main thoughts paragraph or specific information/details / information or referral implied meaning of a word or word / phrase or communicative goals in a short functional text in the form caution/notice/warning, greeting cards, letter/e-mail, short message, advertisement, announcement, invitation, schedule.
2	Writing . Reveal the meaning written short functional text and simple form of descriptive essays (descriptive, procedure, and report and narrative (narrative and recount) in the context of everyday life.	<ul style="list-style-type: none"> Determining the correct word to complete the form of descriptive text hiatus/simple procedures Determine the proper sentence structure to create a coherent and meaningful paragraph

3. The Implementation of Remedial Approach

Based on the analysis of a number of questions, it was found that the questions with a high degree of difficulty were considered as difficult questions for students. Those difficult questions spread in all tested subjects. The results suggested that problems with easy, moderate, and hard category were found in all tested subjects.

Table 5.
Results of Problem Identification by Category Level Difficulties Index; Easy, Moderate, and Hard for all Tested Subjects

No.	Subject	Category Level of difficulty Index			Number
		Easy	Moderate	Hard	
1	Indonesian Language	11	23	16	50
2	English	22	19	9	50
3	Mathematics	15	20	5	40
4	Science	10	19	11	40

Table 5 shows that the difficult problems were mostly found in all tested subjects; namely, Indonesian (32%), Sciences (28%), English (18%), and Mathematics (13%). Based on the degree of question difficulty; easy, moderate, and hard, the proportions were found as follows. For Indonesian the proportions were 0.2: 0.5: 0.3; for Sciences the proportion were

0.2: 0.5: 0.3; for English the proportions were 0.4: 0.4: 0.2; and for Mathematics the proportions were 0.4: 0.5: 0.1, respectively. So, the highest proportion of difficult questions occurred in the subject of Indonesia and Sciences; i.e., 30% out of questions were hard.

Based on the results of remedial for all tested subjects, students were grouped into three categories according to student mastery levels; Level 1, Level 2, Level 3, and Level 4. These levels indicate the percentage of students ability to understand the given test material; Level 1 (0% – 65%); Level 2 (66% – 75%), Level 3 (76% – 85%), and Level 4 (86% – 100%). After the implementation of remedial, the results showed that mathematics and sciences were at Level 3, Indonesian and English were at Level 2. This suggested that students still needed to learn more intensive in order to be able to master all material tested in the national exam (UN 2014), for the same competence and indicators as those tested in the national exam, for the same competence but different indicators, or for different competencies and indicators.

In addition, due to many variants of the problem tested, students still got unequal treatment in terms of the material in the questions even though it the questions were considered having fulfill the principle of equal level of difficulty. The efforts of the improvement of the achievement were not optimal, as indicated by the achievement of the students which reached up to Level 3 for all four subjects tested in the national exam. These findings suggested that teacher should implement learning remedial at school in more intensive and sustainable. The learning activities to be carried out were not only on the problem-solving exercise but also the understanding of concepts for all subjects.

Conclusions

We have introduced a diagnostic model based on national exam that can be used to identify student learning difficulties. The developed model has been tested in a large-scale sample and it worked well. In the case study of national exam in Mei 2014, it was found that students experienced learning difficulties in the subjects of Indonesia (32%), Sciences (28%), English (18%), and Mathematics (13%). With the implementation of remedial measures to student, Mathematics and Sciences were reached at Level 3, Indonesian and English were reached at Level 2.

Suggestions

For increased student achievement at national exam next year, the teachers are expected in applying the model of learning in school activities.

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Theme 2:
**IMPLEMENTATION OF AUTHENTIC
ASSESSMENT**

IMPLEMENTATION OF AUTHENTIC ASSESSMENT OF CURRICULUM 2013 AT PUBLIC ELEMENTARY SCHOOLS IN PABELAN

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Abstract

This research is based on the teachers' difficulties in implementing the authentic assessment of Curriculum 2013 at the Public Elementary Schools in the subdistrict of Pabelan. The purpose of this research is to collect crucial information relate to the obstacles faced by the teachers in implementing this assessment. This research uses descriptive method which state, analyze, and clarify through the techniques of observation, interviews, and questionnaires. The population consists of 225 teachers. The samples taken are 135 teachers, 60% of the total population. The sampling technique used in this research is random sampling. The results of this research indicate that the teachers of PublicElementary School in subdistrict of Pabelan have difficulties in compiling and analyzing the results of the assessment format of the authentic assessment using Microsoft Excel. It is proposed to the government to standardize the format of authentic assessment and provide training in the use of Microsoft Excel.

Keywords: *Authentic Assessment, Implementation, Curriculum 2013.*

Introduction

Curriculum is a set of plan and arrangement about purpose, content, and material of instruction together with the implementation guidelines of learning activities to achieve the purpose of certain education. The challenges and obstacles in educational world are factors that influence the born of Curriculum 2013. Based on the material in a training of Curriculum 2013 implementation, there are five considerations in the development of Curriculum2013; they are (1) internal challenge, (2) external challenge, (3) perfection of mindset, (4) reinforcementof curriculummanagement,and (5) deepening and enlargementof the material.

The learning model used in Curriculum 2013 at elementary school level is Integrated Thematic Instruction. Integrated Thematic Instruction (ITI) was first developed in the early 1970's. It was believed as one of the effective learning models because it was, in integrated way, able to accommodate and touch the emotion, physic, and academic side of the learners in class and school environment. Originally, Integrated Thematic Instruction was developed

for the gifted and talented, smart, and fast learning children in the extension of learning program. It was proven empirically successful to spur the acceleration and increase the learner memory's capacity in a long term.

The assessment of Curriculum 2013 is implemented through authentic assessment. Authentic assessment is a significant measurement to the learners' learning outcomes in the aspect of attitude, skill, and knowledge. The term of assessment is the synonym of scoring, measurement, testing, or evaluation; meanwhile the term of authentic is the synonym of original, real, valid, or reliable.

In the implementation of Curriculum 2013 authentic assessment, Public Elementary School teachers in sub district Pabelan found several obstacles. It was seen in the activity of *Kelompok Kerja Guru (KKG)* [Teachers Working Group] grade four where the writer joins in. There were many Public Elementary School teachers in sub district Pabelan who complained that authentic assessment was difficult. The guideline book that was published three times added their confusion because each book was different. The difficulties faced by the Public Elementary School teachers in sub district Pabelan in the implementation of authentic assessment of Curriculum 2013 is needed to be examined deeper. That is why; the writer was interested to know precisely these difficulties.

Derived from the background explained above, the problem of this research can be formulated as (1) how is the implementation of authentic assessment of Curriculum 2013 in the Public Elementary School in Sub District Pabelan? (2) How is the ability of the Public Elementary School teachers in Sub District Pabelan in operating the authentic assessment program of Curriculum 2013?

The purposes of this research are (1) to describe the ability of Public Elementary School teachers in Sub District Pabelan to implement the authentic assessment of Curriculum 2013 and (2) to describe the ability of Public Elementary School teachers in Sub District Pabelan to operating the authentic assessment program of Curriculum 2013.

Curriculum 2013

Curriculum 2013 is a curriculum that is simplified and thematic-integrated. It is expected that learners get a better competency of attitude, skill, and knowledge. Curriculum 2013 must be applied as good as possible if we want to modernize and develop our education. The teaching method used is scientific approach with authentic assessment. In scientific approach there are five principal learning experiences, they are: (1) observing, (2) questioning, (3) experimenting, (4) associating, and (5) communicating.

Those principals are explained below:

Learning Experience	Activities	Competencies that is Expected to be Developed
Observing	Reading, listening, and observing with or without tools.	Sincerity, carefulness, and discover information.
Questioning	Giving question about information of the object observed that hasn't been understood or question to get additional information from the object observed.	Creativity, curiosity, and ability to formulate question to form critical thinking needed for smart live and long life education.
Gathering information or experimenting	Doing experiment, reading other sources exclude from the text book, observing object, and interviewing informant/source.	Careful, truthful, polite, respect others' opinion, communicate, gather information, lifelong education.
Associating or processing information	Processing information received from experiment or observing activity.	Careful, truthful, discipline, obeying rules, work hard, think inductively and deductively.
Communicating	Deliver observation result and conclusion verbally or written.	Careful, truthful, tolerance, systematic thinking, deliver opinion clearly and use proper language.

Authentic Assessment

Authentic assessment according to Hymes as cited in a training material for Curriculum 2013 (2014) implementation is a term or terminology created to explain various methods of alternative assessments that allow learners to demonstrate their abilities in finishing their tasks and problems. It also expresses how the learners' knowledge and skills are applied in their real life situation outside the school environment.

Assessment is usually connected to the word of evaluation. Edwin Wandt, et al. (1977) stated that, "Evaluation refers to the act or process to determining the value of something." Teachers can measure and assess how far the purpose of study, that has been planned, is achieved or applied. It also measures the progress or development of their program.

Physiologically educational evaluation activities in school can be seen from learners' and teachers' point of view. For the learners, educational evaluation will give them guideline to know their capacity and status. In the other side from the teachers' point of view, educational evaluation will give them assurance on how far their efforts bring results so that they can decide their future steps that are necessary.

Administratively educational evaluation has 3 functions. First, it gives report. Evaluation can be given in a formal written report that explains the development of the learners after they pursue educational process in a certain periodic time. Second, it gives information or data. The learners' grade in the evaluation process is an important data that is used to make decision of the educational department. Last, it gives description about the result achieved by the learners in the learning process.

Basically authentic assessment has relevancy to scientific approach. It fits the demand of Curriculum 2013 that is able to describe the progress of learners' learning outcomes in observing, associating, experimenting, networking, etc. The success of Curriculum 2013 is not only students who understand and master the material taught by the teacher but also lies in the assessment process conducted by the teacher.

The development of Curriculum 2013, including the evaluation tools used, becomes a decisive direction of education. Authentic assessment has its own paradigm in implementing Curriculum 2013. This is of course closely related to the condition and situation exists in educational world. To implement proper authentic assessment, it is needed to review the Curriculum 2013 assessment and the teachers' ability to carry out that assessment. Various obstacles need to be solved to obtain alternative solutions appropriately. The most important findings in the form of data and facts on the reality are the teachers should be given the opportunity to improve their information technology skills so that authentic assessment can be effective and efficient.

Research Methodology

This research is descriptive, the most basic form of a research. Sukmadinata (2011: 72) stated that the goal of descriptive research is to describe or illustrate the existed phenomenon, either natural or human engineering. In other words descriptive research reveals problem, situation, event, or just reveals actual fact.

The population is 225 Public Elementary School teachers in sub district Pabelan. The sampling of this research is random sampling that takes 60% of the population which is 135 teachers. The data was collected through observation, interview, and questionnaire. The data

was then analyzed and clarified to know the difficulties faced by the Public Elementary School teachers in sub district Pabelan in implementing authentic assessment of Curriculum 2013.

Research Finding and Discussion

The Implementation of Authentic Assessment in Curriculum 2013 in Public Elementary School in Sub District Pabelan

Curriculum 2013 authentic assessment has three kinds of assessment, which are (1) attitude assessment, (2) knowledge assessment, and (3) skill assessment. Attitude assessment is divided into two: spiritual attitude and social attitude. Spiritual attitude covers how the learners respect and appreciate their affiliate religion; meanwhile the scopes of social attitude are truthful, discipline, responsibility, tolerance, mutual assistance, polite, and self confidence. The attitude assessment completed indirectly through various learning activities.

From the beginning till now, curriculum 2013 authentic assessment in sub district Pabelan has been changing three times which are red, yellow, and the latest is green assessment book. At first the knowledge assessment was taken in every Basic Competence but in its development changed into sub theme. Because each Basic Competence in every class is different, the assessment format cannot be generalized. Each class should make their own format.

Similar with the attitude assessment, skill assessment completed indirectly in various learning activities through set of learners works that are systematic and organized in certain period. How to assess this skill is not yet final. There is information stated that there is another technique added. So, there will be four aspects concluded which are practical test, project, portfolio, and written test.

Things explained above make the Public Elementary School teachers in sub district Pabelan difficult to arrange the format of Curriculum 2013 authentic assessment. This difficulty then obtained the government attention by making assessment format for each class. However, this format uses the old format where the knowledge assessment arranges by its Basic Competence.

From the evaluation there are many obstacles or obstructions that force the teacher to be on guard. Considering the important function of the assessment, teachers need to rethink and reexamine the planned they made or change the implementation of the authentic assessment.

The material stated in the training of Curriculum 2013 implementation in 2014 explains that observation is an assessment technique that is performed continuously using senses both directly and indirectly by using instrument that consists of several observed indicators. Direct observation is carried out by the teacher without others mediators. In the other side, indirect observation needs help from others such as other teachers, parents, learners, or school staff.

The instruments used in observation are check list or rating scale with rubric. The check list is used to monitor whether certain attitude or behavior is exist; while the rating scale determines the position of a learners' behavior in a range of attitude. Generally observation guidelines contain the statement of the attitude or behavior observed by the teacher and the observation result of attitude or behavior derived from the reality.

The assessment technique that makes the elementary students quite interested is self assessment. Mimin Haryati (2007: 67) explains that self assessment or self evaluation is technique or method of assessment that asks the learners to rate themselves related to their status, process, and the achievement level of the competence they are learning. Assessing or evaluating themselves can give several advantages to the learners' personality development. First, it grows their confidence because they are asked to rate themselves. Second, the learners can recognize their weakness and strength. This method is a tool for selfintrospection. Last, it gives motivation and it trains the learners to be honest and objective in dealing with a case. However, for elementary students it seems that self assessment is still difficult to be applied since they have not been able to understand the essence of self assessmentyet.

That is why certain steps are needed to implement self assessment. They are (1) determining the standard of competence, Basic Competence, and indicators that will be assessed, (2) determining criteria or standard that will be achieved by the learners, (3) designing and formulating the assessment format that consists of scoring guideline, assessment scale, assessment criteria, etc., (4) asking the learners to evaluate themselves, (5) analyzingthe assessment randomly by theteachers, (6) conveying the result of the self evaluation analysis to the learners. This result can be used as a feedback to direct the learners.

Another fact that is found is that the PublicElementary School teachers in Pabelan have applied journal for authentic assessment although it was not maximal. Journal is a teachers' note used inside and outside the class that contains information of the observation result about learners' weakness and strength related to their attitude and behavior. The strength of a journal is its actual report. Whenever teachers find certain attitude of their students, they directly write it in the journal, so it is original and objective. It can be used to understand the

learners accurately. Their weaknesses of journals are low reliability, need a lot of time, need patience to wait the incident, and need to be written soon to avoid low objectivity. To write a journal, teachers need to know and pay attention to their learners' attitude both inside and outside the class. Teachers need to decide the observation aspects first according to the characteristic of the subject being taught. Those aspects should be communicated to the learners at the beginning of semester.

Some things need to be considered in making journal are (1) the objective of the notes, (2) the selective observation, meaning that only events related to the main competency need to be recorded, (3) immediate record without any delay.

There are three forms of knowledge assessment; they are: (1) written test that is a test with written question and answer in form of multiple choices, true false question, matching, and description. (2) Oral test that is a test where the teachers' questions and the learners' respond are oral, so it can stimulate the courage of the learners. (3) Assignment that is an assessment given by the teachers where they give homework individually or in group according the task's characteristic.

The Public Elementary School teachers in sub district Pabelan still have difficulties to implement these authentic assessments because they are not only using score but also giving supporting facts why the learners deserve that score. So far, teachers often give score to the learners subjectively especially in assessing their attitude. That is why in Curriculum 2013 teachers find difficulty because they are required to give score authentically based on the reality. Every student is assessed by their knowledge, skill, and attitude objectively. It is necessary for the Public Elementary School teachers in sub district Pabelan gradually to get used to the authentic assessment.

The Ability of Public Elementary School Teachers in Pabelan in Implementing the Program of Curriculum 2013 Authentic Assessment

Curriculum 2013 suggests the use of authentic assessment where the learners are assessed from their readiness, learning process, and learning outcomes entirely. The integrated assessment from these three components will illustrate the capacity, style, and outcome of the learners and it is even able to give instructional and accompaniment impact of the learning. The result of authentic assessment can be used to plan the improvement, enrichment, and counseling service program. In addition, it can be used as an element to improve the learning process that fits the Standard Assessment of Education. The evaluation of learning process is implemented when the learning process carries on.

Form the result of the observation and literature review, an elementary school teacher should analyze the assessment of knowledge, attitude, and skill. The knowledge assessment is the assessment of Basic Competence (BC) from the Third Main Competence (MC 3). The first step need to be done is analyzing the substance of material or fundamental material in Basic Competence of MC 3. The analysis can use the list of Basic Competence and Main Competence from Permendikbud [The regulation from The Ministry of Education and Culture] No. 57 year 2014 about the Basic Framework and Curriculum Structure of Elementary School and Islamic Elementary School. The second step is preparing the instrument used in the assessment process or uses the application assessment of Curriculum 2013. Teachers assess the learners' knowledge through daily quiz, Mid Semester Test, and Final Semester Test. Next, the average of daily quiz score is combined with the score from Mid Semester Test and Final Semester Test using approved formula from the Document of Curriculum. In the end, there will be a score in 0-100 scale that will be converted in scale of 1-4 and in A-D scale. Teachers also need to add the description of the prominent in a sentence and write the suggestion of development for the Basic Competence that gets the lowest score.

The skill assessment is an assessment of Basic Competence from the Fourth Main Competence (MC 4). The first step to do the assessment is doing analysis of learners practice done in Basic Competence of Main Competence 4. The analysis also can use the list of Basic Competence and Main Competence in Permendikbud No. 57 year 2014 or from the syllabus of Teacher Book and Student Book. The second step, teachers prepare the instrument used in the process of assessment or using assessment application of Curriculum 2013. Teachers assess the skill through written test, oral test, and assignment. This assessment is obtained from the average of daily score, project score, and portfolio. The formula to count these three aspects into a final score is the authority of the teachers unit.

The third assessment is the attitude assessment. It is the assessment from the Basic Competence in First and Second Main Competence (MC 1 & 2). The steps are the same with the skill assessment. The difference lies in the Main Competence that is taken as the guideline. It uses MC 1 and 2. There are four aspects in the assessment. They are the average of the daily observation score, self assessment, peer assessment, and teachers' journal. All aspects of assessment are counted and its formula also being made by the educational unit.

There are many elements in the authentic assessment and it is very specific so it is important for the elementary teachers to master technology. A particular program that can be used by the teacher to help the assessment is needed. The program should be able to integrate

the three aspects of assessment (cognitive, affective, and psychomotor assessment) becomes one whole unit. In the report of Learning Outcomes Evaluation those three aspects should exist to form standardize assessment.

To overcome that challenge, Education Service of Semarang Regency had set training for the using of application program of authentic assessment. The program is in form of Microsoft Excel application. The research shows that the Public Elementary School teachers in Pabelan still have difficulties in using it. They cannot analyze the result of authentic assessment using Ms. Excel. The teachers' ability to operate the Ms. Excel is 35, 56 %. This result shows that there are more Public Elementary School teachers in Pabelan who have not been able to operate MS. Word that is 64, 44 %.

Conclusion and Suggestion

Based on the result and the discussion of the research above, it can be concluded that: (1) the Public Elementary School teachers in Pabelan found difficulties in completing the format of Curriculum 2013 authentic assessment, and (2) the Public Elementary School teachers in Pabelan found difficulties in analyze the result of Curriculum 2013 authentic assessment using Microsoft Excel. Those difficulties are caused by: (1) the format of Curriculum 2013 authentic assessment is still changing and the fixed format is not yet exist, and (2) the ability of the teachers in operating the Microsoft Excel is still low.

The writer suggested that (1) the government fixes the format of Curriculum 2013 authentic assessment, and (2) the government gives training in using Microsoft Excel to the Public Elementary School teachers in Pabelan.

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AUTHENTIC ASSESSMENT OF STUDENT LEARNING MATHEMATICS WITH TECHNOLOGY

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Abstract

The rapid progress of Information Communication and Technology in the 21st Century has influenced the change of the curriculum and its instruction. The government of Indonesia has imposed New Curriculum 2013 for all levels and all subject matters. Among the changes include: the contents, pedagogy and assessment. Moreover, in this new curriculum teachers are recommended to utilize ICT and media in teaching and learning all subjects for primary and secondary level. With the integration of technology, the challenge now is to prepare mathematics teachers know how and when to use technology effectively and to teach an integrated knowledge structure of teaching their specific subject matter and the knowledge of teaching and learning using technology, or Technological Pedagogical Content Knowledge (TPCK). This article describes the characteristics of authentic learning environments, principles of authentic learning, authentic teaching/pedagogy, authentic assessment using technology and TPCK. Example of the implementation is given in using dynamic mathematics software in secondary mathematics.

Keywords: *Authentic Pedagogy/Learning/Assessment, Using Technology, TPCK, Mathematics*

Introduction

In the 21st century, the rapid change of information and communication technology has changed curriculum and instruction in some countries. Indonesian government has changed Curriculum 2004 into New Curriculum 2013. The purpose is to improve the effectiveness of teaching learning quality with the increase and balance of soft skills and hard skills that include aspects of attitudes, skills and knowledge competency. The emphasis of the change focused on the graduate competency standard, the process, the content and the assessment standard. The assessment standard is shifted from assessment through test (product based) into *authentic assessment* (to measure all competencies attitude, skills and knowledge based on the process and product in competency-based assessment (Kemendikbud, 2012). The assessment now is based on the process, the output and the students' ability to do self-evaluation. Authentic assessment requires students to construct unique responses and focuses student activity on complex higher order thinking skills. So, it provides many benefits for promoting deeper, more engaged learning. It responses the demand of external stakeholders for universities to offer more relevant experiences that enhance graduate employability

including the development of authentic graduate capabilities. It also helps students rehearse for the complex ambiguities and unpredictable challenges and roles of working and professional life. (Mueller, 2008)

As the consequent of the technology development, the New Curriculum 2013 has recommended to integrate ICT to become media in teaching and learning of all subjects at secondary school level (Kemendikbud, 2012). With the change of teaching and learning process into “scientific approach” has impact on how the assessment must be done. The challenge now is how to prepare teachers with authentic assessment and to implement it on student learning using technology.

Based on the aforementioned background above, the main focus of writing this article is to briefly explain about the concept and characteristic of *authentic assessment* and its implementation in learning use technology in the mathematics classroom. The discussion is connected to the 21st century teaching, learning and assessment and preparing teachers to teach with technology. It also gives example of the implementation of authentic assessment in learning mathematics using technology, specifically dynamic software Autograph.

Authentic Learning/Teaching/Assessment

Authentic Learning

Revington (writes authentic learning is real life learning. It is a style of learning that encourages students to create a tangible, useful product to be shared with their world. Authentic learning engages all the senses allowing students to create a meaningful, useful, shared outcome. They are real life tasks, or simulated tasks that provide the learner with opportunities to connect directly with the real world. In an authentic learning model the emphasis is mainly on the quality of process and innovation. It's about developing a set of culminating skills sets, within a realistic timeline, using self-motivated inquiry methods to create a useful product to be shared with a specific audience.

a. The Characteristics of Authentic Learning Environments

Rule (2006) writes that authentic learning is a relatively new term that describes learning through applying knowledge in real-life contexts and situations. The term authentic learning is broad and has not been applied to a specific instructional model. He explains the four themes supporting authentic learning experience are:

1. An activity that *involves real-world problems* and that mimics the work of professionals; the activity involves presentation of findings to audiences beyond the classroom.

One component of authentic learning is that it targets a real problem and that students' engagement holds the possibility of having an impact outside the classroom.

2. *Use of open-ended inquiry, thinking skills and meta-cognition.*

For authentic learning, students must exercise higher levels of thinking, according to this. For example, learning in mathematics should occur through discovery, inquiry and induction. Instead of math problems that require that students merely apply a known procedure, authentic mathematical tasks require solvers to use different representations in their solutions and to work with realistic and complex mathematical data.

3. Students *engage in discourse and social learning in a community* of learners.

A community of learners can be a group of learners working together to unravel a problem or refer to the community setting in which the project is based.

4. Students direct their own *learning in project work.*

Instruction can be personalized by allowing the learner to choose from the rich variety of pathways.

To implement this kind of model in our classroom is to consider it as a kind of framework for planning, whether at the unit, lesson, or activity level. The big idea of all learning then may start with knowing, which leads to valuing, which informs action in relevant and authentic communities. The teacher is the critical ingredient in the whole process of authentic learning, teaching, and assessment.

Rule (2006) writes the successful "authentic teacher" must:

- know how to assess students' strengths and weaknesses and design lessons accordingly.
- know how to guide students to build upon their prior knowledge in a reasonably organized fashion by asking rich questions and providing rich resources for students to utilize in their acquisition of knowledge.
- be the nurturer of the process as students view new information and assimilate their understanding.
- be creative about how student learning experiences can be broadened through sharing with the world outside the school walls.

b. Authentic Learning Supported by Technology

Classroom mathematics teachers have started thinking on how to use technology in their class, in order to engage students in meaningful and immersive learning environments, and also to enable students to use and experience with technology as a powerful cognitive tools. However, what often happens now is that the teacher is the only one to use the technology, usually in the form of exposition of content, such as in PowerPoint presentations or alternatively, the focus sometimes rests solely on the technology itself, rather than on the knowledge, content and processes of the subject area. However, as noted by Churchill (2005) ‘technology amplifies our intellectual and physical capacity’ (p. 347), and in this context, technology can play an integral role in supporting higher order learning.

Jonassen (2000) has argued that computer technologies, when used as *cognitive tools* or *mindtools*, represent a departure from traditional thinking about technologies, and also technologies can be used by students as ‘intellectual partners’, and as tools to analyze and interpret their understanding. Moreover, Jonassen (1994) contended: ‘Students cannot use [cognitive] tools without thinking deeply about the content that they are learning, and if they choose to use these tools to help them learn, the tools will facilitate the learning process’.

Teachers implement curriculum plans, that include methods and strategies for applying technology to maximize student learning. As facilitators, teachers:

1. facilitate technology-enhanced experiences that address content standards and student technology standards;
2. use technology to support learner-centered strategies that address the diverse needs of students;
3. apply technology to develop students' higher order skills and creativity;
4. manage student learning activities in a technology-enhanced environment.

Authentic Teaching/Pedagogy

Pedagogy means the profession, science, or theory of teaching. How we teach must reflect how our students learn. It must also reflect the world our students will move into. This is a world which is rapidly changing, connected, adapting and evolving. Our style and approach to teaching must emphasize the learning in the 21st century. The key features of 21st Century Pedagogy are: (1) Building technological, information and media fluencies, (2) Developing thinking skills, (3) Making use of project based learning, (4) Using problem solving as a teaching tool, (5) Using 21st Century Assessments with timely, appropriate and detailed feedback and reflection, (6) Using collaborative learning by enabling and

empowering technologies, and (7) Fostering contextual learning bridging the disciplines and curriculum areas.

Authentic Pedagogy was first defined as instruction and assessment which promoted authentic student achievement. It is often involving long-term projects, usually done in groups, about difficult issues that require some complex written or oral final presentation. Authentic teaching occurs when the teacher utilizes information about how students learn and designs learning experiences or tasks based upon this knowledge. Curriculum reformation in mathematics education in Indonesia since 2004/2006 has been focused in student centered rather than teacher-centered, problem solving approach, and using context and collaborative in teaching learning. Curriculum 2013 has been advocating a shift to use “scientific approach” in which students are actively engaged in the discovery or "construction" of their own knowledge. Students should not only learn basic skills, but incorporate those skills into tasks requiring complex thinking and in-depth knowledge which is then used to solve problems and create actual products. With scientific approach, disciplined inquiry occurs when students hypothesize by stating questions and determining resources necessary for task completion. Beyond formulating ideas, students explore and evaluate information, then synthesize to create examples, which illustrate their understanding of the problem. With this approach, both teachers and students have responsibility for what occurs. Students know what they want to learn, have flexible time parameters, and are responsible for staying on task. Teachers use multiple teaching strategies and maintain an environment of ongoing questions and analysis as they learn with their students.

Authentic Assessment

a. What is Authentic Assessment?

Authentic assessment is a form of assessment that is as close to student's reality as possible. It must also have a practical performance criterion, which measures what the tasks set out to do. Mueller and Stiggins defined authentic assessment as follows:

“ A form of assessment in which students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills” (Mueller, 2007)

"Performance assessments call upon the examinee to demonstrate specific skills and competencies, that is, to apply the skills and knowledge they have mastered." (Stiggins, 1987, p. 34).

The aim of authentic assessment is to assess many different kinds of literacy abilities in contexts that closely resemble actual situations in which those abilities are used. Both the

material and the assessment tasks look as natural as possible. Furthermore, authentic assessment values the thinking behind work, the process, as much as the finished product (Pearson & Valencia, 1987; Wiggins, 1989; Wolf, 1989).

b. Why Use Authentic Assessment?

Mueller (2008) writes 4 reasons why use authentic assessment :

1. *Authentic Assessments are Direct Measures*

When students graduate, we want them to be able to *use* the acquired knowledge and skills in the real world. So, our assessments have to also tell us if students can apply what they have learned in authentic situations. Authentic assessments will provide the most direct evidence of the students' acquire knowledge.

2. *Authentic Assessments Capture Constructive Nature of Learning*

Research on learning have found that students need to construct their own meaning of the world, using information they have gathered and were taught and their own experiences with the world. Thus, assessments must also be asked to demonstrate that students have accurately constructed meaning about what they have been taught.

3. *Authentic Assessments Integrate Teaching, Learning and Assessment*

Authentic assessment encourages the integration of teaching, learning and assessing In the authentic assessment model, the same authentic task used to measure the students' ability to apply the knowledge or skills is used as a vehicle for student learning.

4. *Authentic Assessments Provide Multiple Paths to Demonstration*

Authentic tasks tend to give the students more freedom in how they will demonstrate what they have learned. By carefully identifying the criteria of good performance on the authentic task ahead of time, the teacher can still make comparable judgments of student performance even though student performance might be expressed quite differently from student to student

In assessing students' mathematical performance through authentic contexts, teacher must use examples considered to be meaningful for the students. Authentic Assessment goes beyond simple recall of information to complex displays of student ability to communicate, process, apply, and construct knowledge. Examples of authentic assessments include performances which require students to make analogies, explain, exemplify, and generalize information. They also include exhibitions of student products that convey high levels of competence. True authentic assessment must include student self-evaluation, using teacher-

prepared rubrics, or some other tool, to guide the student's assessment. Authentic assessment must provide the student with information about how well they are learning and what areas need improvement.

c. How to Create Authentic Assessments?

As has been mentioned before, in authentic assessment students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills. To create authentic assessment, Mueller (2008) writes four steps: (1) Identify the Standards (Basic Competency), (2) Select an Authentic Task; (3) Identify the Criteria for the Task ; (4) Create the Rubric

For each criterion, identify two or more levels of performance along which students can perform which will sufficiently discriminate among student performance for that criterion. The combination of the criteria and the levels of performance for each criterion will be your **rubric** for that task (assessment).

The modes of authentic assessment for mathematics could be of the form:

- **Problem-based learning (PBL)** uses real world problems and tasks in which a team of students, over an extended period of time, evaluate what they know and what they need to learn in order to gain the necessary capacities to generate a response.
- **Scenarios** can require students to notice what is important, explain it using theoretical concepts of the course, and plan and theoretically justify an intervention;
- **Portfolios** require that students understand and internalize the learning outcomes of a unit of study and then plan their own set of activities that will generate validated evidence of their performance capability and skill mastery.
- **Writing a journal article** or short story for publication. This can be extended to requiring students to form editorial panels to review the work produced and undertake the full publishing responsibilities.

- **Constructing a website** to develop a public education resource and educate a community group about a contemporary issue that the students have identified, studied and researched.(Mueller, 2008)

Preparing Teachers to Teach and Assess with Technology

The challenge for teacher preparation programs in facing the new curriculum 2013 is to preparing teachers to teach an integrated knowledge structure of teaching mathematics as a subject matter, that is the intersection of knowledge of the subject matter with knowledge of teaching and learning, or Pedagogical Content Knowledge (PCK) as characterized by Shulman (1986). But, for technology to become an integral component or tool for learning, mathematics teachers must also develop an overarching conception of their subject matter with respect to technology and to teach with technology or a technology PCK (Technological Pedagogical Content Knowledge). A variety of additional approaches for preparing teachers to teach with technology to move toward the other end of the continuum by: (1) integrating technology in all courses in the teacher preparation program in order to be more supportive of the development of a technology-enhanced PCK and content specific applications and (2) requiring teachers to teach with technology in their classroom.

TPCK requires a consideration of multiple domains of knowledge. Teachers need a well-developed knowledge base in their subject, the improvement of knowledge of the teaching and learning and they learn how to integrate learning and teaching both the subject matter and technology. Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Teachers : (1) facilitate technology-enhanced experiences that address content standards and student technology standards; (2) use technology to support learner-centered strategies that address the diverse needs of students; (3) apply technology to develop students' higher order skills and creativity; (4) manage student learning activities in a technology-enhanced environment.

Ways to Assess Student Learning Using Technology

We suggest four ways of assessing students learning using technology: (1) analysis of worksheets, (2) observation of students' activities during learning processes, and (3) analysis of saved files and printed-out Using technology, (4) Analysis of project presentation.

1 Analysis of worksheets

By analyzing students' worksheets, we can see students' understanding of concepts or solving problems we give in the worksheets. We can check what student can and cannot do in the worksheets. We also can give feedback to the students.

2. Observation of student's activities during learning processes

Teacher observes students' activities especially while working and the discussing with other students. We can recognize their activities either in a prepared checklist or as an overall opinion. For example: Showing interests in discussion, showing skillfulness in using the technology, following the instruction carefully, communicating with fellow students, Justifying their opinions, summarizing the content of discussing and applying it.

3. Analysis of saved files

By analyzing the process of students' works using the saved files we can get information about students' understanding of concepts and solving problems. We also can ask students to write down the steps they are doing while constructing the graph.

4. Analysis of project presentation

Teacher observes and analyzes students' presentation of the project done either by group or individual. By analyzing the presentation e can see students' creativity in doing the project using technology.

Autograph: Dynamic Mathematics Software

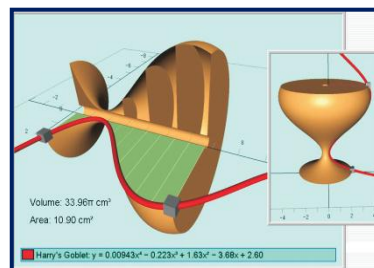
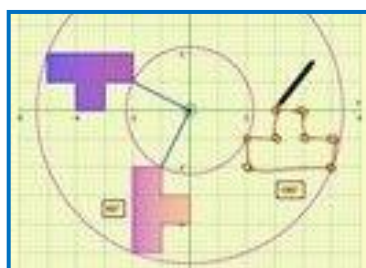
There is now plenty of evidence to show that teaching secondary and college level mathematics with dynamic software is more effective, more efficient, and above all more enjoyable (for both teacher and student). Dynamic software is often employed as a fertile learning environment in which students can be actively engaged in constructing and exploring mathematical ideas (Cuoco & Goldenberg, 1996).

Autograph is a dynamic and very versatile software for teaching and learning mathematics developed by Douglas Butler. In 2000 Douglas Butler founded the innovative iCT Training Centre, based at Oundle School, which is now creating new resources for the educational use of computers in mathematics (Autograph), and running the **TSM** (*Technology in Secondary and College Mathematics*) teacher training events in the UK and many countries overseas.

Autograph is designed to help students and teachers visualize mathematics at secondary/college level, using dynamically linked objects'. It is able to sketch curves (both

implicitly and explicitly defined) solve simultaneous equations, plot derivatives, etc. Autograph is a new dynamic PC program operating in 3 modes: 1D for Statistics & Probability, 2D for Graphing, Coordinates, Transformations and Bivariates Data, and 3D for Graphing, Coordinates and Transformation Geometry.

Autograph has two levels of operation, 'Standard' and 'Advanced'. The 'Standard' level has a greatly simplified interface and a reduced set of options for the less experienced user. Standard Level has been designed for ages 11-16. The interface is simpler (larger icons), and we cannot move out of degrees into radians.



1D – 1 Dimension

2D – 2 Dimension

3D – 3 Dimension

In Advance Level the interface embraces many more options for the discerning user, including calculus, probability distributions, and equations in 3D. At the 'Advanced' level, more challenging problem and investigations can be explored.

Autograph is the ideal solution for the instructor looking to bring mathematics to life. Whether through true-to form animations or through student-driven exploration, its powerful features and point-and-click technology will engage all levels of students. In real-time, users can observe how functions, graphs, equations, and calculations. It also enables users to change and animate graphs, shapes, and vectors already plotted to encourage understanding of concepts. In mathematics class the use of mathematical software enable students to visualize and further understand mathematical phenomenon in real life.

Teaching by integrating Autograph in schools might increase the effectiveness and the quality of teaching. As mathematics class needs lots of interaction, reasoning, observation the above view clearly indicates that interactive software like Autograph can be useful in teaching and learning mathematics effectively. Use of Autograph help teachers in making students attentive towards the interactive whiteboard and acts as a medium of interaction among students or between teacher and the students with rapid responses. The use of Autograph allows learners to acquire skills and knowledge in using the computers whilst concurrently explore the potentials of the software.

Example of Authentic Assessment in Ict Course

This paragraphs show example of using authentic assessment in ICT course in mathematics education of college students. The title of the course is “ICT Integration in Teaching and Learning Mathematics”. The activities was conducted out of/in classroom. All students have laptop and internet connection. The activity was predicting graph of function using Dynamic software Autograph in teaching secondary mathematics. The lecturer used strategy Think-Talk-Write with discovery learning method. The scenario of the class activities described below.

Grade Level : College level (Undergraduate)

Course : Algebra

Procedure :

- Students have been trained to use Autograph in learning graph of various functions as quadratic or trigonometric function.
- The teacher gives students authentic tasks to do in pair using dynamic software Autograph. The purpose is to enrich students with experience by investigating and through real world problems dealing with graph of functions.

Activity : Students and teacher work outside of the class to create a parabolic curve:

1. Group1 squirting water from a hose with different angles.
2. Group 2 playing jumping rope with different distance among the rope holders.
One person on each group doing the activity and other people taking photos.

Student tasks (in group) :

- a. To observe the photo on the laptop and predict the parabolic function formed by those squirting water (without Autograph). Different group observes different photo of different squirting angles or different distance of rope holders. (*The Lecturer observing students in each group*)
- b. Then, they predict the function (the math model). (*The lecturer asking each group to write on the board the predicted function/equation- cannot be changed*)
- c. Use Autograph to check their prediction as follows:
 - Copy the picture to Autograph
 - Enter the predicted equation into Autograph
 - Check whether the equation fit to the picture in the Autograph (*The lecturer checking which group having the best prediction*)

- Students discuss with their friends to make a change of the function by observing the different between the picture and the predicted function
- Suppose students predict the function of the form: $ax^2 + bx + c = y$
 Student discuss in the group and can make change the value of a, or b, or c to a bigger or smaller number until they get the graph exactly fit to the picture (*The lecturer ask the group to record how many changes they make until they get the correct answer and which group did the best*).

Conclusion

The New Curriculum 2013 of Indonesia in recent years encourages teachers to look at not only the knowledge, but also attitudes and skills. It emphasizes on new goals, approach on teaching , learning and assessment strategies. The assessment standard is shifted from assessment through test (product-based) into *authentic assessment* (to measure all competencies attitude, skills and knowledge based) on the process and product in competency-based assessment. The most important reason for shifting assessment practices is to make sure our curriculum goals, instructional methods, and assessment practices align. To be effective as part of educational process, assessment should be as an integral part of learning and teaching. The success of the implementation depends on the teacher's competency in this new assessment.

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AUTHENTIC ASSESSMENT : UNDERSTANDING LEVELS AND CONSTRAINTS IN THE IMPLEMENTATION OF THE TEACHER IN THE CITY OF LHOKSEUMAWE ACEH PROVINCE

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Abstract

This study aims to determine the level of teachers' understanding of authentic assessment as well as the obstacles faced by teachers in implementing the authentic assessment . The research method is a survey. This research was conducted in Lhokseumawe City the province of Aceh. The sample in this research are 165 teachers. The sample consisted of elementary school teachers, junior high school, and vocational school with details of 60 elementary school teachers, 40 junior high school teachers, 40 high school teachers, and 5 vocational teachers . Implementation of the survey conducted by distributing questionnaires to teachers who have participated in the training curriculum in 2013, and direct observation in the classroom implementation . The results showed teachers' understanding of authentic assessment is relatively low, with only 38.33 % of elementary school teachers who claim to understand the concept of authentic assessment. The understanding of junior high school teachers, high school, and vocational school is 50 % , 52.5 % , and 32 % . Poor understanding of authentic assessment of teachers is evident in the implementation of learning, where teachers have difficulty in applying it in the classroom, especially the attitudes and skills assessment .

Keywords : *Authentic Assessment , Understanding Level of The Teacher .*

Introduction

Curriculum 2013 has been prepared and gradually started to be implemented since 2013 at all levels of school education. The fundamental difference between the curriculum in 2013 with the previous curricula substantially rests on three things, namely scientific approach, integrative learning, and authentic assessment. Authentic assessment is one of the critical success factors in the implementation of the curriculum in 2013 at various levels of education in schools. Authentic assessment should be carried out on all three domains simultaneously, ie the knowledge, skills, and attitudes.

According to Mueller (2006), authentic assessment is referred to as direct assessment. Some references state that authentic assessment as a performance assessment. So authentic assessment can be interpreted as a form of assessment that is carried out directly when the implementing of the learning process, which includes three domains at once, the knowledge, skills, and attitudes. In addition to implementing authentic assessment, a teacher must be able to prepare assessment instruments. Assessment instruments can of course be different for the same subject matter if the instructional strategies used are different.

This is in contrast to the implementation of the curricula of learning before. Usually teachers are conducting the assessment at the end of the learning process, even at the end of the semester, and the components are assessed only knowledge. Therefore, the successful implementation of the curriculum at all levels of school education is dependent upon the level of teachers' understanding of authentic assessment and the teacher's ability to carry out the assessment in all aspects, namely knowledge, skills, and attitudes.

This study examines the teachers' level of understanding on authentic assessment of elementary school, junior high school, senior high school, and vocational school in the town of Lhokseumawe and to identify the constraints faced by teachers in implementing the assessment. Benefits of the research is to propose an alternative solution to improve the understanding of teachers in preparing authentic assessment instruments and proposes a strategy assessment that covers the three domains for each competency.

Research Method

The research method is a survey. This research was conducted in Lhokseumawe City of Aceh province. The sample in this research are 165 teachers. The sample consisted of elementary school teachers, junior high school teachers, senior high school teachers, and vocational school teachers with details of 60 elementary school teachers, 40 junior high school teachers, 40 high school teachers, and 5 vocational teachers. Implementation of the survey conducted by distributing questionnaires to teachers who have participated in the training curriculum in 2013, and direct observation in the classroom implementation.

To obtain the data on the level of understanding of teachers used a triangulation approach. Respondents were asked about the level of understanding of authentic assessment. However, the accuracy of answers are controlled by other questions that demonstrate understanding of the actual respondents. To determine the level of understanding of respondents about authentic assessment, the data were processed using percentage

techniques. As for the information about the constraints faced by teachers in implementing authentic assessment of learning is done in-depth interviews with teachers as respondents.

Result and Discussion

The results of research related to the data level of understanding of elementary school teachers , junior high school , and vocational school in the city of Lhokseumawe on authentic assessment has been obtained , and are summarized in Figure 1. According to Figure 1 shows that the level of teachers' understanding of authentic assessment is still relatively low, especially teachers of vocational school and elementary school . The relatively high level of understanding of the assessment are high school teachers , with a percentage of 52.50 % . These results were obtained based on their responses on the questionnaire, either on direct questions and indirect questions. Direct question is perceptual, whereas indirect questions are test -level of understanding.

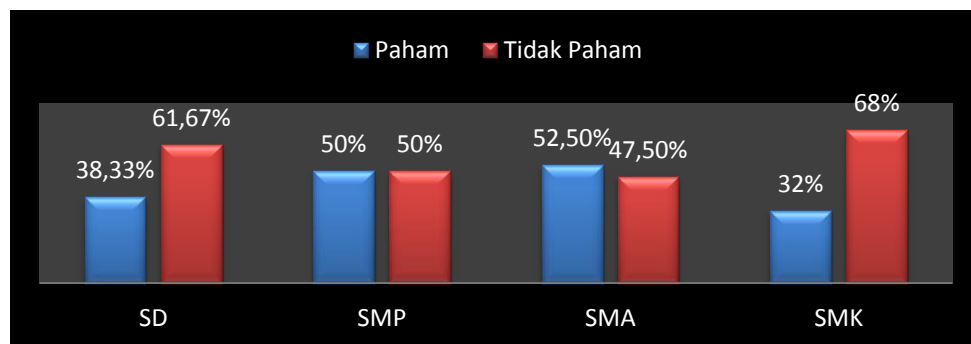


Figure 1. Comparison of the level of understanding of authentic assessment in teacher training by education level

Teachers' lack of understanding of authentic assessment allegedly influenced by their desire to use this type of assessment in learning. According Rustaman (2013), some teachers do not want to use authentic assessment by reason only a waste of time. Yet according to Wiggins (2005) to design an authentic assessment is very efficient, steady, and do not waste time . Additionally Zainul (2001) confirm that authentic assessment is needed, especially to measure other than cognitive aspects, such as skills and attitudes .

In addition, teachers' lack of knowledge about authentic assessment due to their habit. Teachers have not used authentic assessment of learning, so that they are not interested in learning how to create a rubric is an authentic assessment . Now the teachers felt compelled to develop an authentic assessment instrument for the implementation of the demands of the curriculum in 2013. Therefore, the teachers are very difficult to develop an assessment rubric, application, and interpretation of results.

- 1) The teacher is still difficult to implement all authentic assessment criteria, because given the teachers need more provides an explanation of the content of the materia
- 2) Teachers still do not understand compile assessment instrument that includes three domains, : affective , cognitive, and psychomotor.
- 3) Teachers are still not able to and understand how to measure the number of basic competencies that are not core competencies seem achievement, at midtest dan final exam.
- 4) The teacher is still difficult to implement all authentic assessment criteria, because teachers need more time to give an explanation of the content of the konsep.
- 5) When implemented the teacher training, materials about authentic assessment is not yet complete, so the application in teaching-learning activities is still not perfect.
- 6) Teachers still do not understand about the performance assessment, portfolio, and project appraisal, because it all has a certain criteria.
- 7) Teachers need a lot of time allocation to assess the project.
- 8) lack of clear briefing on authentic assessment as teacher training

Baron's (Marzano , 1994), describes five criteria task for authentic assessment, namely : 1) meaningful for teachers and students, 2) involvement of students, 3) the task requires students to find and analyze information as well as draw conclusions about it, 4) the task requires students to work or perform. So authentic assessment leads teachers to determine the number of tasks to be done about the students' competency to be mastered.

Conclusions

The level of teachers' understanding of authentic assessment is still relatively low. These results were obtained based on their responses on the questionnaire, either on direct questions and indirect questions. The constraints faced by teachers in implementing authentic assessment in learning is not enough time to judge while teaching, do not get clear examples when training, and difficult to develop an instrument along with columns for each of the concepts to be taught.

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AUTHENTIC ASSESSMENT DETERMINANT IN ISLAMIC RELIGION EDUCATION EXECUTION TOWARDS COGNIZANCE QUALITY HAVES A RELIGION IN STUDENT AT ELEMENTARY SCHOOL AND MADRASAH IBTIDAIYAH AT KUDUS REGENCY

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Abstract

This research aims to detect, describe, and predict about determinant variables about performance assessment or authentic assessment in Islamic religion education execution towards cognizance quality has a religion in student at elementary school (SD) and Madrasah Ibtidaiyah (MI) at Kudus regency. This research uses to approach multivariate with research kind ex post facto. The research sample teacher and student from six at elementary school (SD) and Madrasah Ibtidaiyah (MI) at Kudus regency, sample taking is done with stratified random sampling data collecting by using questioner and problem check list student in has a religion. Data analysis technique that is: (1) descriptive statistics analysis technique, (2) double correlation analysis technique, (3) analysis technique variance (ANOVA) and (4) double regression analysis technique. The research finding that is: (1) in general difficulty level has a religion student at education stage base SD higher than at MI. (2) found which are positive connection and significant between teacher factor (X_1), student factor (X_2), curriculum factor (X_3), and environment factor (X_4) towards authentic assessment determinant in Islamic religion education execution (Y_1) and towards cognizance quality has a religion (Y_2) in student at SD and MI at Kudus regency. The correlation result delivers free variable and bound that is X_1 ($r = 0,989$), X_2 ($r = 0,983$), X_3 ($r = 0,967$), X_4 ($r = 0,957$), and Y_1 towards Y_2 ($0,947$). R square found X_1 and Y_1 as big as 97,8%, X_2 and Y_2 as big as 96,6%, X_3 and Y_1 as big as 93,6% and X_4 and Y_1 as big as 91,0%, Y_1 and Y_2 as big 89,7%, while for hypothesis testing with ANOVA found significant F Change for all count as big as 0,000. H_a accepted and H_0 averse, so that this watchfulness result can valid for population. Regression line similarity that is $\hat{Y}_2 = a + b_1Y_1$, from calculation is found $\hat{Y}_2 = -0,737 + 0,473$.

Keywords: *Performance Assessment or Authentic Assessment, Islamic Religion Education, and Cognizance Quality Has a Religion.*

Introduction

National education program be one of [the] program that must be run by government, be right for every citizen to get instruction. This matter is in line with Republic of Indonesia country likes included in paragraph fourth constitution opening 1945. Indonesia country government, among others, has duty makes society educates nation life. education for every

citizen that living in Indonesia regulated by constitution 1945 chapters xiii about paragraph education 31 that consist of 2 verses sounds: (1). Every citizen justifiably get instruction, (2).Government carries on and conduct one national instruction system, at regulate (constitution 1945, P-4, GBHN 1993: 240-241). National education aim, as mentioned in UUSPN no. 2 year 1989 in chapter II section 4 at tell: that national education aims to make intelligent society in nation life and develop Indonesia human intact, that is human that believe in and god fearing towards god malt one and virtuous noble character, has erudition and know-how, body well-being and spiritual, steady personality and self-supporting with social responsibility taste and nationality.

Thereby education exertion for all (education for all) for supposed society can increase level and dignity of nation life, national education aim furthermore follows Wuradji (1997: 16) can at see in 5 dimensions that is: (1).Dimension spiritual (belief in god, God fearing, noble character); (2) Personality dimension (steady individual and self-supporting, Strong, work ethic, discipline, well spiritual); (3).Social dimension (social responsibility and nation); (4).Intellectual dimension (intelligent, creative, skilled, Professional, and voluminous); (5) physical dimension (wells physical).

See fifth dimension in national education aim above. So, clear that education and religion instruction is one of [the], dimension, must is on every national education system executor, care of general draft realizes Indonesia human intact well body and, spiritual, beside that is our society is society religious.

But in religion education execution at school this time, experience various complex problem that is: (1) Not yet Islamic religion education teacher the maximal in realize religion study process intact for entrant educate, good begin from planning execution and study evaluation; (2). Total of hours or credit system semester more decried; (3).Not yet integration existence in education exertion in 3 (three) (environment/units in education); (4). The decreased it to care society about meaning the important religion education; (5). The low creativity and religion teacher motivation in subsidize process execution quality learns PAI; (6). Media and study source PAI not yet proper; (7).Curriculum matter development not yet based on psychology for student; (8) Curriculum PAI that experience stagnation, more give top priority cognate aspect; (9). Study only developed intellectual intelligence and not yet develop intelligence spiritual, intelligence emotional, intelligence interpersonal, and others; (10).Matter disagree with development psychology student; (11).Method in monotonous

religion instruction, so that lose looks for entrant educates; (12). Not yet commitment existence between religion teacher and teacher non religion at school according to together in form cognizance has a religion student; (13). Enter it infinite foreign culture (there is no limit) passes assorted media; (14). Not yet walk it comprehensive evaluation system and authentic assessment for entrant educates, but existing evaluation system more in evaluation cheats and artificial.

As finally from Islamic religion study not yet show application that have a meaning from a erudition and know-how essence, so appear assorted crisis and moral crisis (multiple dimension crisis), execution appearance for example inclined aggressive, easy conflict delivers member, conflict deliver adolescent, act violence on behalf of religion, religious radicalism, and there is no tolerance with exclusively, moral crisis, and others, addressed in failure in Islamic religion education at school or madrasah. While peculiarly desirable religion education by government that is comprehension and inclusive religious execution, balance and moderate be condition has a religion all society in democracy atmosphere and fast social change, hotly have a religion tall.

Authentic evaluation (authentic assessment) is real mirror from student study condition, authentic evaluation in Islamic religion education context based on from individual experience, direct experience at real world every student, so that knowable development learn student in the field of Islamic religion education related to Islamic cognizance quality according to intact, good domain cognitive, affective and psychomotor.

With see society reality above, so author wants to detect and identify about: authentic evaluation determinant in Islamic religion education execution towards cognizance quality has a religion in student at elementary school and madrasah ibtidaiyah at Kudus regency. On the chance of knowable earlier about: (1) how does authentic evaluation in Islamic religion education execution towards cognizance quality have a religion in student at elementary school and madrasah ibtidaiyah at Kudus regency, (2) what determine authentic evaluation in Islamic religion education execution towards cognizance quality have a religion in student at elementary school and madrasah ibtidaiyah at holy regency.

Theory Study and Hypothesis Formulation

1. Authentic Assessment in Islamic Religion Education Context

Authentic assessment information collecting process by teacher about development and study achievement that done by entrant educates to pass various technique that can to unfold,

prove, or show correctly that study aim genuinely has been dominated and reached (Nurhadi,2004: 172). Furthermore Hill and Ruptic (1994: 8) declare that assessment a process to gather proof and document study and child growth.

As to rationalization is wanted authentic evaluation in study that is: (1). Related parties willing with education (stakeholders education) to illuminate constructive characters from study and education, (2). Authentic evaluation allows entrant educates to choose the way self to demonstrate competence and the craft, (3). Authentic evaluation evaluates how effective student directly can to apply the erudition in so many kind and task, (4). Give study legitimization with connect it in real world context; (5). Give possibility collaboration deliver student and collaboration rush by curriculum (Ismet Basuki and Hariyanto,2014: 169).

Authentic assessment in Islamic religion education can use various evaluation tool kinds that is: (1) Column/score guide, (2). Portofolio or e-portofolio, (3) Authentic task, (4) Self evaluation or self assessment, (5). Interview ,(6).Narated to return story or a text, (7).Writing example, (8).Project or exhibition, (9) Experiment or demonstration,(10). Constructed response items, (11).Teacher observation note, (12).Diary journal/entry; (13).Work writes, (14). Tongue quiz, (15).Character portfolio, (16).Graphic organizer, (17). Check list, (18).Reading logarithm, (19).Video recording, (20).Discussion process recording, and (21).Anecdotal record.

2. Cognizance Quality Haves A Religion Student

Basically human visible from several truth dimensions, the humanity with the potentially, basically can be grouped to be, 4 dimensions, that is: (1) individual dimension, (2) sociality dimension, (3) dimension morality, (4) dimension haves a religion. (Umar and La Sula, 2000: 130). Scope furthermore haves a religion student covers spiritual aspect and the execution is practiced deed (Muslim, 2001: 4-5), has big responsibility in entrant educates in grow and develop according to according to and proportional as according to fourth dimension, so that can bloom as human figure according to intact.

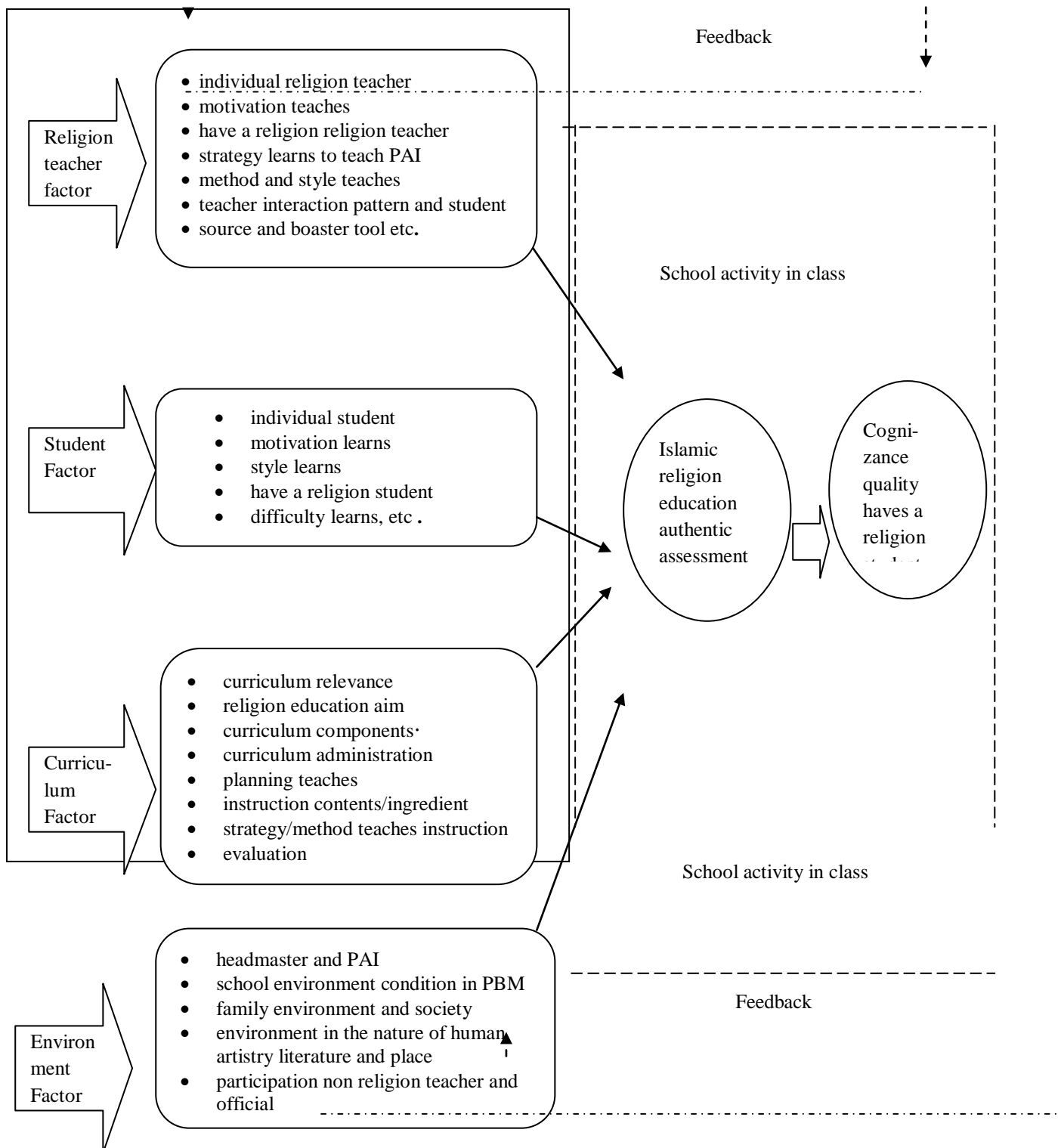
3. Islamic Religion Education Authentic Assessment Determinant Towards Cognizance Quality Haves A Religion Student.

Kernel factors (determinant factor) necessary pay attention in education program execution in process activity learn to teach: (1). educator factor (teacher); (2) student factor; (3) curriculum factor; and (4) environment factor to clarify connection description between determinant factors in teaching and learning process activity in influence process success learns to teach, and result learns to teach, as proposed by J. J. Hasibuan and Moedjiono

(1999: 12) that determinant in school activity election that is aim, student, matter, teacher and administration economy.

4. Sketch Thinks Watchfulness

Figure 1 Draft Thinks And Channel Analysis Hypothesis Delivers Research Variable



With approach multivariate author assuming many variables that be determinant. based on details author presents hypothesis as follows: authentic evaluation determinant in Islamic religion education execution towards cognizance quality have a religion in student at elementary school and madrasah ibtidaiyah at Kudus regency, in any case there variance determinant: religion teacher, student, Islamic religion education curriculum, and environment.

Research Method

1. Approach And Research Kind

This study object is studied by using approach multivariate. This matter is based at one particular phenomenon. That is determined by many, determinant, both merely by one or two determinants. With regression analysis, a certain variable wants forecasted to based linear connection or curve linier, with amount of variable with covariance analysis all at once controlled, amount of free variable passes sample groups and controlled. The individual variation, with factor analysis knowable variable total, free that looked for big determination with variables over (Noeng Muhadjir, 1981: 63). Factor analysis follows Suharsimi Arikunto (2000: 518) as approach multivariate another, assuming about impersonate it many variance in a certain phenomenon. This research is research ex post facto or measurement after incident (Suharsimi Arikunto, 2000: 280). Event that happened and then trace rear pass data to find factors that precede event causes that canvassed. This research has unfolded data has hit phenomenon that is on respondent self without give treatment or manipulation in variables that be canvassed.

2. Factor Analysis as Model to Explain Phenomena

Factorial something that indicates in model or plan. Research (Suharsimi Arikunto, 2000: 519). With assumption that is one or more has influence in variable other.

3. Reseach Area and Sample Election Procedure

This watchfulness is carried out at area Kudus regency. With take SD and MI country good or private at consider representative, with see from geographical condition characteristics, demography, economy social condition, policies and culture from watchfulness location. Literature study and document study at wear to look for alternative

research area sample taking, that is sample election procedure based on in elementary school education institution SD and MI, with pay attention school quality level or MI widespread at environment Kudus regency based on data EMIS official and statistical office.

In research sample taking, election sample based in technique stratified random sampling that is sample election process in such a manner so that all sub group in population is represented in sample with comparison as according to total exist in population. (Sumanto, 1995: 43). Researcher sample magnitude determination uses Krejcie and Morgan (1970), considering that quality level by SD and MI.

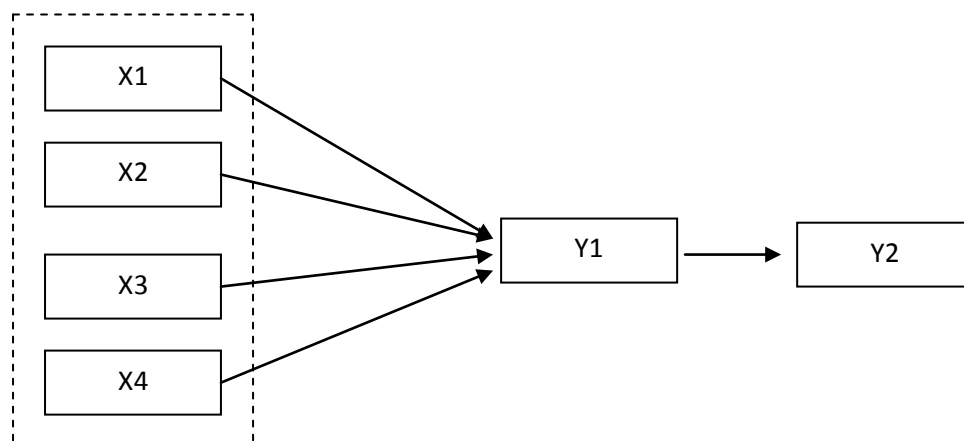
Table.1. Research Sample SD and MI at Kudus Regency

Number	District	MI	SD	MI	SD
		Country	Private	Country	Private
1	Kaliwungu	1	0	0	0
2	Kota	0	0	1	1
3	Jati	0	1	0	0
4	Bae	0	1	1	0
	Total	1	2	2	1

4. Research Variable and The Measurement

In this watchfulness is researcher limits in five (five) variables that estimated as factor mutual influence in cognizance quality formation haves a religion student at school, that is 4 (four) free variables (independent variable) or predictor, and 2 (two) dependent variable). so can be described connection deliver variable in this watchfulness, as follow:

Figure 2. Research Variable Design



Explanation:

X1 = teacher factor, X2 =faktor student, X3 = curriculum factor, X4 = environment factor,

Y1 = authentic evaluation in Islamic religion education, Y2 = cognizance quality has a religion student.

5. Validity Testing And Rcliabilitas Instrument

Good instrument condition one of them instrument must valid, as Suharsimi Arikunto (1992: 136) explain that a instrument is said valid when can to measures what want us measure and can unfold data from variable that canvassed correctly. While test reliability watchfulness instrument is meant to detect permanent degree a measuring instrument. The measuring instrument can has reliability, when repeatedly be used by researcher self also another person show result same in object same, with different time. Testing reliability instrument can be done externally (by using test-retest (stability), equivalent and federation both) also internal consistency by using existing grains consistency, like technique cuts in two (Spearman Brownian), Alpha Cronbach, Gutman, and Anova Hoit. (Sugiyono and Eri, 2001: 220-236). Validity test counting process and reliability grain uses program SPSS version 21.

6. Classic Assumption Test

Testing is technique that usable test of multi-collinearity diagnostics, test of autocorrelation, test of homogeneity variance, test of normality, and test of linearity data. With do classic assumption test, so researcher can decide to what this research uses statistics parametric or statistics non parametric.

7. Data Analysis Technique

In data analyzing process, researcher will use quantitative analysis technique, statistically inference with statistical methods parametric. Technique that worn in analyze data that is analysis variance (analysis of variance), not t-test caused by more than three values, analysis variance has fist function can be used to determine to what value average from two or more sample differ according to significant or not. Second, calculation analysis of variance (ANOVA) produce price F according to significant show to researcher that sample that canvassed to come from different population. Third, ANOVA can be used to analyze data that produced with complex factorial designs (Suharsimi Arikunto, 2000: 517-518).

Data Analysis and Result Discussion

1. Descriptive Analysis,

Problem has a religion student by using check list found that at elementary school (SD) bigger, except inwrought Islam elementary school (SDIT) difficulty level has of religion smaller than SD and MI as big as 26,5 % answer yes, and 73,5 % answer not. This matter is proven by existence SDN 1 Purwosari problem has a religion higher as big as 50 % answer yes and and 50 % answer not, and also SDN 5 Dersalam problem has a religion lower than SDN 1 Purwosari as big as 36,6 % answer yes, and 63,4 answer not. While problem have a religion student at MI in general lower than at elementary school (SD) keculai SDIT, with sequence bottommost begin from SDN Kaliwungu as big as 33,5 % answer yes, and 66,5 % answer not. Then continued MI Darul Ulum and MI Muhammadiyah each of 33,7 % answer yes, and 66,3 % answer not.

2. Analysis Inferensial and Research Result Discussion

After done test of multi-collinearity diagnostics, test of autocorrelation, test of homogeneity variance, test of normality, and test of linearity data, so step furthermore that is do watchfulness hypothesis testing, with do data processing process with result as follows:

Table 3. Correlation Delivers Teacher Factor, Student, Curriculum, Environment And Authentic Evaluation PAI

		Faktor Guru	Faktor Siswa	Faktor Kurikulum PAI	Faktor Lingkungan	Penilaian Otentik PAI
Penilaian Otentik PAI	Pearson Correlation	.989**	.983**	.967**	.957**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	18	18	18	18	18

** . Correlation is significant at the 0.01 level (2-tailed).

In table 3 above be matrix correlation between variable X1, X2, X3, dan X4 with correlation that used correlation Pearson (correlation product moment). In correlation matrix found connection significant between each free variable with bound variable that is Islamic religion education authentic evaluation is found number 0,989, 0,983, 0,967, and 0,957, as to acceptance rule and denial. When significant under or equal to 0,05 so H_a accepted and H_0 at refuse.

Table 4. Correlation Between Authentic Evaluation PAI And Cognizance Quality Haves A Religion Student

		Penilaian Otentik PAI	Kualitas Kesadaran Beragama Siswa
Penilaian Otentik PAI	Pearson Correlation	1	.947**
	Sig. (2-tailed)		.000
	N	18	18
Kualitas	Pearson Correlation	.947**	1

Kesadaran Beragama Siswa	Sig. (2-tailed) N	.000 18	18
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In table 4 above be matrix correlation between variable Y1 with Y2. Correlation that used correlation Pearson (correlation product moment), in correlation matrix found connection significant between each free variable with bound variable that is Islamic religion education authentic evaluation is found number 0, 947. as to acceptance rule and denial, when significant under or equal to 0,05 so ha accepted and ho at refuse.

Tabel 5. Determinant Coefficient Summary Between X1, X2, X3 and X4 with Y1 towards Y2

No.	Hubungan Variabel	R	R Square	Sig. F Change
1.	X1→ Y1	0,989	97,8 %	0.000
2	X2→ Y1	0,983	96,6 %	0.000
3	X3→ Y1	0.967	93,6 %	0.000
4	X4→ Y1	0.957	91,0 %	0.000
5	Y1→ Y2	0,947	89.7%	0.000

Data Source: Hasil Olah Data SPSS version 21

Tabel 6. ANOVA Coefficient Summary Between X1, X2, X3 and X4 with Y1 towards Y2

No.	Hubungan Variabel	F	Sig. F Change
1.	X1→ Y1	697,981	0.000
2	X2→ Y1	450,750	0.000
3	X3→ Y1	232,505	0.000
4	X4→ Y1	172,259	0.000
5	Y1→ Y2	139,830	0.000

Data Source: Hasil Olah Data SPSS version 21

In table 6 ANOVA above show F value counts. In column significant at can value 0,000? mean that ha accepted and ho averse. Thereby inference this test result can operative in population.

Regression line similarity can be used to do predictions (estimation), how does independent variable influence towards variable change magnitude dependent. To determine

regression line similarity, so researcher shall have knowledge my price is zero (a), and my price is one (b), be putted into regression line similarity. $Y_2 = a + b_1Y_1$, to simplify counting result, so researcher uses aid SPSS version 21, with result as table 7 hereunder:

Table 7. Coefficient Between Authentic Assessment Towards Cognizance Quality Haves A Religion Student In Regression Line Similarity

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.737	5.810		-.127	.901
Penilaian Otentik PAI	.473	.040	.947	11.825	.000

a. Dependent Variable: Kualitas Kesadaran Beragama Siswa

In above mentioned table is found my price zero (a) = -0,737 and my price is one (b) = 0,473. Thereby determinable regression line similarity between Islamic religion education authentic evaluation towards cognizance quality have a religion student at school? can be composed as follows: $Y_2 = -0,737 + 0,473$, with found regression similarity, so can be used to do predictions (estimation). Value t test in Islamic religion education authentic evaluation variable $Y_1 = 11.825.$, this value testing towards regression coefficient to detects to what independent variable Y_1 influential significant towards variable value change dependent (Y_2). As to rule to test hypothesis that submitted to what accepted or averse with see standard significant, when significant under or equal to 0,05, so H_a accepted and H_o averse. Seen number significant found number as big as 0,000. Thereby H_a accepted and H_o at refuse, thereby inferential there variable influence Y_1 towards Y_2 .

Conclusion and Suggestion

There are some conclusion that can researcher take that is: (1). teacher condition, student, curriculum, and environment is factor determinant in Islamic religion education authentic evaluation, so that influential towards cognizance quality haves a religion student, in general difficulty level haves a religion student at education stage base SD higher than at MI, (2). from this research result inferential that teacher factor, student factor, curriculum factor, and influential environment factor, and towards performance assessment Islamic religion education and cognizance quality haves a religion student at education stage base SD and MI either through self also together found which are positive connection and significant between teacher factor (X_1), student factor (X_2), curriculum factor (X_3), and environment

factor (X4) towards Islamic religion education authentic assessment (Y1) and cognizance quality has a religion student (Y2) at education stage base SD and MI.

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AUTHENTIC ASSESSMENT FOR IMPROVING TEACHING QUALITY: PORTFOLIO AND SLC IN PAPUA HARAPAN SCHOOL

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Abstract

Background of this paper based on researchers concern against a challenge in the world of education ahead of the 21st century. Researchers realize that to enter the 21st century, teachers must improve the quality of their teaching in implementing the curriculum in class. Currently, Indonesia has implemented use curriculum 2013. The curriculum 2013 use scientific approach rendering accompanied by some new change in Indonesia curriculum system. One of the things the form of renewal is in applying assessment to the students. Assessment is one of the most important part in the success of students and teachers. Hence, this study aims to describe and review research in implementing the model of authentic assessment to improve the teachers teaching quality at Papua Harapan School through portfolio and SLC (Students Led Conference). Through this study, researchers want to review of what the models authentic assessment which has been implemented in Papua Harapan School. The authentic assessment through portfolio and SLC (Students Led Conference) that is not focus only on the final result but rather than, assessment based on the learning process that has been traversed by the students. Based on the review of research obtained that authentic assessment able to improve the teaching quality of teachers. Teachers can make the authentic assessment as a result of achievement reflection of the learning objective so as to the teaching quality of teachers could be improved through the result of authentic assessment.

Keywords: *Authentic Assessment, Portfolio, SLC (Students Led Conference), Improving Teaching Quality.*

Background and Research Problem

The application of curriculum 2013 by using the approach of scientific rendering is a form of new challenges for teachers in Indonesia. Through the curriculum 2013 teachers have to be more creative, innovative, and responsible in implementing curriculum in class. One form of the challenges faced by teacher is in conducting assessment. Assessment was by form of authentic assessment that with certainty and right to be able to measure all the students achievement that eventually will impact on improving the quality of teachers teaching. This study will describe and review model of authentic assessment used in Papua Harapan School through portfolio and SLC (Students Led Conference) that can improve the quality of teachers teaching.

A model assessment formerly used in Papua Harapan School (SPH) is a model of assessment that more reference to the figures of a result of students working achievement. The teachers only measure the student aptitude through the achievement of a digit of number based on a students work sheet result. Formerly, SPH do not implement assessment through portfolio and SLC. Hence, the teachers more tend to get confused to choose teaching strategy that proper in class. Confusion problem faced by teachers in determining the teaching strategy is directly would affect on the quality of teaching from teachers.

Since the academic year 2013 – 2014, SPH starts to implement model portfolio and SLC as a model of authentic assessment that believed to be able to give a clear and valid description to the teachers about student's achievement. Achievement intended not only about the final result, but more to the learning process of students in the class until it reaches the final result. Through a clear on scholastic achievement, students and teachers will make it as a reference to improve the quality of teaching in the classroom.

Authentic assessment through portfolio and SLC believed to be some kind of model assessment that effective and efficient ways to improve the quality of teachers in teaching at SPH. Teachers in SPH not only assess students through the digit of numbers as the value of students result, but the teacher was able to see the reflection of students in any duty that do their work assignment. Through the reflection could become a reference for teachers to improve the teaching to meet the needs of students in each subject in class. In line with the background of the study, the problem of this study is formulated as follows: (1) How the authentic assessment process of portfolio held in SPH? (2) How the authentic assessment process of SLC held in SPH? (3) How impacts or influence from authentic assessment through portfolio and SLC to improving the quality of teachers teaching?

Methodology (Literature Review)

1. Authentic Assessment

One emphasis in the curriculum 2013 is authentic assessment, it is caused by the KTSP has not been fully implement the authentic assessment, though there is in space against authentic assessment. The core question of authentic assessment is “Whether students study?” not “What is already known by students?”

In authentic assessment students valued its ability in various ways, not only from the result of determined inscribed course. The ultimate principle assessment in learning not only assess what is unknown by students, but also assess what can be done by students. The assessment is prioritizing the quality of students work in complete a task (Kunandar, 2014).

Before defining understanding of authentic, there is a better should understand the definition of assessment first. Assessment is the process of a variety of data collection which could provide an illustration of the development of students learning. The outlook for the development of students learning needs to know by the teacher in order to ensure that the students subjected to the process of learning that right. In authentic assessment, students was asked to implement the concept or in the real world. Authentic means the state of ability or high skill that is owned by student (Kunandar, 2014).

2. Portfolio

General portfolio is a collection of objects assessment document used by a person, group, institution, organization, company, or the like which aims to document and evaluate the development of a process to achieve a goal set forth in the company. Portfolios can be interpreted as the result of a collection or study or work learners who shown business development, academic achievement of students from time to time, a dab of the subjects. It can affect as a tool to improve the educational chances of students to participate more in the learning process (S. Surapranata and M. Hatta, 2004: 28).

In education, portfolios can be used by the teacher to see the progress of learners from time to time based on the collection of works as evidence of a learning activity. Portfolios can also be viewed as a social process of pedagogical, as a collection of learning experience that may be in the mind of students, either in the form of knowledge (cognitive), skills (psychomotor) as well as attitudes and values (affective). That is, the portfolio is not just a real object, but includes "all inner experience" that happens to learners.

Portfolios can also be used by learners to collect all the documents of the science that has been studied, either in class, in school or outside of school. In the field of language, the

portfolio could be an adjective that is often paired with other concepts, such as learning and assessment, because it arise term portfolio-based instruction and portfolio-based assessment.

S. Surapranata and M. Hatta (2004: 73) explained, "portfolio assessment is an assessment on an ongoing basis with information or data collection methods systematically at result of the work of students in a certain period of time". In portfolio assessment system, teachers create a file for each student, containing a collection of systematic at results of their academic achievement during the learning process.

3. Teaching Quality

Quality according to Nana Sudjana is as a good overview explains the bad results achieved by the students in the educational process undertaken. Teaching according to Nana Sudjana (2000) is a process of arranging, organizing around the existing environment so that students can grow and encourage students in the learning process. While teaching according NK Roestiyah (2012) forward four definitions, the first instruction is the transfer of knowledge to the students; the second instruction is to teach students how to learn, thirdly, teaching is an interactive relationship between teacher and student, the fourth, is to teach the student interaction with the students and teacher consultation.

4. Improving

To increase the education is a very significant step in making that students growing fledge. In the modern life, all things are possible as well as education may be conducted; it is likely to increase. Without improvement, education is antiquated style that shall not be imposed. For this reason, education should be improved as a function of time on.

Research Finding and Discussion

Based on literature review that has been described in the previous section, would henceforth be examined regarding of the quality of teaching through teacher authentic assessment: portfolio and SLC at SPH. Here are the explanation:

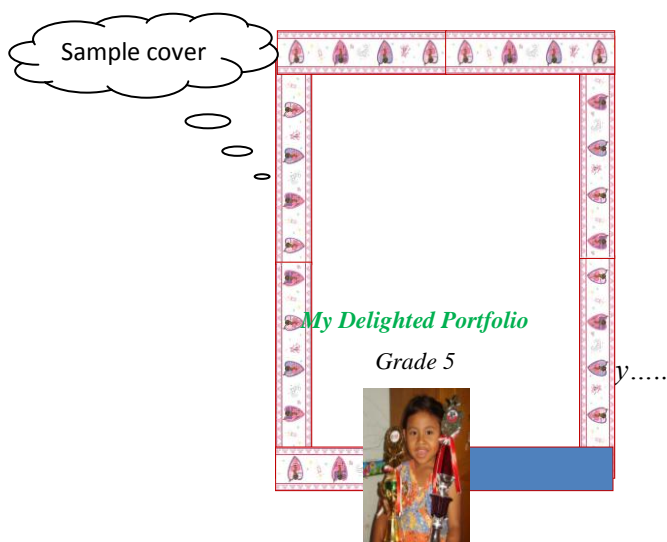
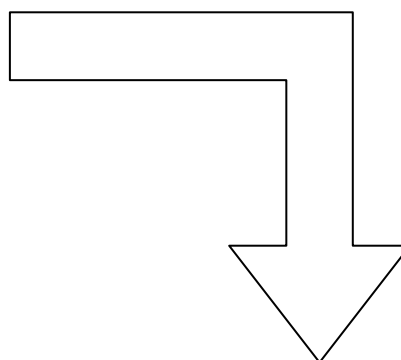
1. Portfolio

These are the following grooves of portfolio activities in SPH for one academic year at school:

Portfolio Flow Chart

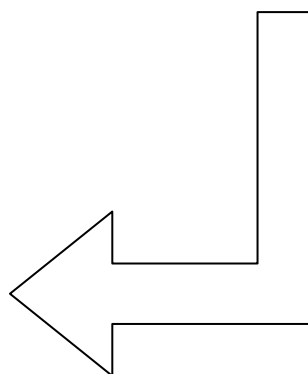
1ST Week of School

- ★ Review last year Portfolio
 - ★ Explain the importance of Portfolio to students
 - ★ Make the cover and acknowledgement (*see example from TL*)
 - ★ Make the divider for these following parts:
 - Math
 - Language
 - BI-PKn
 - Science
 - SS/IPS
 - CB-CS
 - SMART
- (each part will get about 8-9 slides front-back)*



During 1st semester

- ★ Kids always write the reflection in every test paper after doing the test and after the paper given. (*provide a space in the test paper*)
- ★ Keep the test paper in their Business file.
- ★ Right after Lebaran Holiday, they need to sort which result will be put in their Portfolio and write the reflection. Do it in **every two weeks**
- ★ Teachers need to check the students work **monthly**, especially HR (Homeroom Teacher).
- ★ Teachers can ask the students to take turn present their Portfolio in front of the peer group/ teacher.
- ★ End of sem 1, **SMART teachers** need to follow up the Kids' portfolio in their classes.



2nd semester

- ★ Kids review the Portfolio, make it nice and neat. Teachers supervise.
- ★ Keep putting the test paper.
- ★ Teachers inform the students about kinds of Portfolio activities will be done in SLC.
- ★ Start to practice in peer groups and teacher.
- ★ (grade 6, two weeks before SLC practice the **special class** during electives)

As a broad outline it can be said that portfolio is a purposeful collection of student work that tells the story of students' growth or achievement. A portfolio assessment in SPH will exhibit the student's efforts, progress, and achievements in one or more areas. The

collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self-reflection.

Portfolio was one of subjects that inserted in a schedule the lesson in class. One week there was once a schedule for conducting activities of portfolio that consist of 30 minutes. Portfolio activities namely activities whereby students will choose one or more his/her work of each subject. After students finished choose, students will do self-reflection on the result of work are chosen.

2. SLC (*Students Led Conference*)

SLC is activities whereby each student will be presented their portfolio in front of their own parents. SLC is a model exhibition the work of students (portfolio) adopted from one national plus school in Daan Mogot, Jakarta (Dian Harapan School). The main purpose of the activity performed SLC in SPH is students have the courage to showed the results of his/her achievements during the learning process unfolding in front of their parents. Besides, through the activities of SLC was a chance for students, teachers, and parents to reflect the result of the achievement of starting from the process until the final result achieved by each students in class.

One week before the SLC, parents will receive invitation from school. Parents will fill the time that is suitable for parents to attend the SLC. After an invitation form filled out by the parents, the form will be returned to the school that teachers can set a time by grouping some parents and students in same session of SLC (adjusted with the number of students in the class). These are the following steps from the activities of SLC:

- 1) Step 1: “Welcome to my class” → Students introduce parents to their homeroom teacher and welcome them to the class.
- 2) Step 2: “Class Tour” → Students lead parents on class tour, they have to explain any activity displayed in the class.
- 3) Step 3: “Viewing Portfolio” → Students escort parents to sit, give explanation about their portfolio and clarify why they put a certain task in it.
- 4) Step 4: “Reading Selection from HM” → Students will demonstrate language activities from Houghton Mifflin book.
- 5) Step 5: “Students/Parents Reflection” → Students and parents fill in a reflection and oal sheet, and place it in the provided box.
- 6) Step 6: “Collect the Reflection to Home base teachers (in the basket) → Students submit the reflection to home base teachers/put in the provided basket.
- 7) Step 7: “Thank You and Goodbye” → Dismissal.

Through the SLC, teachers at SPH can see the extent to which mastery students against the subject matter. The teachers could see the extent to which students over matter lessons from in every student explain and presented the results of his work in front of their parents.

3. Improving Teaching Quality

The authentic assessment through portfolio and SLC in SPH really give impact to the quality teaching of teachers in class. Through both assessments, teachers become understand what things need to be done at the time of teaching and learning activities in the classroom can answer the needs of students.

Through the portfolio system, for teachers at SPH motivated to be more creative in designing learning activities. Learning activities that compelling that students can showed the results of their work with pride in the presence of parents each one of them.

Teacher at SPH understand that the authentic assessment through portfolio and SLC not only function as assessment the outcome, but more to the learning process experienced by a student during learning activities in class. To assess the learning process of each student in the classroom then the teacher in SPH also requires observed every students in their class for joined the activity of learning. This can be reflected in the assessment rubric that used by teachers. These rubrics will be included in the work of the students in each of the portfolio. This example is the rubric assessment that is used by teachers:

The Students	5 Outstanding	4 Good	3 Satisfactory	2 Limited
<u>Study Habits:</u>				
Punctuality	has textbook and materials open and ready to begin	has textbooks and materials on desk	eventually gets books and materials ready	late to class and may not be prepared with books or materials
	remains on task without reminders	works quietly	eventually gets to work on the assignment	distracts others instead of working
Independence	works quietly and efficiently	asks questions when necessary	can participate but prefers to be quiet	needs reminding to get to work
	volunteers to answer questions	participates when asked	needs reminding to begin task – not a self-starter	doesn't ask for help or needs constant support to do the task
Initiative	knows what needs to be done and does it	begins works when assignment given	seldom asks for help	frequently absent
Homework	assignments complete and answers have been checked and corrections made	works hard most of the time - assignments usually complete but may not be checked or corrected	homework complete but done without care or quality	seldom participates
	notebooks organized	notebooks fairly complete but some organization could be used	notebooks tend to be disorganized	notebooks lost or not usable
Organization	uses agenda as a tool for organization and self-improvement	uses the agenda	uses agenda but frequently needs to be reminded to be faithful in its use	needs reminding to use agenda
	takes initiative in helping the team get organized	works agreeably with team members	needs to be coaxed into meeting with team member	is not ready when the team members meet
<u>Group Work:</u>				
Contribution	provides many ideas	offers encouragement when other team members make suggestions	listens to others and on some occasions makes suggestions	is disinterested in team conversations
Communication	contributes fully to	participates in	on occasion expresses	is seldom expresses thoughts

	complete the task	discussions	ideas	– lets others do that
Cooperation	assists other team members	does an equal share of the work	did almost as much work as others	did less work than others
Goal/task completion	clearly communicates ideas	usually shares ideas	encourages occasionally the work of others, but usually takes their work for granted	is not observant of others needs, more concerned with self
Self – control	maintains voice and behavior self-control without reminding	usually maintains voice and behavior self-control without reminding	needs to be reminded to keep voice and behavior under control	has little voice and behavior control even when reminded
Feedback	appreciates team members - gives feedback that makes others feel dignified	often encourages team members/is sensitive to others when giving feedback	can sometimes hurt the feelings of others with feedback	does not consider the feelings of others when giving feedback
	accepts feedback and uses it as an opportunity to improve	accepts feedback as needed for improvement	reluctantly accepts the feedback given	refuses to accept feedback as a means for improvement

Assessment rubric above, provide a clear description of SPH teachers in a very serious and detailed in give an authentic assessment on the process of learning at the classroom. When teachers give a kind of assessment that is not only focusing on the outcome of the students, but stressed the process, more the teacher may determine with certainty on the strategy teaching proper in class. At the time when the teachers been able to choose as well as use teaching strategy proper and answer the needs of students then at the same time the of teaching quality of teachers to teach increased.

The teaching quality of teachers are rising too can be seen from the activities of learning which applied by the teacher in class. One example of the learning that ever been used by teachers in SPH namely teachers in each grade level team teaching learning activity in designing the project, project science and social studies. Through both projects, the students in SPH will make a variety of the work of learning in accordance with the topic of learning in each grade level.



Conclusion and Suggestion

Conclusion

In address challenges of curriculum 2013, the teachers are required to have qualities teaching that creative, innovative, and responsible. The discussion on the quality of teachers to teach in SPH that rises because influenced by the process of authentic assessment (portfolio and SLC) show clearly that as teachers, the assessment process for students from it is important. Through the authentic assessment, the teacher will have a very clear reference to make a plan for an effective and efficient measure in the process of learning and teaching in the classroom.

In the implementation of authentic assessment, teacher will see mistake and also the success of students through any process of learning that takes place in class. Mistake is to give an opportunity to students to get more involved, and the learners themselves can easily control which the development of capabilities that have been gained. Thus, students will be able to perform self-assessment. Skill will find advantages and disadvantages, as well as the ability to use these advantages in dealing with an authorized capital of an important weakness in the learning process.

Suggestion

1. In the assessment, teachers are advised to use authentic assessment so that teachers can always identify the material that is to be continued and for that matter the material still needs to be remedial.
2. In the teaching and learning activities in schools, especially to the teachers as a professional person is recommended to improve the quality of teaching through authentic assessment result does.

3. Teachers can apply the authentic assessment through portfolio and SLC that emphasized on the learning process of students. Teachers can use the model of assessment that has been used in SPH as some kind of model assessment that can measure the process and the result of student's achievement against matter of learning in class.

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Theme 3:
**DEVELOPING A STRATEGY OF CREATIVE
TEACHING**

THE EFFECT OF MATH LESSON STUDY IN TERMS OF STUDENTS' MATHEMATICS ACHIEVEMENT

Afifatul Muslikhah

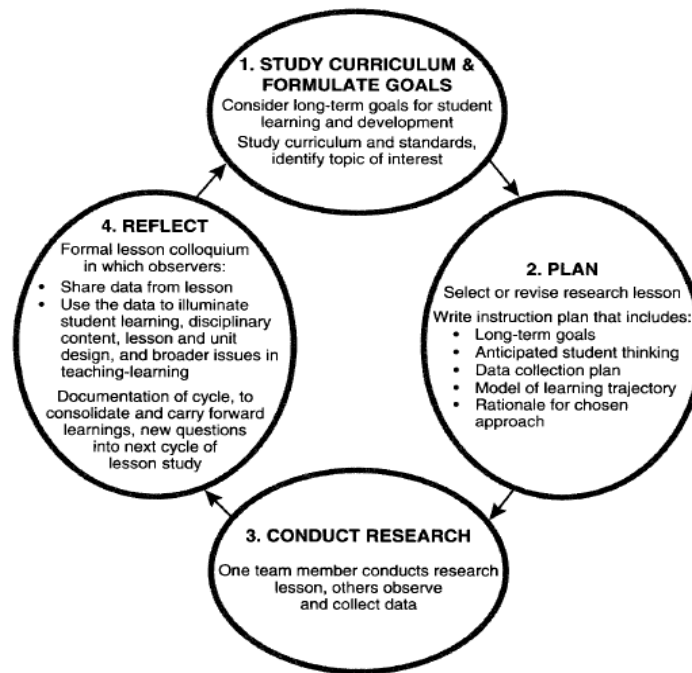
Abstract

The aim of this study is to determine the effect of mathematics Lesson Study in the terms of student's mathematics achievement. Student's mathematics achievement in this study referred to the average achievement scores of National Examination (UN) in field of mathematics in the year 2012. This research is an experimental research. The research involves an experimental group and a control group. The population of this research includes all students in junior high school in the district of Bantul, Yogyakarta. The samples of this study were taken by purposive sampling technique. The sample consisted of 68 schools, 28 of them were schools that had been implementing Lesson Study which were monitored and evaluated by Yogyakarta State University (UNY) and the rest were schools that had not implemented Lesson Study yet. To determine the effect of Lesson Study based on math student achievement, the data were analyzed by using Univariate tests. The result showed that the average score on the National Examination (UN) in the subject of mathematics by the school that had been implementing lesson study tended to be higher compared to schools that had not implemented Lesson Study yet. The average score on the National Examination (UN) in the subject of mathematics of schools that had been implementing Lesson Study is 7.71 while the average score on the National Examination (UN) in the subject of mathematics that had not implemented Lesson Study is 6.61. Based on the Univariate test, it showed that there was significant difference among mathematics achievement of schools that had been implementing Lesson Study and schools that had not implemented lesson study yet.

Keyword : *Math Lesson Study, Math Student Achievement*

Introduction

The aim of this study is to describe the effect of lesson study in terms of students' mathematics achievement. Lesson study is a direct translation for the Japanese term *jugyokenkyuu*, which is composed of two words: *jugyo*, which means lesson, and *kenkyuu*, which means study or research (Fernandez & Yoshida, 2004: 7). The process of lesson study are (1) study curriculum and formulate goals; (2) plan; (3) conduct research; and (4) reflect (Lewis, et.al., 2006: 4).



Adopted from Lewis, et.al., 2006: 4

Lesson study was originally a series of activities or systematic process used by teachers in Japan to test the effectiveness of learning in order to improve learning outcomes (Garfield, 2006: 4). According to the tests' result, it was found out that lesson study is effective to increase the learning outcomes. Besides, according to the findings of Takaharu Komiya, lesson study is able to implement students' mathematical activities and able to develop ideas to foster students' basic mathematical skills. (Isoda, 2007: 154). Lewis (2002: 3) also reveals the advantages of lesson study for teachers, some of them are (1) teachers can determine the necessary competence possessed by the student, to plan and implement effective learning; (2) teachers can review and improve the useful lessons for students. Thus, this research tried to prove those issues as the experimental group and the control group were determined in some districts of Bantul, Yogyakarta special Province, Indonesia.

The implementation of lesson study in Yogyakarta is the result of cooperation of the Yogyakarta State University (UNY) and the Japanese government. The cooperation has been effective since 2007 up to the time of the research is conducted. The researcher wanted to investigate the effects of lesson study activities in the District of Bantul in terms of students' mathematic achievement.

Method

The data of student's mathematics achievement in this study referred to the average achievement scores of National Examination (UN) in field of mathematics in the year 2012. The samples of this study were taken by purposive sampling technique. The sample consisted of 68 schools, 28 of them are schools that had been implementing Lesson Study, and the rests are the schools that had not implemented lesson study yet.

The analysis of the data consist of descriptive analysis and inferential analysis. Inferential analysis was performed by doing the normality and homogeneity test first. If the data treated show normal distribution and homogeneous state, the analysis goes on by using *one way ANOVA* test to investigate whether any significant difference among students' math achievement of schools that had been implementing lesson study and students' math achievement of schools that hadnot implemented lesson studyyet.

Finding and Discussion

From the descriptive analysis, the researchrevealed that the average of National Examination value in field of math of schools that had been implementing lesson study is about 7.74 with the range of 6.30 up to 9.20. The average of National Examination value in field of math of schools that hadnot implemented lesson study is about 6.61 with the range of 5.22up to 9.16. For more detail, the data is presented on the table 1.1 below.

Table 1.1 The descriptive analysis

	N	Mean	Std. Deviation	Minimum	Maximum
Experiment group	28	7.7461	.83912	6.30	9.20
Control group	40	6.6143	.88312	5.22	9.16
Total	68	7.0803	1.02598	5.22	9.20

By those value, it can concluded that there is a difference averageamong student's math achievement of schools that had been implementing lesson study and the schools that had not implemented lesson study yet. It could be said that the achievement of student from the schools that implemented lesson study tended to be higher compared the achievement ofschools that had not implemented Lesson Study yet. To determine whether the difference of the average is significant or not, then the inferential analysis is performed

Based on the result of normality and homogeneity test, the data were normally distributed and proved to be homogenous. Thus, *oneway ANOVA* test can be performed. According to the result of the test, the student's math achievement of schools that had been implementing lesson study and the student's math achievement of schools that had not implemented lesson study yet was significantly different. So, lesson study was absolutely effective to increase the learning outcomes. This finding is in line with the findings made by Garfield and Takaharu Komiya.

Conclusion and Suggestion

Based on the analysis, it can be concluded that there is significant difference among student's math achievement of schools that had been implementing lesson study and students' math achievement of the schools that had not implemented lesson study yet. Thus, it can be concluded that the students' math achievement of school that had been implementing lesson study is tended to be higher compared to schools that had not implemented Lesson Study yet.

Based on these findings, the researcher recommends the teachers at junior high schools in districts of Bantul, Yogyakarta, which has not conducted the lesson study to conduct math lesson study activity that can increase students' math achievement.

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An Evaluation of the English Teaching Methods Implemented at Bujumbura Montessori Primary School: Weaknesses and Achievements

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Abstract

The aim of the current case study was likely to highlight possible weaknesses and achievements resulting from the English Teaching Methods implemented at Bujumbura Montessori Primary School, in Burundi. This case study was conducted in one private educational school known as Bujumbura International Montessori School (BIMS) and used mixed methods with a descriptive technique. In this research, the headmaster of the school, teachers, and some selected parents constituted the sample of the study and data was obtained using questionnaires, observations and interviews. The study results showed that Bujumbura International Montessori School has an efficient policy for its teaching of English. Moreover, it has found that the school in question has sufficient and relevant materials to facilitate the work of teachers and learners in their daily activities. Last but not least, the findings revealed also that teachers of the school understudy are trained to teach in their situation.

Keywords: *Evaluation, Teaching Methods, Teaching Material, Montessori system, weakness and achievements.*

Introduction

Until very recently, English was given a rather narrow place in the Burundi educational system. It was just taught as a school subject starting from the second year after primary school, except for University departments where it was a main subject. Nowadays, however, learners study English from kindergarten in some private schools and from first grade in all public schools.

Such a change in the country's policy rests on the government's understanding of the growing place of English in worldwide social, business, political transactions. At the regional level, let us point out that English is the first language of work in the East African Community (EAC) which Burundi is a member of.

However, in the view of most English teaching practitioners, it is still hard for teachers and learners. One of the main reasons is that teachers have not got sufficient and adequate training. How can they efficiently impart knowledge skills of a language they speak and write — that they know in fact — so poorly? How much can they learn about EFL teaching methods in a month or two of their preparation? Is the methodology relevant to the level and needs of the learners? The real question to ask in the present context is whether teachers of

primary schools take into account all these factors while teaching English. It is expected of every teacher to use whichever methods depending on the topic of his lesson as well as on the individuals in his/her class. We insist on teachers because they are the ones called upon to teach English with no prior training as such. To explore the situation in depth, we have chosen to focus on the situation at Montessori School. Our focus is on evaluating the methods implemented while teaching English in this school in order to assess their relevance and achievements. Where weaknesses are thought to exist, suggestions have been made in order to improve the teaching and learning process.

1. Background of the study

To begin with, the school owes its name to a brilliant and polyvalent Italian woman by the name of Maria Montessori. She lived from 1870 to 1952 and was an educator, a doctor as well as a philosopher. Maria Montessori began to develop her philosophy and methods in 1897, attending courses in pedagogy at the University of Rome and reading the educational theory of the previous two hundred years. In 1907, she opened her first classroom, the Casa dei Bambini, or Children's House. Montessori education is fundamentally a model of human development, and an educational approach based on that model. The model has two basic principles. First, children and developing adults engage in psychological self-construction by means of interaction with their environments. Second, children, especially under the age of six, have an innate path of psychological development.

The Montessori school in Bujumbura constitutes an international meeting point for learners attending it. Information obtained from the school authorities in October 2009 indicated that indeed all continents are represented as there are: Burundians, Tanzanians (Zanzibaris), South Africans, Kenyans, Ethiopians, Algerians, French, Belgians, Indonesians, Laotians, Pakistanis, Indians, and Arabs. A total of 18 nationalities are found in the school, which makes the latter a bit of a melting pot. Needless to point out are the different languages spoken by the students during break time for example.

2. Montessori school language policies and goals

Behind Montessori school language teaching lies the principle to teach and develop communication skills among learners. As stated earlier, Montessori school is a very complex school where more than nineteen languages are in regular use; yet, only two of them are taught, that is, English and French. Besides, learners are prepared to face up to the challenges of attending so-called “national and international schools” located in Burundi or abroad, where indeed they have to be competitive when it comes to displaying

intellectual knowledge and creativity. As a matter-of-fact, the academic motto at Montessori is “give your child the very best start on the road of success”. That is probably why teachers are university graduates. Montessori school has also a policy of training teachers who did not attend pedagogical studies. The latter must undergo special training in order to acquire the knowledge necessary to cope with their jobs. This is an opportunity for them to learn about “what to do”, and “how to do it”, as well as on “why to do it”. One draws from this the authorities’ awareness that in whatever they do in language teaching, they have a purpose, an aim to be fulfilled sooner or later. It is after that special training that all teachers are gathered together just to undergo additional training.

Additional competence for the primary school teacher lies with the ability to display a good model of what he is advocating. He must be able to put theory into practice himself. He should be able to reflect on the use of different learning techniques and styles of teaching so that he can try to develop his own teaching approaches.

3. Children’s learning styles

3.1. Differences between a child’s mind and an adult’s one

During the very early times of the world, there were a lot of researches on the best ways how children learn languages. The researchers were interested to know the nature of a child’s mind. Some thought that all human beings have the same nature regardless of their ages and therefore concluded that all existing methods were applicable to all kinds of learners. With time, it became clear that the way children learn is quite different from the way of adults. This understanding had to innovate the teaching methods and techniques so far used.

Another view that was widely held was that a child’s mind is just smaller than the adult’s, for they may consider children as adults in miniature. During the industrial revolution of the eighteenth century, this attitude about children started changing. Some philosophers began to study the nature of children and the best methods for their learning. They discovered that the child’s mind is quite different from that of an adult. This is the view of Montessori in her book entitled *The Absorbent Mind* (1949) when she says that the learning capacity of a young child is fundamentally different from that of an adult. To realise this ourselves, we need only to think of one learning task attempted by both adults and children - learning to speak a new language (internet source accessed on March 17th, 2010 from <https://archive.org/stream/absorbentmind031961mbp#page/n17/mode/2up>).

By absorbent mind, one can understand that children are able “to absorb”, i.e. to record everything they see or hear in their surroundings through activity, not only unconsciously but also effortlessly, something an adult cannot even conceive of.

4.2. Pedagogical techniques in the teaching of children

Commonly known methods of teaching children include: demonstration, field trips, recitation, experimenting, and audio visual aids. Basically, they are all applicable to a language teaching although they vary according to the subject under discussion or to what kind of learners one has. But he must have love for children. He must be trained in the teaching of young children; he should be a child-oriented teacher rather than a subject-oriented one. He should also bear in mind the different stages that a child has to go through in order to determine which method is suitable to his learning.

According to Vincent R. Rogers (1972: 130), he mentioned that:

In the British primary school, the children begin their explorations with simple experiences that involve the senses: listening to a plop of bricks in the water tray, touching the roughness of bark or tasting the saltiness of a shell. In that sense, they feel the rhythms of life around them and become aware that their own bodies can respond sympathetically... and where a skilled teacher creates an environment delicious to the senses, a child's speech and writing patterns can change radically.

From the above quotation, it is important for the teacher to know if the learners in question are sensitive or not as senses play a great role in language learning. John W. Hug and Phyllis J. Wilson in *curriculum enrichment outdoors* (1965: 3) agree wholeheartedly that children can learn using all of the senses. They point out that:

“Multi-sensory experience can be so directed in the outdoors that, through practice, the learner develops something of the keenness of senses that was so useful to the pioneers in knowing and using their surroundings. He develops the acuteness that helps a person really to save each minute of living. From that, the child is provided unlimited opportunities to practice the precise seeing, hearing, feeling, tasting and smelling that but also leads to more effective multi-sensory learning”.

From the statement above, one can deduce that senses play a great role in the learning activity in that they assist children in learning with understanding and interest. From this point of view, senses become prerequisites for learning. Without them, no learning can happen and be successful.

In all cases, teaching a language to children is an activity which requires special methods and techniques. The teacher of primary school should know all aspects of child's learning including the natural order of acquiring language. Once factors of success are understood, the teacher's job would be to stimulate and capitalize on them. In the same lines of thoughts, Nida (1957:1920) points out to the natural order of learning a language arguing that it is not random, but rather systematic. That is: listening - speaking - reading, and writing.

What methods are suitable for teaching English to children? This is a question that has haunted the minds of many researchers. Naturally, all normal children play and want to play. Children learn through playing. The play-way method may include recitation, demonstration, field trip, experimenting, discriminatory methods, and so on. In playing together, children interact and in interacting they develop both cooperation and language skills. Results reached in most studies suggest that efficiency in the art of teaching young children basically stems from play-centred methodology.

Therefore, there seems to be agreements on the fact that children learn a great deal through playing. As implication, the teacher of primary school ought to be very dynamic and able to motivate children into learning something using many different play ways. "Different" here is important and implies that young children soon get tired of learning through one way. It is equally important for the teacher to have an ability to communicate with children. Of course for some people, this is like an instinctive skill, whereas for some others, it is a skill they have to learn.

In his book, *Evaluating and selecting EFL teaching materials* (1984:99), Alan Cunningsworth states that the only way to teach a language to young learners in a childlike fashion is a course full of play; plays combined with structured teaching so that the children are only aware of the play content and learn language almost without noticing. They play and develop sociability and the language at the same time. Through plays, they interact with the nature, experiment many things needed not only for their body development, but also for their intellectual development.

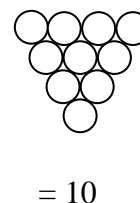
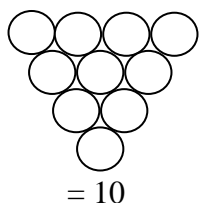
We can understand that when children play, they intermingle with things and people. Indeed, play is so crucial in the child's life. It is a very strong characteristic through which he learns harmoniously. During play, children use play materials which should connect them to things in their environment. Since children learn from concrete to abstract, the teacher may equip students with skills using play. For that he needs to be trained in play-related materials.

As S. Hudspeth (1987: 103) observes that instructional materials aid the children to understand and remember what they have learnt. Therefore, a teacher of primary school should be trained in different skills of using attractive materials in order to create favourable conducive environment of learning.

V. Hildebrand (1972:69) on his part finds that *play is the companion of the young. It gives the sparkle to the home, school or wherever children gather. Children say what they feel and they feel what they say.* So, the teacher of primary school should very much be aware of the values of play in the young children's learning. While at play, children express themselves, gain experience in many things and that play in itself is preparatory for physical and mental growth. In play, children develop their large and fine muscles, they practice sex roles, integrate the rules of society, develop co-operation and love while their full range of feelings are being expressed.

J. Piaget (1971: 51) on this part points out something referring to the working of the child's mind. According to him, the latter is not just a smaller mind than the adult's but quite different altogether. The small child's mind cannot accept that numbers remain the same when they look different.

Eg:



Concerning this example, the child will likely say that the number of the first pile of circles is bigger than the second one because his mind is not yet able to differentiate between size and number. This is to say it is almost impossible for the children to imagine things without seeing, feeling or testing them.

The more they practice, the more effective the learning will be. So, the teacher of young children should be very resourceful and able to collect and use a lot of play-materials in children's learning just to accelerate the development of various skills such as:

- i) concept formation
- ii) logical thinking
- iii) imagination
- iv) association of ideas
- v) vocabulary building

Many other researchers concur with the view on the role of play in the teaching of young children. In L.H. Wario (1989: 38), it is said that:

“Children learn a lot, through play. They engage in activities which in turn help to generate language and learn new words to describe new experiences. The teacher should make it easy for pupils to engage in those games and activities which will help the pupils to express themselves and to experiment with words”.

In addition, teachers ought to remember that schools are built for children not for teachers. To be successful, their teaching styles must be learner-centred and involving enough. Referring to the Chinese proverb according to which:

When I hear, I forget

When I see, I remember

When I do, I understand.

In conducting or practicing the play way method, the teacher should be conscious of what kind of game is being dealt with, and thus consider which games to use, when to use them, how to link them up with the syllabus, textbook or programme and how, more specifically, different games will benefit children in different ways.

4. Place of materials in a language learning process

4.1. Materials: nature and function

In any teaching activity, materials are taken as the way to reaching a given destination. Without them, the teacher may not know what to do and what not to do and how to do it. Thus materials take the place of a guide” in the daily teaching work. By materials, one understands mainly curriculum, syllabus, textbooks (for teachers and for learners) and other teaching facilities such as wall charts, maps, pictures, CDs, tapes, radio, ... which make teaching/learning more meaningful and real to pupils. Alan Cunningsworth, in his book (Op. Cit: 31) says that:

Teaching materials should take the learners forwards as directly as possible towards their objectives already planned which fall in line with the aim of the teaching program. The aim of a teaching program should determine the course materials to be used and not vice-versa.

It is clear that the choice of teaching materials must relate to the teachers’ aims and objectives as established prior to his teaching. It is also important that those materials be exciting and motivating to enhance the learners’ desire to work.

Clarifying the nature of positive/efficient pedagogical materials, A. Wright (1976: 42) observes that:

Whatever other functions the materials may have, providing interest, fun, cultural setting and so on, the main function is that of guiding the student to use his store of foreign language to communicate his ideas and opinions

In the same point of view, Stevens (1983: 164) emphasizes the above idea saying that material can be used in an effective and enjoyable way for teaching or for supporting the teaching of almost every aspect of language. In his words,

as any branch of teaching, the preparation of materials offers scope for ingenuity, innovation and imagination. Materials do not only refer to books, but are meant to refer to and include newspapers, magazines, periodicals, journals, individual articles, short stories, poems, plays, pictures, charts, photographs, maps, films, tapes, tape-recorders, video ... Most materials come from the world of reality rather than from textbooks.

This is to say that teaching/learning process is a demanding task. It requires not only a collection of materials but also a sense of ability and creativity. It is understood that a teacher should be able to use all available materials and vary them according to what he is teaching if he wants to be successful in the teaching of all forms of a language.

4.2. Materials and motivation

Motivation is arguably the most important single factor in success or failure at language learning. J. Harmer (1986) identifies two kinds of motivation namely the intrinsic and the extrinsic motivation, the former coming from within the learner whereas the latter comes from outside the learner. Our concern is not to develop the two in detail, but to underline their role in language teaching/learning.

Insofar as we can see, children do not usually ask to learn a foreign language. That is done by their parents who have a given purpose for them to achieve. In his book, *Teaching English to Children*, C. Brumfit (1979: 97) remarks that children are not motivated to learn another language in the way older people might be. If they are to take part in a foreign language course with success, their motivation has to come from another source, for example from their parents but above all, from the enjoyment and pleasure experienced in the learning situation.

Unfortunately, in the sphere of some schools, teachers do not pay attention on those factors as they may not know their importance in language learning. This is

worrying given that in some teaching situations — and Burundi is not an exception — a number of teachers will complain about the lack of materials, whereas those who have them available are unable to exploit them positively to meet the needs of their learners. That explains why regular training to update teachers' methodological awareness are more that necessary and know how is another requirement for children's success in foreign language learning.

5. Research hypotheses and questions

Before conducting this research, the researcher was guided by a number of questions based on the following hypotheses:

- 1) Montessori primary school must have an efficient policy for teaching English;
- 2) Montessori school must have sufficient and relevant materials to facilitate the work of teachers and learners in their daily activities;
- 3) Montessori school teachers must have been trained to teach in their special situation.

As for the questions to be answered they are:

- 1) Does Montessori school have an efficient policy for teaching English?
- 2) Do the materials in the school facilitate the teachers and students in their daily work?
- 3) Are Montessori School teachers trained to teach in their special situation?

6. Purpose and Significance of the Study

The aim of this work is likely to highlight possible achievements and weaknesses resulting from the methods implemented at Montessori School. In the case weaknesses and achievements are observed, they will both be useful. They will help the school holders to focus on them in their in-service training sessions. Moreover, the school holders will benefit from it as they will know what is said about their school and will take it into account while planning what to be done along the school year for example. Teachers will also gain something from it as long as they will know where to put much emphasis in their teaching/learning activity in order to enhance learners' knowledge.

7. Methodology

The triangulation of instruments was used to gather data. The researcher got information not only from teachers or some parents, but also from the headmaster of the school. There were 4 teachers involved, from the first and second level, two teachers per class, one of them teaches English and the other French. A number of fifteen parents were asked to complete a questionnaire related to their children's learning.

To reinforce the interviews and questionnaires, the observation technique was used as it depicts the teacher in activity and his/her general behaviours during the process. In other words, it gives a lively image of the happening of the teaching activity. The observer was the researcher, who is better positioned to see what is happening in the classroom. It is he who is able to see both the teacher and learners at a time. To get the required data from the observation sessions, the researcher went there two consecutive days, and each class was visited twice for a period of one hour per class.

The data from the observations and the interviews were analysed qualitatively. The questionnaires were analysed quantitatively, using simple statistics, the data was described quantitatively and interpreted qualitatively to make it easy to understand.

8. Findings and Discussion

After confronting all the data, we found out that Montessori School has an efficient policy for its teaching of English. During classroom observation we noticed how actively learners responded to the teaching, how they were highly motivated and how they were interacting actively. We also witnessed their enthusiasm in asking the teachers to clarify a given question once they did not understand it. As far as communication skills are concerned, we noticed that they have a good base since English is taught from the nurse levels, and the teachers had received training in teaching young children. Using these findings we can therefore present our first hypothesis as proven. It was:

“Montessori Primary School must have an efficient policy for teaching English”

The second hypothesis was related to the teaching materials used by both teachers and learners and it was stated as follows: “Montessori School has sufficient and relevant materials to facilitate the work of teachers and learners in their daily activities”

In our investigation, we realised that Montessori School has not only sufficient but also relevant books. Speaking of sufficiency, we found that each textbook had its Teacher’s Guide and that each learner had his own book. Moreover, each skill has its appropriate book. That is a rare situation in the schools of Burundi. The materials are relevant in since the books fit first the learners’ level; then they are well coloured, and full of interesting pictures which excite the learners to explore them. Besides, they are written in accessible English to the children.

The last hypothesis, which related to the training Montessori School teachers receive before beginning to teach, was slated as follows: “Montessori School teachers are trained to teach in their situation”

Concerning this hypothesis, findings have proven that all teachers undergo seminars before starting to teach. Data revealed that young children are difficult to handle. To cater for their needs, trainings are organized in order for teachers to understand what a child is, what he needs for his positive development and how to handle him. So, after a close analysis of all teaching methods implemented at Montessori School, but also keeping in mind that there is no “perfect method”, we conclude that teachers have reached their goal. As a matter-of-fact, most learners are able to express themselves in English, which is the first goal of any language teaching process. That must be facilitated by the training teachers, the availability of modern materials and the teaching methods well adapted to young children.

Besides the achievements mentioned above, some hindrances have also been found in that school. The lack of recorders and magazines was pointed out, which once availed, should contribute and increase success in the language teaching/learning process in general and in English in particular. Moreover, the language transfer is another challenge to be pointed out. Indeed transfer is a big handicap that takes place while learning a second or foreign language. To finish with the section of challenges, the school is very expensive in the sense that it is not open to middle or low-income Burundian children.

9. Conclusion

All along this case study, our goal has been to assess the achievements and weaknesses of the English teaching methods implemented at the Montessori Primary School, a school located in Bujumbura City. It has been found that Bujumbura Montessori International School really follows the Montessori system of teaching kids according to the individual’s pace. The school truly promotes its motto which is stated as “Give your child the very best start on the road of success”. To that end, teachers are trained to teach using play-way methods, as children learn very well through games; and teachers have understood that kids are not adults in miniature as it used to be thought in the past. BIMS teachers have understood the different psychological steps a child passes through, their needs, and thus work with that in the teaching activities. Even if there were some missing teaching aids, the school has availed sufficient teaching materials suitable for the level of its kids. The administration of the school as well as the teachers has succeeded in implementing the Montessori teaching system inside the English lessons.

10. Recommendations

Considering the results of our investigation, we judged it relevant to suggest some recommendations in order to spread out the English teaching methods of Montessori Primary School.

a) To the school managers.

- 1) To avail the missing materials in order to enhance success in the teaching/learning process.
- 2) To review the school fees in order to allow more Burundian children to attend it.
- 3) To open more branches of the Montessori School in other parts of Burundi to allow many teachers across Burundi to learn from the experiences of their counterparts at Montessori School.

b) To teachers.

To keep up their good work but above all, to develop interest in understanding their responsibility to supplement the textbooks where weaknesses may exist. They should also take the interference of mother tongues easy as this is a natural phenomenon in second/foreign language learning situations.

c) To parents

- 1) To encourage their children and look for occasions to speak English with them.
- 2) To incite the Montessori school authority to supply the missing materials such as recorders and magazines.

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TEAMS GAME TOURNAMENT FOR IMPROVING THE STUDENTS' INTEREST TOWARD MATHEMATICS

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Abstract

This study aims to identify how the teams game tournament has a capacity to improve the students' interest toward mathematics.

This study was a classroom action research that conducted in two cycles. The reasearch subjects were the students of VIIIIB of SMAN 2 Klaten. The research object were the process of teaching and learning in the classroom and the students' interest toward mathematics. Data were collected by questionnaire, interview, and documentary. Data were analyzed by descriptive analysis.

The results show that teams game tournament has a capacity to improve the students' interest toward mathematics. The score of students's interest toward mathematics increase from first cycle to second cycle. The are 70% of students that have interest in mathematics (high and very high) in the end of the first cycle and 83% in the end of the second cycle.

Keywords: *interest, mathematics*

Introduction

Improving the quality of human resources cannot be separated from the role of education. PembukaanUndang-undangDasar 1945 states that one of the purposes of the Republic of Indonesia, is making the Indonesian intelligent. The article 3 of Undang-UndangDasarRepublik Indonesia Number20 year 2003 states that national education serves to develop the ability and character development and civilization of dignity in the context of the intellectual life of the nation, aimed at developing students' potentials in order to become a man of faith and fear of God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become citizens of a democratic and accountable. In addition, it is mentioned in the strategic plan that the Ministry of National Education of the National Medium Term Development Plan (RPJMN) 2010-2014 aimed to consolidate the restructuring of Indonesia in all fields by emphasizing efforts to improve the quality of human resources, including development of science and technology and the strengthening of economic competitiveness.

One of the disciplines that play a role in the development of science and technology is mathematics. This is consistent with Muijs and Reynolds (2005: 212) that states that mathematics plays a major role in various fields of science such as physics, engineering, and

statistics. Because mathematics plays a vital role in the globalization era, mathematics education in Indonesia is required to prepare in order to deal with the development of science and technology. Mathematics education should be able to prepare the learners with the knowledge and skills to the challenge in the era of globalization.

Mathematics was learned from basic education to higher education. Mathematics learning is implemented at every level of education different from one another. Mathematics at the secondary school level, includes four aspects: number, algebra, geometry and measurement, statistics and opportunities.

Based on the reports of Programme for International Student Assessment (PISA) in 2009, the quality of mathematics education in Indonesia is below average. This is evidenced by the results of a test where Indonesia got a score of 371 which put Indonesia ranks 61 from 65 participants. If compared with neighboring countries, Singapore, Indonesia is still behind far. Singapore is ranked second with a score of 562 (OECD, 2010: 135).

The quality of learning is influenced by several factors. Bridge (1979: 10) states that the learning process is influenced by: a) the students characteristics, b) the family background, c) the physical characteristics of the students, d) the characteristics of the teacher, and e) the school characteristics. Djamarah (2008: 175) states that learning activity is influenced by the purpose of teaching, teachers, educators, facilities and infrastructure, learning activities, environment, materials and evaluation, and learning atmosphere.

There are several factors that lead to low student learning outcomes. Zulkardi (2007) states that low levels of student learning outcomes are caused by several factors: (1) complicated curriculum, (2) many and difficult material, (3) the traditional teaching methods and interactive; (4) less effective learning media, and (5) a bad evaluation.

Some conditions above consistent with the fact that occur at SMA N 2 Klaten. Interview with the mathematics teacher informed that the study of mathematics conducted using conventional approaches. Learning conducted by order of the teacher explained, giving examples of problem solving, then gives exercises. Students do not take an active role during the learning of mathematics.

Based on interviews with teachers, most of the students are busy with their activities that are not relevant to learning. Students do chatting and joking while in learning. Some students leave the class by unreason. The interaction of students and teachers is less. Just a little students who is active in learning.

The problems mentioned above indicate low interest in students to follow the learning of mathematics. Djemari (2008: 112) defined the indicators of interest in mathematics include the benefits of learning mathematics, trying to understand the math, reading math books, asked the class, ask a friend, ask other people, and do math.

Low of the interest students of Klaten 2 Senior high school in mathematics allegedly affected by teacher-designed learning activities. DjemariMardapi (2010: 43) defined that teachers affect to the quality of learning. Therefore, the teacher's role in creating meaningful learning should be improved. As has been explained above, the study of mathematics held at the school is the traditional method and is not interactive. Hence, to overcome this problem, efforts are needed to determine the interactive learning and meaningful mathematics learning model.

Expected learning model is a model of learning that is meaningful, involving the active participation of students, and is able to change the paradigm of teaching and learning. The learning model is also expected to realize the interaction among students and between students and teachers. This is consistent with what is being said Mathew Mitchell (Woolfolk, 2009: 384) that the use of the learning group can enhance the students' of junior high school interest in math.

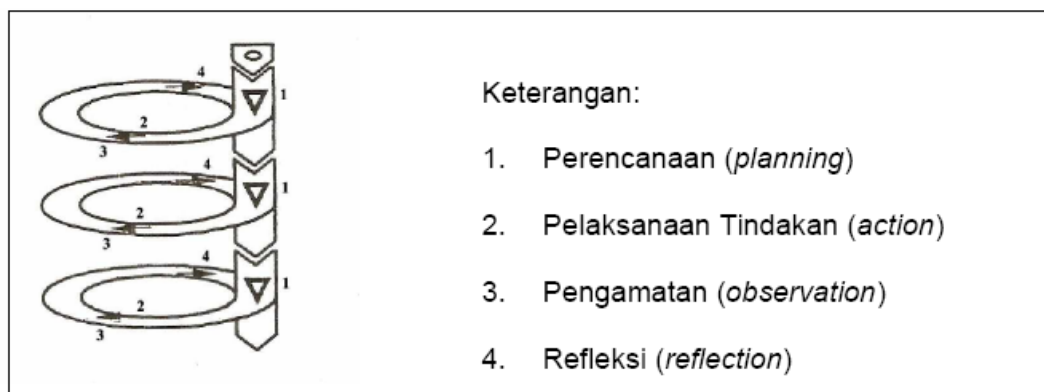
The learning model that is suitable with the principles above are cooperative learning model. Cooperative learning is learning that involves interaction among learners. Slavin (2006: 255) defined "Cooperative Learning Instructional approaches in the which students work in small mixed ability groups". Cooperative learning is an instructional approach in which students work in heterogeneous small group. While Gillies et. al. (2008: 97) defined "Cooperative learning teams were used as a vehicle to get students to engage in academic interactions that would further Reviews their understanding of what had been taught (National Reading Panel)". The essence of the above statement is that the cooperative learning group serves as a means to engage students in academic interactions that would hang them on the material being studied.

There are many cooperative learning models. Slavin (2010: 143) stated that these types of cooperative learning include Student Teams Achievement Divisions (STAD), Teams Assisted Individualization (TAI), Jigsaw, and Teams Games Tournament (TGT). The four types are basically the same, the priority activities involving student-student interaction.

TGT is the most unique learning model. Activities designed in this study involves academic tournament. In general, classes are grouped into several groups of 4-5 members. Each group consists of heterogeneous members. Each team has members who are capable of high, medium, and low. Thus, the ability of the team is equal. Next, each representative group join the tournament according to his ability. The smart students solve the difficulty problems. Each playersrives for the best player. Based on the description above, it was needed to have a research entitled: Teams Games Tournament (TGT) for Improving the Student Interest in Mathematics.

Research Method

This research was a Classroom Action Research conducted collaboratively with the mathematics teacher of Klaten 2 Senior High School. The research model used in this study is action research model developed by Kemmis and Mc. Taggart. Each cycle of the action research includes four components as shown in the figure below.



Subjects of this research were students of class XA Klaten 2 Senior High School. The research objects were the process of mathematics learning with TGT and the students' interest in learning mathematics.

The instruments used by researchers to collect data in this study were researchers and questionnaire interest in learning mathematics. Data were analyzed with descriptive qualitative analysis. The score of students' interest towards mathematics are grouped according to the range of scores by categories such as in Table 3.1.

Table 3.1. Interest Category

Score Interval	Category
$Mi + 1,5 SDi < X$	Very high
$Mi + 0,5 SDi < X \leq Mi + 1,5 SDi$	High
$Mi - 0,5 SDi < X \leq Mi + 0,5 SDi$	Sufficient
$Mi - 1,5 SDi < X \leq Mi - 0,5 SDi$	Low
$X \leq Mi - 1,5 SDi$	Very Low

Mi= Mean

SDi = Ideal Standard Deviation

X = Score

Indicators of success in this research is 75% of students have a high or very high interest toward mathematics and the average percentage score of 70% interest in the ideal score.

Research Finding and Suggestion

A. Research Finding

1. Students's interest towards mathematics

This study was conducted in two cycles. The result of this research showed the description of the students' interest toward mathematics. Table 4.1. show a map of the criteria scores of high school students' interest Class XA N 2 Klaten 2011/2012 school year to mathematics.

Tabel 4.1. Peta Kriteria Minat Siswa Kelas XA SMA N 2 Klaten terhadap Matematika

Interest Category	Pre Cycle		Cycle I		Cycle II	
	n	Percentage	n	Percentage	n	Percentage
Very low	2	9%	0	0%	0	0%
Low	3	13%	2	9%	1	4%
Sufficient	6	26%	7	30%	3	13%
High	9	39%	13	57%	14	61%
Very high	3	13%	3	13%	5	22%
Total	23		23		23	

Table 4.1 indicates that at the pre-cycle, most students have a low interest toward mathematics. There are 2 students that have very low interest, 3 students have low interest, 6

students have sufficient interest, 9 students have high interest, and 3 students have very high interest towards mathematics. Figure 4.1 describe that result clearly.

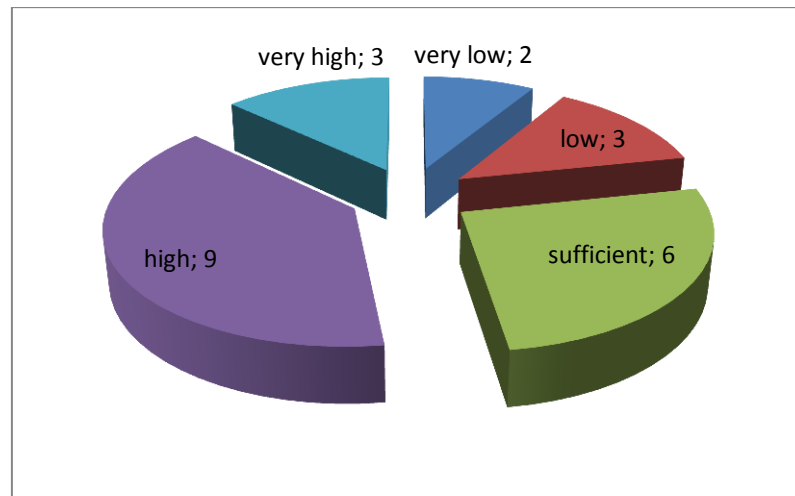


Figure. 4.1 Students' Interest toward Mathematics (Pre Cycle)

TGT was implemented at cycle I. In the end of this cycle, students' interest toward mathematics were measured. The category of students' interest toward mathematics are no students who have very low interest, 2 students have low interest, 5 students have sufficient interest, 13 students have high, and 3 students have very high interest towards mathematics (Figure 4.2). Based on pre-defined indicators of success, this research has not been successful, because there is only 70% of all students who are interested in the high and very high on the math and the average score of the student's interest is less than 70% of the ideal score.

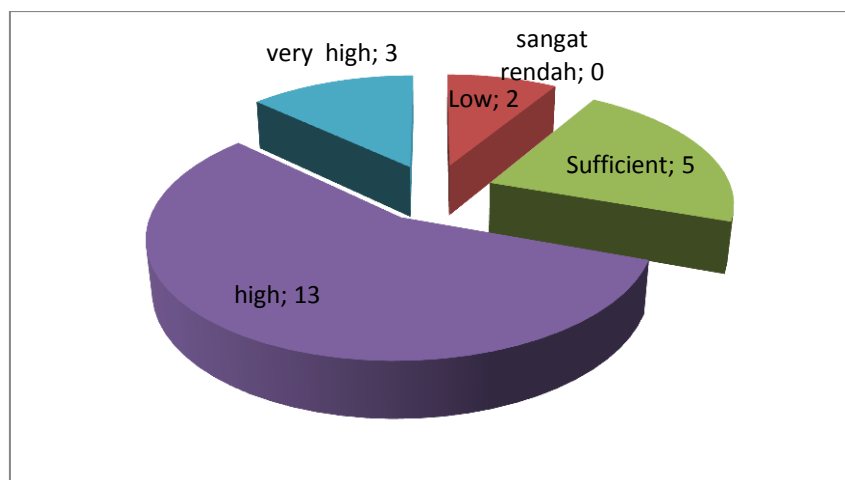


Figure. 4.2. Students' Interest toward Mathematics (Cycle I)

Researchers further reflect on their learning in cycle I. Here are reflections of the cycle I.

- 1) The division of the group is unefficient. The division of the group performed at the beginning of learning. The teacher read the studentsgrouping. It make the class unconditional and waste the time.
- 2) When solving problems, students intergroup collaboration. Some students are still unfamiliar with the previous study that they are allowed to work together to solve problems. In fact, the type of learning with the learning model TGT their friend is a rival to be defeated.

The result of reflectionsare used to determine corrective at the second cycle. Here arethe improvement efforts implemented at the second cycle.

1. The division of the group in the second cycle conducted at the meeting before the meeting at the second cycle. By this strategy, when learning the second cycle, students gather with their own group directly.
2. Before the tournament conducted, teachers told that students between groups are a rival. Thus, there is no collaboration intournament.

After the improvement in the second cycle, at the end of the second cycle showed that from 23 students, no student has low interest, 1 studenthas low interest, 3 students have sufficient interest, 14 students have high interest, and 5 students have very high interest towards mathematics (figure 4.3).

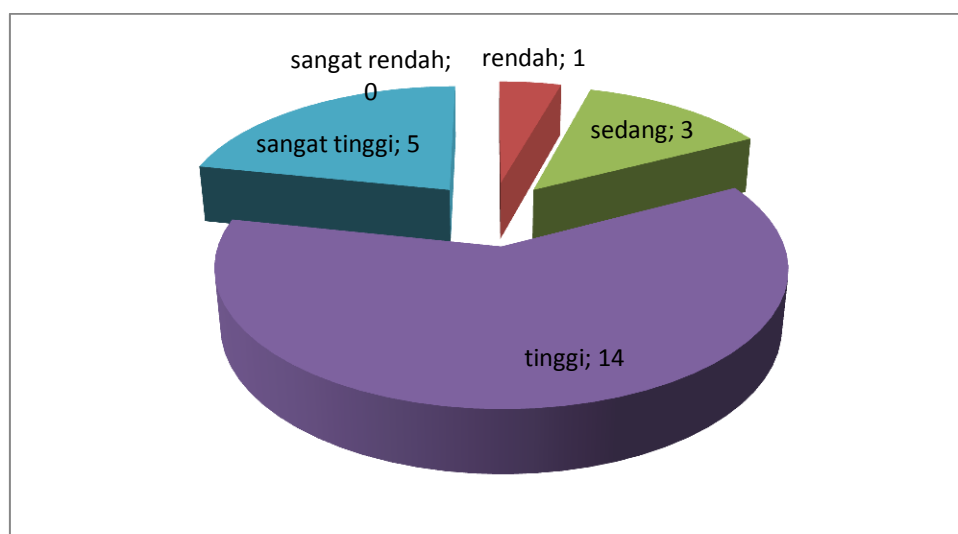


Figure 4.3. Students' interest toward Mathematics (Cycle II)

At the end of the second cycle, 83% of students have high and high interest towards mathematics. The average score of the students' interest in mathematics is 73% of the ideal score (Table 4.2). Based on the indicators of success, this research is successful.

Table 4.2. The Score of Students' Interest toward Mathematics

PreCycle		Cycle I		Cycle II	
Average	Percentage	Average	Percentage	Average	Percentage
40,91304	56%	41,6087	57%	53,08696	73%

The results of the reflection at second cycle show that TGT run well. There are conditional class. In addition, the group has been established a healthy tournaments between the groups.

2. Minimum Mastery Achievement Criteria (KKM)

Criteria for the minimum mastery in mathematic in SMA N 2 Klaten is 7.5. In this research, KKM has been reached in each cycle. At the first cycle, the average of KKM is 7.63 and the second one is 7.87 as presented in Figure 4.5.

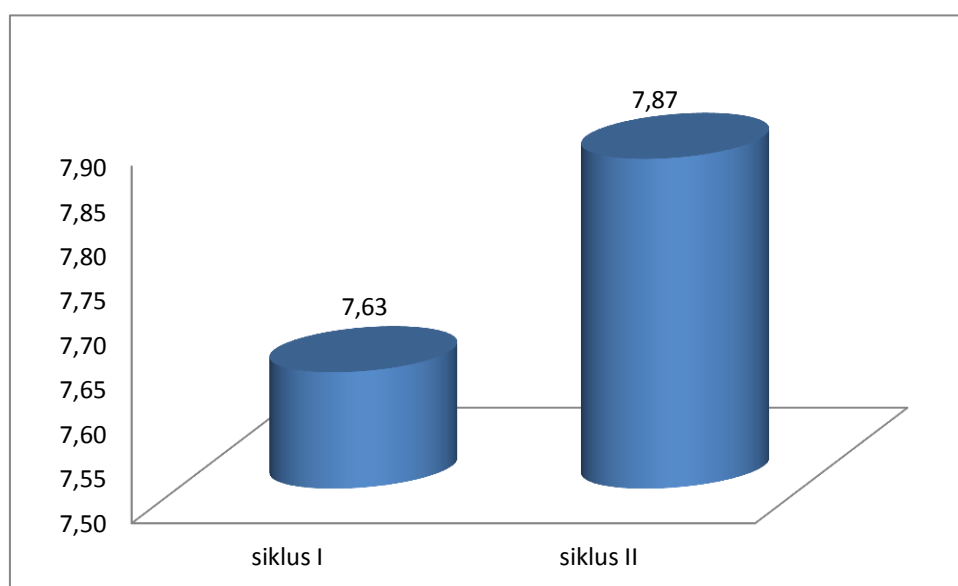


Figure 4.5. The KKM of Mathematics

Discussion

Students' interest towards mathematics includes students' interest towards mathematics and learning. Interest is one aspect of the affective domain has a significant role to the success of student learning (Begle, 1979: 87). Students who are interested in

mathematics tend to gain maximum learning results. To that end, the interest should be developed and improved. Increasing interest in a lesson can be done by applying learning involves the active participation of students (Woolfolk, 2009: 384).

Teams Games Tournament (TGT) is a cooperative learning model that involves the active participation of students. These lessons can be applied in mathematics. In this method, students are involved in the academic activities of the tournament.

Students of class XA of SMA N 2 Klatenat 2010/2011 academic year have problems related their interest in mathematics. At beginning, the average of students' interest towards mathematics was sufficient. Having implemented the mathematics learning with cooperative learning (TGT) in the class, there is increasing interest in the students towards mathematics. Having conducted in two cycles, the average interest of the students towards mathematics increased to very high.

Besides being able to increase the students' interest towards mathematics, TGT also increase the score of KKM mathematics students. KKM of mathematics at SMA N 2 Klaten is 7.5. The results showed that at the end of the first cycle, the KKM students are reached, 7.6 at cycle I and 7.87 at cycle II. This is suitable to Arends (1997: 111) that state that one goal of cooperative learning is to increase student academic achievement.

Based on the results of research and discussion, it can be concluded that the TGT can increase the students' interest toward mathematics at class XA of SMA N 2 Klatenat toward mathematics. In addition, TGT also able to improve the students' achievement of class XA of SMA N 2 Klaten.

Conclusion and Suggestion

A. Conclusion

Based on reflection during the study period can be concluded that TGT has capability to increase the students interest of students of class XA SMA N 2 Klaten 2011/2012 academic year.

B. Suggestion

Based on the results and findings of the research related to mathematics learning some suggestions are as follows.

1. To avoid boredom and to increase the interest of students towards mathematics, mathematics learning should be implemented with a variety of methods involving the active participation of students.
2. To achieve effective learning, teachers should prepare and implement a lesson plan carefully.

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DEVELOPING LEARNING KIT TO IMPROVE HOTS FOR FLAT SIDE OF SPACE COMPETENCE

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Abstract

This research was aimed to develop a learning kit for flat side of space competence to improve higher-order thinking skills using problem-based learning, consisting of valid, practical, and effective syllabuses, lesson plans, worksheets, and the valid and reliable of evaluation instrument i.e. test. The research is a development research (research & development), which was carried out by the implementation of Borg & Gall (1983) development model, which modified into three stages: preliminary study, product design, and development and evaluation. The result of validation by expert judgement shows that the developed learning kit is feasible to use with valid category. The aspects of practicality was falls into practical category based on observation of learning implementation, and teacher's and student's assessment. The aspect of effectiveness could be reached from the student's HOTS. The result of field tryout shows that student's HOTS category gets A at SMP Negeri 1 Daha Utara and B at SMP Negeri 2 Daha Utara.

Keywords: *development, higher-order thinking skills, problem-based learning*

Introduction

Higher-order thinking skills (HOTS) was really important for students because the characteristic of real life problems was complex, illstructured, novel, and needs thinking skills more than just aplicates what was studied. Students should be creative for making solutions of the problems what they faces in society. On the other hand, in UU number 20 year 2003 section 3 clarified that one of the functions and purposes of national education is developing student's potential to become human that have devout and pious to the one and only God, kind character, healthy, scholarly, skillful, creative, stand alone, and become democratic and responsible citizen.

Based on those laws, it's clearly known that higher-order thinking skills or we called HOTS of student's potential should be developed and improved. So, learning activity should be focus on reaching those HOTS.

Curriculum of 2013 today have prospects on inquiry-based learning by students (Permendikbud No.65 year 2013a, p.3). One of the suitable alternative learning models is

problem-based learning, because Rusman (2011, p.234) said problem-based learning makes teachers focusing their attention on developing inquiry skill.

Problem-based learning, or PBL for short, is one of the learning model that can improves student's problem solving skill. This thing explained by Herman (2007, p.52) on result of his research that in PBL activity, student's activity to learn was greater than teachers. Students commonly shows their great spirit and diligent for solving problems, actively discussing and helping each others in team, and not awkwardly asking questions or directions to the teaches.

HOTS like explained by Thomas & Thorne (Higher level thinking-It's HOT!, p.1) is thinking on higher level than just memorizing facts. HOTS requires students to do something with the facts. They must understand them, connect them to each other, categorize them, manipulate them, put them together in new or novel ways, and apply them as they seek new solutions to new problems.

HOTS in mathematics learning is very important, as clarified on BSNP (2006, p.139) that mathematics subjects gived to students to makes them have logical, analytic, systematic, critical, and creative thinking, also teamwork skill. On those documents also clarified that mathematics learning in school have purpose to make students have problem solving skills include skill of understanding problems, creating mathematics models, solving those models, and explaining solutions that was reached.

Mathematics learning, especially in junior high schools, also concerns on developing and improving HOTS. This thing explained on standar isi untuk satuan pendidikan dasar dan menengah (BSNP, 2006, p.140) that one of the purposes of mathematics learning in junior high schools is manipulating mathematics to makes generalisation, arranges evidence, and solves problems include skill of understanding problems, creating mathematics models, solving those models, and explaining solutions that was reached.

Based on TIMSS (Trends in international mathematics and science study) 2011 and PISA (Program for international student assessment) 2009 result show that Indonesia have lower position of 65 states, with weaknesseson (1) understanding complex imformation, (2) theorizing, analysing, and solving problem, (3) using tool and procedure to solve problem, and (4) doing investigation (Winataputra, 2013, p.6). This show that student's HOTS commonly still in low level.

In addition, based on Puspendik data about national examination report in last 3 years show that junior high schools state in Hulu Sungai Selatan regency getting lower significantly on graduate level, especially from year 2012 to 2013. Those result show that even total

students not graduated from year 2011 to 2012 decrease from 7 students (0.304%) become 1 student (0.040%), those number increase significantly for year 2012 to 2013 become 40 students (1.723%).

Based on those result show the important of teachers character on improving mathematics skills, especially student's HOTS. This conclusion supported by preliminary study was conducted on two junior high schools state in Hulu Sungai Selatan regency, i.e. SMP Negeri 1 Daha Utara and SMP Negeri 2 Daha Utara. Based on the result of HOTS test presented in those schools show that student's HOTS of 8th class whose contain total 97 students was not good yet. This conclusion can be seen from Table 1 below.

Table 1. Student's HOTS in Preliminary Study

HOTS Aspect	Score mean	Maximum score	Reachness rate (%)
Analysing	0.041	2.000	2.041
Evaluating	0.000	2.000	0.000
Creating	0.173	4.000	4.337
Critical thinking	0.378	2.000	18.878
Problem solving	0.122	2.000	6.122

Based on interview result of those two schools show that the teachers agree about focusing their learning for HOTS, but in the field reality they not implementing those learning yet. This result also supported by literature study result about learning kit what teachers uses, that until now teachers still using learning kit which is not specifically guide students for improving HOTS.

One of the efforts we can do to solving those problem is developing good lesson plan and specifically focus on student's HOTS. This thing agree with government law number 19 year 2005 section 19 poin 3 about lesson plan, including learning kit.

One of the learning model which is support in improving student's HOTS is PBL. This conclusion supported by research result conducted by Setiawan, Sugianto, & Junaedi (2012). The conclusion of their research show that activity and attitude of students in PBL can improve HOTS.

So, it's important to doing research about developing mathematics learning kit for improving HOTS in 8th class of junior high schools using PBL as one of the supporting alternative learning model.

Research Method

This kind of research is Research & Development. Developmental model used is Borg & Gall (1983) model which is modified into three stages, containing preliminary study,

product design, and development and evaluation. This research conducted in SMP Negeri 1 Daha Utara and SMP Negeri 2 Daha Utara from April to May of 2014.

The subjects on readiness study is 12 students and 6 teachers from combination of two schools from the place which is research conducted. The subjects on field tryout is 22 students from SMP Negeri 1 Daha Utara and 15 students from SMP Negeri 2 Daha Utara.

Analysis of the data in this study aims to answer the research questions. Data in the form of comments and suggestions were analyzed qualitatively, which are then used as input to revise the products developed. While the data obtained through the validation sheet, sheet teacher assessment, student assessment sheets, observation sheets feasibility study conducted, and evaluation instruments in parametric statistical analysis. To assess the feasibility of learning tools are developed in terms of validity, practicality, and effectiveness.

Data in the form of comments and suggestions were analyzed quantitatively, which is then used as the basis for revising the products developed. Data in the form of the rating scale of 5 is converted into qualitative data also scales 5. Categories of data conversion is performed based on the categories presented in Table 2 below (Azwar, 2010, p.163).

Table 2. Categories of validity and practicality of Products

Score interval	Categories
$(M + 1,50s) < \bar{x}$	A
$(M + 0,50s) < \bar{x} \leq (M + 1,50s)$	B
$(M - 0,50s) < \bar{x} \leq (M + 0,50s)$	C
$(M - 1,50s) < \bar{x} \leq (M - 0,50s)$	D
$\bar{x} \leq (M - 1,50s)$	E

Keterangan:

\bar{x} = mean score

M = meanscore ideal

$$= \frac{1}{2} (\text{maximum score} + \text{minimum score})$$

S = standard deviationideal

$$= \frac{1}{6} (\text{maximum score} - \text{minimum score})$$

Learning kit as valid for use in the trial if the validity of the scores of each learning device having at least a valid category (B). Thus, the results of the analysis of data that do not meet the minimum valid category in this study will be considered to revise the learning device before tested.

While the practicality of the analysis, the study said practical if the score obtained from the questionnaire assessment of learners and teachers and observation sheets feasibility study has practical minimum category (B).

Effectiveness analysis was conducted to determine whether the device is prepared to comply with the learning effectiveness category, which is able to improve the achievement of basic competence, and are able to develop learners HOTS minimum B, through experimentation.

In the experiments conducted, there are some calculations to measure the effectiveness of learning tools are developed, starting from the assumption test analysis, normality test, homogeneity test, test the effectiveness of the learning of each class, and the latter assumption test the effectiveness of learning. Test the effectiveness of this learning assumption can only be done after all the testing analysis assumptions are met.

Test assumptions of analysis is a series of tests conducted prior to test the assumption that the learning effectiveness of the developed device. Test assumptions include normality test, homogeneity, and test the effectiveness of each class learning trials. This test using statistical software SPSS version 22.

Research Findings and Discussions

The results of the development of learning kit such as geometry flat side to improve HOTS include syllabus, lesson plans and worksheets are valid, practical, and effective, as well as the instruments are valid and reliable evaluation. The design of each of the products developed are described in the following description.

Validation is done by two expert material. At the beginning of the product validation process, the validator to provide input and assessment of learning tools are developed. Validator provide an assessment of the learning device by using the validation sheet which has been validated previously. The results of the validation study by experts material is presented in Table 3 below.

Tabel 3. Score of Validation Result for Learning Kit

Validator	Product score which was validated			
	Syllabus	Lesson plan	Student's worksheet	Evaluation instrument
1	90	152	66	228
2	95	150	76	223
Sum	185	302	142	451
Chategory	Valid	Valid	Valid	Very Valid

Estimation of reliability conducted on an evaluation instrument developed. This estimation is done by performing a test using the evaluation instrument to the ninth grade at each school where the study took place. Based on the results obtained, the coefficient alpha

for pretest multiple choice questions was 0.79, while the post-test multiple choice questions amounted to 0.78, and in the form of a description about the HOTS obtained an alpha coefficient of 0.78.

Maximum score results of the assessment of learning by teachers as a whole is 810. Based on 6 ratings teachers obtained a total score of 675 so that the assessment is developed learning tools are included in the category of very practical. The results of the analysis of teacher assessment data for learning devices developed, including syllabi, lesson plans, worksheets, and evaluation instruments, in more detail can be seen in Table 4 below.

Table 4. Results of Data Analysis Teacher Assessment Questionnaire

Teachers	Product score which was validated			
	Syllabus	Lesson plan	Student's worksheet	Evaluation instrument
1	32	31	34	24
2	30	28	30	22
3	30	29	31	23
4	32	28	30	22
5	28	26	26	18
6	32	32	34	23
Total	184	174	185	132
Chategory	Very practical	Very practical	Very practical	Very practical

Based on teacher ratings in Table 4 concluded that all the learning tools that include syllabi, lesson plans, worksheets, and evaluation instruments fall into the category of very practical, so that the learning device is said to be practically developed.

Analysis of student assessment data is accomplished by converting the data from the quantitative scores obtained into qualitative data. Assessment of learners in the form of a questionnaire distributed to 12 students consisting of learners men and women by category of high, medium, and low in each school. The results of the analysis of the developed learning obtained an average score as in Table 5 below.

Table 5. Results of Data Analysis Questionnaire Assessment Learners

Learning kit	Score	Chategory
Student's worksheet	255	Very practical
Evaluation instrument	101	Very practical

In more detail, LKS said to be very practical if the scores obtained exceeds 240, while the evaluation instrument said to be very practical if the score exceeds 96. Based on the results obtained learner assessment concluded that the learning device consisting of LKS and evaluation instruments fall into the category of very practical.

Analysis of practicality also be done by converting the quantitative data from the score sheet observations obtained feasibility study into qualitative data. Percentage results of these observations can be seen in Table 6 below.

Table 6. Observations of Learning

Meeting	SMP Negeri 1 Daha Utara	SMP Negeri 2 Daha Utara
1	42,86	57,14
2	42,86	57,14
3	71,43	71,43
4	71,43	71,43
5	71,43	85,71
6	71,43	100,00
7	100,00	100,00
8	100,00	100,00
Mean	71,43	80,36
Category	Very practical	Very practical

From Table 6 shows that the feasibility of learning using learning tools developed in the experimental class in Junior High School 1 North Daha are in the category of practical, sedangkan the experimental class in Junior High School 2 North Daha are in the category of very practical. From the results it can be concluded that the developed learning device meets practicality category.

Analysis of the effectiveness of learning in this study viewed from two aspects, namely the test results HOTS aspects of learning and learners.

Test for normality using the Shapiro-Wilk test for many students of each class of less than 30 people, and the homogeneity test using independent samples t test. Data were analyzed as a prerequisite of this is data pretest experimental class and control class from each school. This test using statistical software SPSS 22. Results of normality test pretest can be seen in Table 7 below.

Table 7. Results of Normality Test for Pretest

		df	Significance
SMP Negeri 1 Daha Utara	Experiment class	22	0,620
	Control class	23	0,688
SMP Negeri 2 Daha Utara	Experiment class	15	0,412
	Control class	13	0,643

From Table 7 shows that the significance value of the Shapiro-Wilk normality test in fourth grade more than the value of alpha ($\alpha = 0.05$) so that it can be concluded that the value of the fourth grade pretest the normal distribution. Furthermore, the homogeneity test results can be seen in Table 8 below.

Table 8. Summary Result of Homogeneity Test for Pretest

		F Levene
SMP Negeri 1 Daha Utara	Score	0,000
	Significance	0,994
SMP Negeri 2 Daha Utara	Score	1,677
	Significance	0,207

Prior to test the effectiveness of the learning assumptions, which will be measured post-test scores should be normally distributed population. Normality test is also using the Shapiro-Wilk test. Following is a summary of the SPSS output for each class normality test post-test for each school.

Table 9. Summary Result of Normality Test for Postest

		df	Significance
SMP Negeri 1 Daha Utara	Experiment class	22	0,057
	Control class	23	0,157
SMP Negeri 2 Daha Utara	Experiment class	15	0,224
	Control class	13	0,174

From the table above shows that the significance of the Shapiro-Wilk normality test on the four classes of more than alpha ($\alpha = 0.05$) so that it can be concluded that the population is normally distributed.

From Table 10 shows Levene F test of significance of less than 0.05 (α value) for SMP Negeri 1 North Daha and more than 0.05 for 2 Daha North Junior High School, so it can be concluded that the post-test scores between the experimental class and the control class in junior high school School 1 North Daha not homogeneous, and the North junior High School 2 Daha homogeneous

Table 10. Summary Result of Homogeneity Test for Postest

		F Levene
SMP Negeri 1 Daha Utara	Score	5,355
	Significance	0,026
SMP Negeri 2 Daha Utara	Score	0,013
	Significance	0,911

The last step before making the assumption test the effectiveness of learning is to test the effectiveness of each class of learning research. This assay uses paired samples t test, because the comparison is a correlation between the rise and the data pretest posttest data for each class. The following results were obtained.

Table 11. Summary Result of Paired-Sample t Test

		Experiment class		Control class	
		Correlation	t	Correlation	t
SMP Negeri 1 Daha Utara	Score	0,682	10,487	0,867	11,333
	Significance	0,000	0,000	0,000	0,000
SMP Negeri 2 Daha Utara	Score	0,564	11,145	0,737	11,628
	Significance	0,028	0,000	0,004	0,000

From Table 11 shows that the value of the fourth-class correlation was positive and significant correlation of the four classes is less than alpha ($\alpha = 0.05$) that qualifies for the paired t test. Furthermore, from signifikansi t seen that the fourth class has significance not less than alpha ($\alpha = 0.05$) so that it can be concluded that the teaching of the four classes effectively.

After all testing requirements analysis in the experimental class and control class at each school are met, then it can continue to test the assumption that the learning effectiveness of the developed device. This test aims to compare the post-test between the experimental class and the control class to find out which one is superior class after class of experimental treatments imposed. The treatment in question is the use of learning tools are developed. Data results of statistical tests on the posttest values are summarized in Table 12 below.

Table 12. Summary Result of Homogeneity Test for Posttest

		t
SMP Negeri 1 Daha Utara	Score	2,564
	Significance	0,014
SMP Negeri 2 Daha Utara	Score	3,309
	Significance	0,003

In addition to the views from the achievement of competence of learners through multiple choice questions, the effectiveness of the learning device is also seen from the aspect HOTS achievement of learners. Scores of matter in the form of quantitative description of converted into qualitative. Learners are said to have HOTS category B if the scores obtained are in the range $58.33 < X \leq 75,00$. In summary, the overall scores for the learners HOTS aspect of the answer to the problem description of the learners are presented in Table 13 below.

Table 13. Achievement for HOTS Aspect of Students

School	class	Total of Students Who Have Good HOTS		Total of Students	Percentage of Students Who Have Minimal HOTS B at posttest (%)
		Pretest	Posttest		
SMPN 1 Daha Utara	Experiment	0	20	22	90,91
	Control	0	2	23	8,69
SMPN 2 Daha Utara	Experiment	0	13	15	86,67
	Control	0	0	13	0,00

From Table 13 it can be concluded that overall, the experimental class was better than control classes for each school. It can be concluded that the developed learning tools are effective in improving learners HOTS.

Conclusions and Suggestions

The conclusion of this study is the result of the development of learning geometry in the form of the flat side consists of syllabi, lesson plans, and worksheets valid, practical, and effective, as well as an evaluation instrument that is valid and reliable for use. Aspects of the validity of the study in terms of the assessment of the experts and achieve a valid category. Practicality of achieving practical aspects of categories in terms of adherence to the observation of learning, teacher assessment, and the assessment of learners. Aspects of effectiveness has been achieved in terms of competence and achievement of learners HOTS. The results of field trials showed that the experimental class is better than the control class views of the achievement of competence, and HOTS students in the experimental class achieve minimum category B.

Some suggestions can be put forward in this study is that the learning device is fit for use by junior high school teachers, especially in mathematics learning in class VIII in the wake of competence flat side room, and the device can be used as an example of learning by junior high school math teachers who want to develop on other competencies as well as other subjects of learning activities that can be designed with a focus on improving the learners HOTS.

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DEVELOPMENT STRATEGY OF TEACHERS' TEACHING PROFESSIONALISM

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Abstract

Improving the quality of education is the main priority in developing education in Indonesia. One of the factors that determine the quality of education is the teacher. Improvement of the quality of education is characterized by increased students' achievement, and it can only be achieved through teaching professionalism of teachers. Therefore, to improve the quality of education, the first step that must be conducted is to improve the teaching professionalism of teachers. The purpose of this study is to describe the determinant factors that determine the professionalism of teachers' teaching. The study used descriptive research design. Samples were 90 teachers and 28 principals in East Java, taken by using a quota random sampling technique. The data collected by questionnaires, interviews, and documentation, and analyzed by descriptive statistics, correlation, and qualitative data analysis. The results showed that there are six strategies to improve the professionalism of teachers' teaching, namely use proper supervision approach, effective supervision techniques, positive supervision principles, and supported by good facilities, good media, competent supervisors, and relevant places. The collaborative approach is the most appropriate supervision approach, but it also needs to be adapted to the characteristics of the teachers. The most effective technique provide learning experiences widely for teachers, and its implementation is based on the positive principles, for example, democratic, scientific, cooperative, creative, and constructive. The good facilities, relevant media, competent supervisors, and good places also contribute to the professionalism of teachers' teaching. The use of positive principles is the most decisive factor to improve the professionalism of teachers' teaching. The professionalism of teachers' teaching include the ability to know the learners' characteristics, mastery of the learning principles of learning, curriculum development capabilities, the quality of the learning process, ability to develop the learners' potency, communication skills, evaluation skills, mastery of material, personality, and ability to develop themselves.

Keywords: Approaches, Techniques, Principles of Supervision, Teaching Professionalism of Teachers

The quality of education is still not considered good today. It is characterized by low students' achievement, decrease students' behavior, low students' ability, the number of school leavers who are not ready to use, and low students' achievement at the international level. Based on the results of measurements of the Human Development Index in 2011, Indonesia still ranks 108 of 169 countries surveyed in the world.

In educational components, one of the factors that affect on improvement of quality of education is teacher. The teacher is central in improving the quality of education. Improvement of the educational quality is characterized by increasing students' achievement. The level of students' achievement is determined by the teacher. If the teacher is able to teach well, the students' learning process will be implemented well, and can lead to greater students' achievement.

Today, the level of teachers' professionalism in teaching has not been excellent. Results of teacher competency test held in 2012, professional skills and pedagogical skills of teachers is low. Hence, in order to improve the quality of education, the main steps that need to be done is to improve the professionalism of teachers' teaching. To improve the professionalism of teachers' teaching can be conducted through effective teacher development.

Teacher development is the process of providing assistance to teachers, either in the form of guidance, stimulation, or other activities forms, with the aim to enhance the teacher's ability to perform their duties, especially task of teaching. The teacher development activities have been carried out at all levels of education, both primary and secondary education. However, according to some studies, the goal is still not achieved optimally. The study of Suryadi and Tilaar (1993) showed that the teacher development activities that have been implemented have not effected on improving teachers' teaching ability. This is consistent with the results of Kummerer study (1990) also showed that most teachers still had not achieve standard qualifications of professional teacher. The finding of Wiyono and Maisyaroh (2007) also did not show the different results. Based on these results, it would need to be found effective strategy to develop the professionalism of teachers' teaching.

The government has been implementing several policies to improve the professionalism of teachers' teaching, through teacher certification programs, teacher performance appraisal, induction programs for beginning teachers, or continuous professional development, but the policy, yet equipped with the operational techniques in fostering effective teacher. In fact, based on some results of recent research conducted, the policy could not be implemented effectively and still has not shown success as expected.

Based on the Regulation of the Minister of Administrative Reform and Bureaucratic Reform Number 16 in 2009 has been mentioned that the continuous professional development of teachers can be done in three ways, namely self development, scientific publications, and innovative work, but what is the relevant approach can be used, what are

techniques can be applied effectively in conducting professional development of teachers has not been formulated. Therefore, it is necessary to find a strategy that is effective for developing professionalism of teachers based on factors that affect on teachers' performance. Based on these rationales, the research was conducted.

The purpose of this study was to: (1) to describe the experience of teachers development, in terms of the principles, techniques, approaches, and other attributes that have been implemented, (2) to find variables that affect on the professionalism of teachers' teaching viewed from the principles, techniques, approaches, and other attributes of teacher development side, and (3) generating effective development strategy to improve the teachers' professionalism in implementing teaching learning process.

Method

This study aims to find a strategy for effectively developing professionalism of teachers' teaching based determinant factors of teachers' performance. The study used descriptive design. The research process was conducted through several stages, namely, designing the study, collecting data, analysing and interpreting data, and finding effective strategies to improve the professionalism of teachers' teaching. The professionalism of teachers' teaching viewed from several aspects, namely the ability to know the characteristics of learners, mastery of theory and principles of learning, curriculum development capabilities, the quality of the learning process, the ability to develop the learners' potency, the communication ability, evaluation ability, mastery of material, personality, and the ability to develop themselves.

The study was conducted on two cities in East Java, that are, Batu and Blitar. Samples were taken at 118, which consisted of 90 teachers and 28 principals of Kindergartens, Elementary Schools, Junior High Schools, Senior High Schools and Vocational Schools, which 57 samples were taken from Blitar and 61 samples were taken from Batu. The sampling technique used quota random sampling.

The data was collected by questionnaires, interviews, and documentation. Questionnaire technique was used to collect data of the implementation of teacher development, both in terms of approaches, principles, techniques, and other attributes as well as the professionalism of teachers' teaching. Interview techniques, used to collect data of the implementation of teacher professional development in deeper. Documentation techniques,

used to collect documentative data, for example about school conditions, characteristics of teachers and principals, and the result of teachers professional development.

In accordance with the data collection techniques, the instruments are developed based on the study variables. To obtain a good validity and reliability, development of the instruments is done carefully. In addition, the instrument also be tested empirically. The results of the analysis showed that the instruments have good validity. The results of Cronbach alpha reliability analysis also showed good results, with reliability coefficient of the instruments were > 0.7 .

Based on the research objectives and the type of data, there were three data analysis techniques used in this research, that are, descriptive statistics, correlation, and analysis of qualitative data. Descriptive statistics were used to describe implementation of development of professionalism of teachers' teaching and teachers professionalism. The correlation analysis was used to examine correlation between the variables, and the qualitative data analysis techniques was used to analyse qualitative data.

Research Finding And Discussions

Determinant Factors of Teachers' Teaching Professionalism

The present study was undertaken to find effective development strategy of teachers' teaching professionalism based on determin at factors of teachers' performance. The results of data collecting were analyzed by descriptive statistics, correlation, and qualitative data analysis. The first step is studying development or supervision techniques, which are analyzed in terms offer quency and variety of techniques, as well as effectiveness of the supervision techniques.

Based on the analysis, it can be concluded that the teachers had experience in teacher development activities through various supervision techniques. The most supervision technique sthat followed by teachers are meetings, teacher group meetings, peers discussion, upgrading, ands eminars. All of the supervision techniques are quite effective, however, the technique hat has highest effectiveness score is teaching demonstration, followed by teacher group meetings, training, self-development, action research, teacher meetings, classroom visitation, peers discussions, upgrading, clinical supervision, in on in activity, teaching simulation, lesson study, and comparative studies. Thus, techniques that have high

effectiveness are more emphasize the active learning of teachers and supervisors in the process of development.

Most teachers accept or follow the teacher professional development by collaborative approach, non-directive, and directive. Based on data analysis results, collaborative approach is the most effective approach, followed by non-directive approach, and directive approach. It shows that most teachers consider collaborative approach is the most appropriate approach, and second approach is the non-directive, and the lowest position is the directive approach.

In development process, the teachers are developed by several supervisors, namely, principals, school super intendants, facilitators or teachers themselves. When analyzed in terms of the effectiveness of supervisors, can be concluded that the most effective supervisor is teachers themselves, followed by principals and facilitators, and in the third rank are by school super intendants and teacher colleagues. Thus, from the side of supervisors, the teaching professional development of teachers is most effectively supervised by principals or self-development by teachers themselves.

According to the most of teachers, the best place for developing teachers professionalism is at schools. Secondly, it is at teacher group meeting place, and thirdly, is at education offices. Places used for incidental teacher development activities, such as, at Education Quality Assurance Agency offices, or at college offices, are at the third position.

Most of the development activities that had been followed by teachers, tend to apply the principles of good supervision. These principles include friendly, democratic, cooperative, referring to the purpose, scientific, open, creative, and constructive. Some of the principles are still relatively less applied is the use of supervision instruments, provide an opportunity for teachers to evaluate themselves or doing reflection, and provide welfare support.

In teaching competency, based on the data analysis, it can be concluded that firstly, teachers need improving professional competency. Most of teachers need increasing mastery of subject matter. Secondly, they need improving pedagogical competency, for example, the ability to write an instructional design, to use teaching strategies and methods, to use instructional media, or ability to implement evaluation. At last, most of teachers need improving personal competence and social competence.

Based on the correlation analysis results between predictor variables and criteria variables, it can be concluded that there are no significant correlation between techniques,

principles, approaches of supervision, supervisor characteristic, supervision place, and professionalism of teachers' teaching. Nevertheless, there was a generally positive relationship. Of the various components, the use of the supervision principles have the highest correlation value, followed by the supervision approach and the supervisors characteristic. In conclusion, the finding of the descriptive analysis can be a major consideration in developing strategies for improving professionalism of teachers' teaching ideally.

Development Strategy of Teachers' Teaching Professionalism

Based on the results, it can be concluded that the effective development strategies of teachers' teaching professionalism were conducted through four stages, that are, needs assessment, planning, implementation, evaluation, and follow-up of teacher development program. From needs assessment up to evaluation and follow-up, need good coordination among units or institutions related to the development activities of teachers' teaching professionalism.

The first step that must be done in implementing teacher development is to conduct needs assessment. The objective of needs assessment is to find teachers' needs. The needs assessment can be done through observation, questionnaires, interviews, or documentation.

Based on the needs assessment results, it's drafted planning of effective teacher professional development. It is necessary to make good coordination, so that, there is no overlap of teachers development activities. The steps of planning include formulating goals, designing materials, choosing teachers as supervisee, assigning supervisors or facilitators, making supervision schedule, preparing supervision facilities, assigning the media, and developing evaluation instruments.

After completing planning, then, implementing the program of teachers development activities. The implementation must refer to the planning. There are several principles to implement the teachers development, that are, democratic, cooperative, referring to the goal, cooperation, constructive, harmonious, prosperous, objective, and open.

In addition, it should use effective supervision techniques, such as teaching demonstrations, workshops, upgrading, training, or teaching simulation. These techniques emphasize teachers' active learning, collegiality, and it's conducted at long time.

In another sides, the development of teachers' teaching professionalism, also need to use the right approach. Based on the results of data analysis, the most appropriate approach is the collaborative approach, however, it also needs to be adapted to the characteristics and capabilities of teachers.

After implementation of teachers' development program, the next step is to carry out the evaluation of teachers' development. There are four types of evaluation are applied, namely, the reaction evaluation, evaluation of learning, evaluation of behavior, and evaluation of results. The reaction evaluation aimed to evaluate the teachers' development process. The learning evaluation is to measure learning outcomes directly as a result of the development. Evaluation of behavior intended to further the results of teachers' development at schools. The evaluation of the results directed to measure the end result of development activities, namely, improving student learning outcomes. Based on the evaluation results, can be conducted further development program planning. It is as follow up of the teachers' professional development program.

These research finding is accordance with several previous studies. Based on the results of previous studies show that effective teacher professional development requires a relatively long time, and needs to be done continuously. The study of Mc Gregor & Gunter (2006) showed that the teacher development program implemented in quite a long time, which is for two years, can improve teachers' pedagogy competence. The development program, including intensive training activities and school visitation.

These results are also consistent with the research finding of Bisset & Nichol (1998) which shows that the course of material comprehension for 20 days had a significant impact on the improvement of teacher knowledge and instructional practice in the classroom. The development activities are not only in the class, but also require field visitation. The results showed that the technique of in-on-in is an ineffective technique in improving the professionalism of teachers.

On the other hand, the findings of Leonard and Marquardt (2010) showed that action learning is a learning model that is very effective to enhance the ability of practitioners. Some characteristic of action learning is a lot to ask, emphasize on practice, group interaction, exchange experience, and learning from experience (experiential learning). The result is in accordance with the results of this study that emphasize collaborative approach in the

process of teacher development, emphasize on practice, and interaction between teachers and supervisors.

On the other hand, the study results of Dhillon & Moreland (1996) also showed that an effective teacher professional development, which can contribute to the achievement of student learning outcomes, provide practical activities, collegial development, and optimal learning responsibility. In accordance with the results, findings of Reed and Nyabanyaba (2002) also showed that the effective technique for improving teachers professional competences emphasize reflection on practice. These results concur with this results that effective teacher professional development provides an opportunity to take much active involvement activities, emphasizes collegiality and practices.

These results are also consistent with the findings of Neil (2006) which found that effective in-service education model have four characteristics, namely: (1) focus more on collaboration, (2) relating to the needs of teachers, (3) held in right place, and (4) is done through induction of new teachers. This study is very consistent with the results of this study, which emphasizes the collaborative, collegial development, in accordance with the needs of teachers, and implemented in the right place.

Results of the research of Wiyono (2000) showed that most of the teachers were more suited to the leadership style of human relations oriented and integration of human relations oriented and tasks oriented than other leadership styles. Teachers have higher morale under human relations-oriented leadership style and the integration of human relations oriented and task oriented than other leadership styles. The study result, consistent with this finding that the collaborative approach is the most appropriate approach for the professional development of teachers.

Conclusions and Suggestions

Conclusions

Based on the results, it can be concluded that teachers have participated in various supervision techniques. The effective technique emphasize involvement of teachers and supervisors in development activities, collegial, and independent. Several techniques have a high effectiveness are teaching demonstration, teacher group meetings, training, self-development, action research, teacher meetings, classroom visitation, peers discussions,

upgrading, clinical supervision, activities of in on in, teaching simulation, lesson study, and comparative studies.

Most teachers also have to follow various supervision approach. Based on the data analysis results, collaborative approach is the most appropriate approach for teachers. Teacher characteristics are mostly situated on the middle level, both in terms of the competence or motivation. Several teachers have a high competence, but their motivation are low, and the others have a high motivation bu tlow competence. The collaborative approach is appropriate approach to improve the professionalism of teachers' teaching.

Teachers also follow development activities by various supervisors. Based on the data analysis results, the most effective development is self directed, then by principals and facilitators, school super intendent, and teacher colleagues. Thus, the most effective person to develop the professionalism of teachers' teaching, besides self development, is the principal. The best place of development is conducted at the school, with enough time, and carried out continuously. The principle of supervision is the highest aspect in determining the effectiveness of teacher professional development. Hence, in carrying out professional development of teachers' teaching, supervisors must use the appropriate principles, for example, friendly, democratic, referring to the objective, cooperative, constructive, scientific, reflective, harmonious, and open.

The steps of effective technique have been conducted through five stages, that are needs assessment, planning, implementation, evaluation, and follow-up of teachers development program. Starting from needs assessmen to evaluation and follow-up, it needs good coordination between related elements.

Suggestions

Based on the findings of the study, it can be presented some suggestions. Firstly, the professionalism of teachers' teaching is still not optimal. Teacher professional development activities undertaken have not been proven effective. Hence, it is necessary to use an effective strategy of teacher professional development.

Secondly, the results of exploration, there is lack of coordination in the implementation of professional development of teachers. Therefore, it need good coordination among related institutions or elements. Heads of education offices, heads of education quality assurance ofiiices, super intendents, principals, and teachers must make

good coordinat in in needs assessment, planning, implementation, evaluation, dan follow-up of teachers development program.

Thirdly, the results of the study found that there are several aspects that must be considered in carrying out professional development of teachers' teaching, that are, approaches, techniques, principles, characteristics of supervisors, time and place. These components, need to be properly held, especially supervision principles, that have contributed greatly to the improvement teachers' teaching professionalism.

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THE EFFECT OF QUESTION PROMPTING AND LANGUAGE ABILITY ON THE QUALITY OF STUDENTS' ARGUMENTS

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Abstract

This research examines the effect of question prompts on the quality of arguments written by students with high, moderate, and low language abilities. The research is conducted with a pretest-posttest non-equivalent control group design, focusing on finding the answers to two research questions: a) What are the significant differences between the quality of arguments written by students who use question prompt scaffolding and those who teach with an expository method? b) What are the significant differences between the quality of arguments written by students with high, moderate, and low language abilities? Data is gathered by conducting pre- and post-argumentative tests, which is scored with an adapted version of the Rubric of Argument Quality from Cho and Jonassen (2002). The scores of the quality of students' arguments are then analyzed with a mean differential analysis. The results of the study indicate that: a) there are significant differences between the quality of arguments written by students who use question prompt scaffolding and those who teach with an expository method; b) there are no significant differences between the quality of arguments written by students with high, moderate, and low language abilities.

Keywords: *Question Prompt Scaffolding, The Quality of An Argument.*

Introduction

The ability to evaluate and make well-founded arguments – as a basis in obtaining critical thinking competence – is an important learning outcome in the educational process in various countries. This skill is closely related with various high-level learning outcomes like the ability to think at a high level and solve ill-structured problems (Goodlad, in Marzano, 1988; Tan et al., 2001; Nussbaum, 2002; Shin & McGee, 2004; Kuhn, 2003; Shin & McGee, 2004; Marttunen et al., 2005; Simon et al., 2006; Chang, 2007; Pinkwart, 2008; Abbas & Sawamura, 2009; Easterday, 2010; and Chase, 2011).

In Indonesia, having a critical thinking ability is also applied as one of the competences that must be mastered by students, starting from the elementary and middle school levels until the tertiary educational level (National Education Department a, 2006; National Education Department b, 2006). Now, the 2013 Curriculum also emphasizes a high order thinking domain as a learning goal, which also covers the development of a critical thinking ability in students (National Education Department, 2013).

According to Paul (in Marzano, 1988) critical thinking can be differentiated into two characteristics: a “weak sense” and a “strong sense”. Critical thinking behavior that is lacking in sensitivity occurs when a person uses one’s primary analytical and argumentative abilities to attack and criticize another person who has a different way of thinking. In contrast, a person who thinks critically with sensitivity awareness is not blinded by his/her own viewpoints and is able to realize the significance of considering rebuttals to one’s own insights. Education should be directed to develop a strong sense of critical thinking. In the Pancasila course, students are also expected to develop their analytical abilities and expand their arguments about democratic civics issues in a respectful manner or arguments that heed others’ feelings.

An argument can be defined as a position that is adjusted through cognitive reasoning based on evidence or foundations (Toulmin, 2005). In other words, there are three primary elements in an argument, which are position/claim, evidence / position framework, and reasoning that justify a logical argument between its basics and position. Besides the three primary elements above, Toulmin (2005) stated that there are three other components from a supporting reasoning argument, modal qualifier, and rebuttal. An argument is considered good, sound, or high quality if (a) the position is clear and complete; (b) the foundation of its establishment is relevant and sufficient as a basis; (c) the reasoning is relevant and sufficient to gain backing; (d) the supporting evidence behind the reasoning is clear, relevant, and specific; as well as (e) it considers rebuttals that may be contra to the argument, so that (f) it uses proper modal qualifiers (Cerbin, 1988).

Although competence in building an argument is an important learning outcome, a number of studies reveal that in general students are unable to build cogent arguments (Cerbin, 1988; Jonnassen, 1999; Tan et al., 2001; Marttunen et al., 2005; Erduran et al., 2006; Simon et al., 2006; Chase, 2011). Erduran et al. (2006) found that even science program graduates are usually unable to provide proof and justification for their claims. Simon et al. (2006) and Chase (2011) stated that based on the national evaluation results in the USA in 1996, 1998, and 2008, about 40% of 12th grade students did not have the skills to make written arguments.

Therefore, now many learning methods have been developed to improve argument building proficiency (Cerbin, 1988; Cho & Jonassen, 2002). Cho & Jonassen (2002) revealed that nowadays an argument mastery scaffolding has been developed in the form of cognitive tools, like the Sherlock program made by Lajole and Lesgod as well as CSCA (computer-

supported collaborative argumentation). In addition, there is also an argument map from Nussbaum (2002) called 'Quest-Map'; a 'constrain-based argumentation tool' from Tan et al. (2001); 'peer challenge' guidance, 'self-monitoring' guidance, and 'self-monitoring' without guidance as historical learning scaffolding from Choi (2004); and 'online argumentation scaffolds' from Cho & Jonassen (2002). Pinkwart et al. (2008) developed the LARGO program, which is a legal argumentation program that assists students in making an oral argument diagram that is contained in the United States Supreme Court transcript. Meanwhile, Abbas and Sawamura (2009) developed the ALES program to aid students in developing their arguments.

Based on the need to develop students' critical thinking ability through refining their argument building above, research about the influence of using scaffolding (learning assistance) on the quality of students' arguments in the Pancasila course is conducted.

This research focuses on answering two research questions: a) Are there significant differences between the quality of students' arguments when they learn with guided questions as learning assistance compared with students who learn with a conventional method in the Pancasila course? b) Are there significant differences between the quality of students' arguments when they have good mastery of Indonesian language compared with those students who have low mastery of Indonesian language in the Pancasila course?

The two hypotheses tested in this research are: a) There are no significant differences between the quality of students' arguments when they learn with guided questions as learning assistance compared with the quality of students' arguments when they learn with a conventional method in the Pancasila course; and b) There are no significant differences between the quality of students' arguments when they have high, moderate, and low mastery of Indonesian language in the Pancasila course.

Research Method

This quasi-experiment research is conducted with a pretest-posttest non-equivalent control group design. The population for this study is Satya Wacana Christian University (SWCU) Information Technology Faculty (FTI) students in the *Pancasila* course. There are approximately 600 students divided into 10 parallel classes. From this population, 2 classes are chosen randomly as the research sample / experiment class with a total of 121 individuals.

To measure the ability of students to build their arguments, an argument making test is developed that functions as a pretest and posttest instrument. Meanwhile, to measure

students' language mastery, the same test used by Satya Wacana Christian University to select new potential students is applied. In other words, the data source of this research is 2 student classes of the Pancasila course.

The data gathering is conducted through a pretest to discover the quality of students' arguments before they are given treatment and a posttest to find out the quality of students' arguments after undergoing the experiment treatment. The same pretest and posttest instruments are used. Data is collected through a pretest and posttest by using an argumentative test. The test results are then given a score with the Argument Quality Evaluation Rubric that is adopted from the Rubric of Argument Quality that was developed by Cho and Jonassen (2002).

To test the two hypotheses above, a Mean Differential Test statistical analysis is used (Hair Jr. et al., 1995) by applying the SPSS 15.0 for Windows analytical program. A significant range of 0.05 is established. Before conducting the variant analytical test, a conditional fulfillment test or assumption test, also known as a normality test and homogeneity test, is carried out. The data distribution normality test is conducted by using Kolmogorov-Smirnov and Shapiro-Wilk statistics, while the data homogeneity test between data variants is carried out with the Levene's Test.

One-Sample Kolmogorov-Smirnov Test			
		Delta control	Delta-x
N		54	49
Normal Parameters ^{a,b}	Mean	30.6667	40.1429
	Std. Deviation	15.61567	6.91014
Most Extreme Differences	Absolute	.180	.115
	Positive	.096	.115
	Negative	-.180	-.059
Kolmogorov-Smirnov Z		1.321	.806
Asymp. Sig. (2-tailed)		.061	.534
a. Test distribution is normal. b. Calculated from data.			

From the variable normalcy test results above, there is a control group Kolmogorov index of 1.321 and experiment group Kolmogorov index of 0.806, where the significance level is 0.061 and 0.531; keeping in mind that the significance level is larger than 0.05, both variables above are included in the normal category.

Meanwhile, for the data homogeneity test between data variants, the Levene's Test is used. The following results were obtained.

Test of Homogeneity of Variances

Delta-x

Levene Statistic	df1	df2	Sig.
.917	9	34	.522

Bearing in mind that from the Levene Statistic test results, an index of 0.917 with a significance level of 0.522 greater than 0.05 was obtained, and the experiment group variable is considered homogenous.

Test of Homogeneity of Variances

Delta control

Levene Statistic	df1	df2	Sig.
3.438	11	37	.002

Meanwhile, from the results of the Levene Statistic test for the control variable, an index of 3.488 was obtained with a significance level of 0.002 smaller than 0.05, so this control group variable is considered as not being homogenous.

Research Results and Discussion

The Kolmogorov-Smirnov statistical test reveals that the Sig (p-level) experiment class data group and control class data group > 0.05, which implies that the data distribution of both data groups above is normal. Meanwhile, the Levene test for the experiment class data conveys that the data is homogenous, but the data for the control class is not homogenous. As a result, the next step undertaken is a non-parametric statistical test.

After a statistical pair sample test was conducted, the following results were obtained.

Paired Sample Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Delta-x	40.1429	49	6.91014	.98716
	Delta control	32.0816	49	13.63335	1.94762

From the table above, there was an increase from the pretest to the posttest scores of the experiment class with an average of 40.1429. Then in the control group there was an increase from the pretest to the posttest with an average of 32.0816. Numerically, the experiment group was higher than the control group. To determine the significant statistical difference, a mean differential test with a T-test technique was conducted with the following results obtained.

Paired Sample Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Delta-x Delta control	8.06122	15.84878	2.26411	3.50892	12.61352	3.560	48	.001

From the T-test results, $t = 3.560$ with a significance level of 0.001. This implies that there are significant achievement differences (pretest – posttest). The experiment group achievement (an average of 40.1429) is higher than the control group achievement (an average of 32.0816). As a result, the significance or probability level is $0.001 < 0.05$. Therefore, the H_0 statement “There are no significant differences between the quality of students’ arguments when they learn with guided questions as learning assistance compared with the quality of students’ arguments when they learn with a conventional method in the *Pancasila* course” is rejected. In other words, there are significant differences in providing guided learning questions as assistance towards the quality of their arguments.

Next, a Chi-Square Test is used to measure whether there are differences in students’ argumentation abilities according to their Indonesian language abilities. The results are listed below.

Chi-Square Test			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	58.800 ^a	63	.627
Likelihood Ratio	59.301	63	.609
Linear-by-Linear Association	4.392	1	.036
N of Valid Cases	49		
a. 88 cells (100.0%) have an expected count of less than 5. The minimum expected count is 0.02.			

From the Chi-Square Test results in the table above, there is a Chi-Square value of 58.800 with a significance level of 0.627. Since this value is greater than 0.05, it can be concluded that there are no significant differences in students' argumentation abilities based on their Indonesian language abilities. Thus, the low/high level of students' argumentation ability is not determined by their Indonesian language abilities.

The research results reveal that there are significant influential differences between learning with guided question assistance and learning with a conventional learning method towards the quality of students' arguments. This is in line with the study results of several experts that a) convey that guided questions and statements can function as an effective learning aid, including in designing sound arguments (Chi et al., 2004; Lin & Lehman, 2004; King & Rosenshine, 2004; Blanton, 2003; Myhill & Warren, 2005). These research results can be considered as being related with learning aid factors. As a series of questions to delve into argumentation elements and substances that are used by lecturers to assist students in building arguments, the assistance questions are thought to help students in developing their prerequisite abilities to construct good arguments. Cerbin (in Choi et al., 2004) identified a number of skills needed to build effective arguments: (a) an analytical ability, which is the capacity to delve into argument elements, and (b) an evaluative ability, which is the mastery of criteria to determine whether: the position is clear, the data is relevant and sufficient to support the position, the reasoning is relevant and enough to be supported, as well as does the conclusion already consider contra-arguments or possible exceptions. The reasoning questions used in this research are thought to assist students in developing both argument making primary abilities above.

The research results above are considered to be connected with the role of learning aids as a means to fulfill cognitive and meta-cognitive requirements in solving ill-structured problems. Ge & Land (2004) found that ill-structured problems need cognitive and meta-cognitive skills to solve them. Cognitive requirements to solve an ill-structured problem cover special domain knowledge as well as the knowledge structure itself. Knowledge about a special domain is knowledge about a particular related scholarly discipline like propositional information, concepts, regulations, and principles. In contrast, meta-cognitive requirements involve knowledge about how to solve problems and working arrangements in solving problems. In this research, specific domain knowledge and a Pancasila knowledge structure are provided in the form of teaching material and lecturer explanations about the teaching material. Then knowledge about how to solve problems and working arrangements in solving problems are revealed through explanations about how to take advantage of assistance questions in the learning process.

However, the results above are different with the study results of Choi et al. (2004) regarding using scaffolding in learning about history. In the study by Choi et al., there were no significant differences between the scaffolding / kinds of learning assistance on the students' argumentation scores. Nevertheless, Choi's study also reveals that students' argument scores in their final essays show an improvement compared with their first essays.

Related with the Indonesian language mastery level variable, the research results show that this variable does not have a significant influence on the quality of students' arguments. In other words, there are no real differences between the quality of students' arguments when they have high, moderate, and low Indonesian language abilities. This finding is dissimilar with research results by Nussbaum (2002), who concluded that students with high verbal scores from the California Test of Basic Skills were more capable of producing numerous arguments, and these differences were statistically significant.

These research results are assumed to be related with the nature of the argument itself as a position that is justified logically based on evidence or good argument fundamentals, sound arguments, or high quality arguments if (a) the position is clear and complete; (b) the foundation of its establishment is relevant and sufficient as a basis; (c) the reasoning is relevant and sufficient to gain backing; (d) the supporting evidence behind the reasoning is clear, relevant, and specific; as well as (e) it considers rebuttals that may be contra to the argument, so that (f) it uses proper modal qualifiers. Thus, the argument maker does not just

need language ability, but rather the ability to think logically in using language is more important.

Conclusion and Suggestions

Conclusion

It can be concluded that (a) there are significant differences in the quality of students' arguments when they are provided with guided question learning aids compared with students' arguments when they just receive conventional learning; (b) there are no significant differences in the quality of students' arguments based on their Indonesian language abilities.

Suggestions

The development of student building excellence needs to be supported by various learning aids, in order that students are capable of building cogent arguments.

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THE USE OF RESPONSE ACTIVITIES IN DEVELOPING READING SKILLS AMONG INTERMEDIATE EFL STUDENTS

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Abstract

Reading in an English lesson is an essential activity to develop in order to acquire knowledge, a text will not always help students develop this knowledge by itself; it is the uses of the activities that help students to achieve this point. This research was a case study of the implementation of response activities. The objectives were: To observe how students respond to using authentic written texts in a lesson and to check if by using response activities is possible to have students' positive reaction. The hypothesis was established as follows: Students react positively to the use of authentic written texts in a lesson with response activities. 4 lessons were planned and observed; at the end of each lesson questionnaires to all students and some interviews were applied, all the results from activities were collected. This investigation was developed with students in the 4th semester of the B.A. program in ELT at the Universidad Autónoma de Chiapas during their English lessons. A mix-method methodology was used, using quantitative and descriptive qualitative. The hypothesis was accepted and the objectives were reached. So, using response activities and using authentic written texts can help students to show a positive response to reading lessons.

Keywords: *Response Activities, Authentic Texts, Critical Thinking, Positive Response.*

Introduction.

While learning English as a foreign language, many students have few opportunities to experience working with authentic written texts. Besides, most of time the texts are not related to students' life, sometimes is too difficult to understand the messages. So, students end up copying and pasting the answers from the text, only to pass the exams or fulfill the activity.

While learning a foreign language, most of the goals found in a regular reading class are directly concerned with the grammatical aspects or vocabulary acquisition in that lesson. It is not completely wrong, but this method needs more natural language. On the other hand, there is a need of meaningful activities so students can do what they do in real life with a text in L1, with the texts in L2.

Otherwise, the image that students may have about reading in English, then, becomes a frustrating idea, shallow and out of their contexts.

This research seeks into students' reaction to the teaching of reading through authentic material using response activities due to the fact that authentic materials provide students with a practical opportunity to learn in a natural and effective way. Activities play a key role to practice and learn the target language. Instead of using the usual reading comprehension question, the use of reading response activities can challenge students more.

In order to develop this research the following objectives were established: to observe how students responded using authentic written texts in a lesson; and to ensure if by using response activities it was possible to have students' positive reaction. According to previous studies the following hypothesis was established. Students react positively to the use of authentic written texts in a lesson with response activities. Four lessons were planned and observed; at the end of each lesson questionnaires to all students and some interviews were applied, all the results from activities were collected. This investigation was developed with students in the fourth semester of the B.A. program in ELT at the Universidad Autónoma de Chiapas during their English lessons. A mix-method methodology was used, using simple quantitative and descriptive qualitative methods. The hypothesis was accepted and the objectives were reached. So, using response activities and using authentic written texts can help students to show a positive response to reading lessons.

Nowadays, some teachers have seen the importance of using reading lessons as a communicative tool to obtain knowledge and cultural capital. So, if we expect to give a language lesson, we should include in our planning of activities some that involve critical thinking. As Brown (cited in Arnold 1998: 235) points out that when incorporating critical thinking in our classrooms, we should be concerned not just about helping our students "to become aware of information" but "to become participants in a global partnership of involvement in seeking solution".

We are all critical thinkers but we do not all have the quality of thinking critically. Harmer (2001:205) defines:

"Authentic material is language where no concessions are made to foreign speakers. It is normal, natural language used by native speakers of a language. This is what our students encounter (or will encounter) in real life if they come in contact with the target language."

Guariento (2001) also mentions: "The use of authentic texts is now considered to be one way of maintaining or increasing students' motivation for learning". Nowadays, taking

advantages of the technology such as internet, it is possible to find practically all the genres such as menus from any country in the world, novels and magazines, articles and so on.

It is necessary to recognize that just by bringing authentic material to the class will not magically do the entire job. As Williams (1984:118) explains “the task itself is interesting and interesting activities that incorporate reading are more likely to lead to a positive attitude to reading.” Therefore, adding authenticity in the activities will help countless to reach one of the goals in today’s teaching towards communicative competence. There must be an interaction between the learners and the text. Sometimes it will be difficult to adapt a class to a text, but there will always be a range of topics that can be chosen to match the students’ contexts and interests.

There are many factors to take into account while selecting material. Dumitrescu (2000) found out that two of the most important factors to take into are applicability which means that the content of the text should be relevant for all the students and adaptability which means that the text can be used for different tasks. Schema is also crucial while deciding which text to bring to class because it is unreasonable to expect that students would learn something that they do not have even a small clue about. Peregoy and Boyle (2005) consider that the reader’s prior knowledge of the passage’s content and familiarity with its genre and the text structure play a major role in comprehension. If students are not used to reading poems we cannot pretend that they are going to interact well with the first poem they read, so training is necessary.

The theory of reader response activities’ origins are in the field of literary criticism; as Hirvela (1996) describes it as a way to challenge learners to be critical about the text. Maley and Duff (cited in Hirvela 1996:127) explain that “The primary aim of our approach is quite simply to use literary texts as a resource...for stimulating language activities...” They also explain that there is an interest in engaging students interactively with the text, with their peers and, and with the teacher in the performance of activities involving literary texts. So, students are induced to pay careful attention to the text itself and to generate language in the process of completing the task. Then, the reading response theory is more than simply bringing a text to the class. It is about planning a lesson with activities that develop critical thinking among students, that engage students with the text and with their surroundings; that help students develop their imagination and to read the text and produce language. Since this

theory stresses the link between reader and text, then a practical application has to be designed based on this interaction.

Reading response activities can help students to understand and create an interest in a text. The main purpose of reading response activities is to obtain a response from the students which is going to make students use the target language without even noticing it. Then, it is possible to obtain a natural, authentic and creative language. Also, this is a way to guide students to a real situation using the language. There is a wide range of activities that can be developed in a reading lesson.

Examples of reading response activities are:

1. *Graphic organizers* are a pictorial way of constructing knowledge and organizing information. They help the student convert and compress a lot of seemingly disjointed information into a structured, simple-to-read, graphic display. The resulting visual display conveys complex information in a simple-to-understand manner. (Col, 1996) Example of Graphic organizers are: Venn diagrams , Semantic mapping, Story maps or character webs and Time lines.
2. *Art projects* are another type of reading response activities, some examples of art projects are collages, murals and posters. To be able to perform an art project it may be need extra material such as paintings, glue, crayon, special paper, etc, may be needed. Example of Art projects are: Collages, Posters and Murals.
3. *Drama* is another example of using response activities; after reading a text. The Exeter University School of Education and Lifelong Learning (2003) explain that drama is a useful tool within the English classroom and can often help to bring life, vitality and creativity into the teaching of English. Peregoyle and Boyle (2005) remark that drama activities offer students activities that involve progressively more participation and oral language proficiency; these kind of activities are also nonthreatening and students may even have fun. Examples are: Puppet shows and TV or radio talk show with invited characters
4. *Writing a Response* is to write something about the text. The activities that can be used are: response to journals, letter to the author, retelling, and rewriting the ending. Examples of this are: Literature Response Journals, Letter to the Author, Retelling and Rewriting the ending.

Methodology

To develop this investigation it was important to establish the objectives of the research. There were two objectives to be achieved during the investigation:

1. To observe how students respond to using authentic written texts in a lesson.
2. To check if by using response activities is possible to have students' positive reaction.

The hypothesis that is been investigated is the following:

1. Students react positively to the use of authentic written texts in a lesson with response activities.

This investigation was developed with students in the fourth semester of the B.A. program in ELT at the Universidad Autónoma de Chiapas during their English lessons. The population considered, according to the hours covered in English learning is placed in an intermediate level. There were 30 students in the class; the group was not representative of the population of the intermediate students at the University, as the sample was chosen by convenience. The reason of choosing this particular group, besides the level, was the fact that the teacher is used to working with authentic material. In addition, he was willing to collaborate, since he knows the importance of doing research and also he was open to collaborate following a planned lesson. He was not used to working with response activities, though.

The instruments were designed after two previous observations and an interview with the teacher. The first impression was that it was a large group that looked very difficult to engage to the activities.

The readings, as the main instrument, were selected. The first criterion was to bring to the class authentic material. My second criterion was to select materials related to the topics that needed to be learned during the semester. Finally, materials according to the age of the students were chosen. Also, different kinds of genres were included, such as a short story ("The house on Mango Street"), articles (about inventions), a poem ("El Día de los Muertos") and a lyric (Imagine).

The following step was the design of the four lesson plans which played an important role in this work, since they were the teacher's guide and the basis for the collection of the data needed to carry out this investigation. These lessons took two classes of 50 minutes each.

The four lessons and the reading response activities were designed as follow:

1. "The House on Mango Street", (Cisneros, 1984). The response activities were: a questionnaire to check understanding and promoted critical thinking. A vent-diagram to compare the ideal house and the actual house.
2. 8 different readings all related to inventions. The response activities were: Write an e-mail (to promote understanding), act out an advertisement (to promote creativity).
3. "Dia de los Muertos" by Delgado (1994). The response activities were: Discuss ideas about culture (Critical Thinking), Make a poster (Creativity) and Write "calaveritas" (humorous poem which is talks about the death) using Spanglish (Creativity and Critical Thinking).
4. "Imagine" by John Lennon (1988). The response activities were: Discussion social issues such as war and hunger (Critical Thinking), write a letter to John Lennon (Critical Thinking) and write a poem using the last sentence of the lyric "and the world will live as one" as reference (Creativity).

Then, the observation sheet was designed to observe 5 students at the same time, and it had room to include the stage of the lesson and the time of starting. It helped to observed the following aspects: *Paying attention*, *"On-task" or "off-task"*, *Doing the activities as requested*, *Participating in the lesson (describing its content*, *Collaborating in the activities (describing it) and Attitudes and Gestures*.

The next step was to develop a questionnaire; questions 1 and 3 are closed questions; numbers 2, 4 to 9 are open questions where students had to explain the reasons for their answers.

1. Questions 1, 2 and 5 are about the written text.
2. Questions 3, 4 and 6 were about the activities presented in the lesson.
3. Questions 7 and 8 were about students' involvement with the lesson.
4. Question 9 was about students' interest and motivation about the topic.

The interview consisted in 9 questions as well:

1. Question 1 was about the general idea students have about the reading class;
2. Question 2 was about what they thought about the lesson presented.
3. Questions 3 and 4 were about the text.
4. Questions 5 and 6 were about the activities presented in the lesson.
5. Questions 7 asked if they learned something new from the lesson.

6. Question 8 asked students to think in the differences between a text from a book and the text presented.
7. Finally, question number 9 was about students' involvement and participation in the lesson.

Four lesson plans were completely taught by the teacher. The questionnaires were handed out to the students immediately after each lesson was finished. The interviews were done after each lesson too; most of them were done at the end of the day when students had the time. There were four students interviewed for each lesson. Two of them were students that were also observed, and the other two were selected at random. The answers were written down students were asked if what it was written was exactly what they meant. The observations were done the days that the lesson plans were presented. It is important to highlight that some of the students observed the first day of the lesson did not come to the class the following day, so only the ones that did participate in the whole lesson were taken into consideration, as data to analyze.

First, since this is a mix-method research the data was divided and analyzed in quantitative and qualitative data. The questions were the quantitative data, and the answers were counted and a simple percentage was taken from them.

The Qualitative data was taken from: The observations, interviews and results from the activities. The data analysis strategy chosen for the data qualitative, before a report can be made, is the one presented by Hesse-Biber and Leavy (2006): Prepare the data for analysis (organize the data), Data exploration phase (Reading, thinking and making notes) and Data Reduction phase (Select the relevant data and assign a label). The observations, interviews and results from the activities. After this the conclusions and the report will be made.

Findings and Discussion of The Results

Students had no problems understanding authentic material according to the information gathered from the questionnaires (In all the lessons presented around the 63% of the students understood the text except from the third lesson were 80% students reported to have understood) and the interviews, where students showed that they understood most of the texts: the main reason was that the texts were at their proficiency level. Then it is important to choose the text carefully. The following variables were taken into account to be able to determine if there was a positive response:

1. Willingness to read more about the topic

Not all the students were usually interested in the topic, but students have recalled, in the questionnaires (39%) and the interviews, that the activities made them feel interested in the topic. Therefore, while planning the lesson, it is easier when you bring topics to class that students are interested in because they can talk about their experiences in the themes. Students reported that have a relation with the students' real lives. Students reported that one of the things that they liked about the text was that they were able to compare them with personal situations or experiences.

2. Interest

To create interest is not always easy, but if we try to observe what kind of activities they enjoy then, it becomes easier; one method is by bringing different activities and verifying if they work. Deciding to bring activities were students could have fun (24%) and use their own ideas (16%). felt freer to express themselves and students could use the language as a tool to express ideas.

3. Knowledge acquired

Students reported that they did acquire knowledge. The questionnaires (67%) and the products showed that students did in fact. One example was when students wrote an e-mail about the inventions they had read about. They not only wrote about what they had learned but also they gave their own personal opinions about the inventions.

4. Meaningful learning

Students experienced the acquisition of meaningful learning when they reported that they felt the readings and the activities had a relationship with their lives (39%). Florence (1995) mentions in her description of authentic material, aspects and patterns of language are learned within meaningful contexts. That is why it is clear to use response activities when the objective of the class is to practice the language and learn it in a meaningful way.

5. Being "on-task"

Students were not "on-task" all the time while the lesson was developed; but most of them were "on-task" while doing the response activities. The challenge that students found in the activities helped them to be "on-task". It is important to know why students get "off-task" and try to engage them by challenging them more. It is important to

remark that reading response activities helped to get students “on-task”; as it challenges learners to be critical about the text

Conclusions

Objective 1. To observe how students respond using authentic written texts in a lesson.

Students’ response to the use of authentic written texts was positive since they understood the main ideas of the text; since the vocabulary was known or well introduced, students also helped each other with possible doubts; they also asked the teacher to explain some unknown words. Also, students expressed in the interviews and the questionnaires that they liked the idea of reading authentic material since they were exposed to real life issues. It is true that not all of the students were interested in reading more about the topics presented, but it is important to state that some of them were interested, which shows that students are willing to read more and learn about a topic using English as a tool. Students did not have problems in reading the text in different styles and formats since they are familiar with all these from their experience in real life.

Objective 2. To check if by using response activities it is possible to have students’ positive response.

It is true that the use of response activities helped students to show a positive response; they were willing to read more about the topic; they did acquire meaningful learning since they expressed that they felt they could relate the topics to their own lives. Students also showed that they had acquired knowledge, as they reflected it in their activities. Moreover, based on the interviews, students showed interest in the topics, in the lessons and in the activities. Here, it is important to mention that the students were not “on-task” all the time as the activities requested concentration and a mental process, but not all the students worked at the same rhythm, so some were “off-task” as soon as they finished doing the activities, others could not help themselves joking around; but all the students did the activities and helped doing the group activities although it was impossible to maintain every single student “on-task” all the time.

In regards to the hypothesis being investigated, the conclusion based on the results obtained, the interviews, the questionnaires and the products of the lesson plans, there is clear evidence that students showed positive response to the use of authentic written texts in a lesson using response activities. Here, the main thing to highlight is that students enjoyed

reading authentic written texts since they felt they were reading real life texts; plus they worked within meaningful context. Also, most of the students were not used to developing this kind of activities in an English reading lesson. For this, the teacher was an important part in the development of this investigation since the teacher tried hard to perform the activities as they were planned and he added a positive motivation to the lesson. Also, the use of response activities helped to achieve students' positive response, as the main purpose of the reading response activities is to obtain a reaction from the students in order to make students produce the target language.

Peregoy and Boyle (2005) mentioned that the ideal reader is one who is an independent reader "one who responds to literature individually and shares responses with others, listens to others' viewpoints and adjust interpretations, and uses information in a literary text to support interpretations, but remains open to interpretation of others." At some point, these students behaved as this "ideal reader", since they did everything mentioned by Peregoy and Boley and that was mainly due to the use of careful planned response activities.

Pedagogical Suggestions

To be able to use reading response activities it is necessary first to have clear goals to be achieved. Otherwise it will be very difficult to see if there was a kind of success. Second it is important to train students to develop the activities, especially if they are not familiar with this kind of activities or they do not know exactly what the purpose of the activity is. Otherwise it is going to be difficult to achieve success while performing them since students will develop the activities but they might not have the same effectiveness.

There are also some other points to take into account while planning to use response activities; for instance time: to find a written text, to prepare the lesson, to train students to develop the activity, to pre-teach vocabulary if it is needed and to check students' works. Another factor to take into account is students' schemata; to take advantage of them and bring texts and activities where students can use their schema. As Selden (cited in Hirvela 1996:128) observes, "We can no longer talk about the meaning of a text without considering the reader's contribution to it". So, it is very necessary to do small research about students' previous knowledge.

Also, it is necessary to mention that most of the time the answers will vary from student to student, depending on the kind of activity requested. Sometimes students will hesitate

while doing an activity because they are not used to this kind of exercises where there might not be a correct answer, only answers. Therefore, it is required to establish a pattern if it is necessary to give a grade to the work done; it is highly recommend to use response activities as a way to show students that they are able to produce language. As Paul (2004) explains that quality thinking has to do not only with students asserting things but mainly making students reflect on the facts and the causes of the content of what they are reading about.

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**COMPARISON OF THE EFFECTIVENESS OF CONSTRUCTIVISM AND
CONVENTIONAL LEARNING KIT OF MATHEMATICS VIEWED FROM
ACHIEVEMENT AND SELF CONFIDENCE OF STUDENTS IN VOCATIONAL
HIGH SCHOOL
(AN EXPERIMENTAL STUDY IN YEAR XI OF SMK MUHAMMADIYAH 2
YOGYAKARTA)**

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Abstract

This research was aimed to describe and compare constructivism and conventional learning kits of mathematics viewed from achievement and self confidence of students in vocational high school. This research was a quasi experimental study using the pretest-posttest nonequivalent comparison-group design. The research population comprised all Year XI students, consisting of 5 classes of SMK Muhammadiyah 2 Yogyakarta. From the population, two classes, Class XI TKJ 1 and Class XI TKJ 2, were selected randomly as the research sample. Students' Class XI TKJ 1 learned through the constructivism learning kit and students' Class XI TKJ 2 learned through the conventional learning kit. The data collecting instruments consisted of learning achievement test and student's self-confidence questionnaires. To test the effectiveness of the constructivism and conventional learning kits, the one sample t-test was carried out. Then, to test the more effectiveness of the constructivism learning kit than the conventional learning kit, the MANOVA was carried out and then continued by the t-Benferroni test. The results of the study show that the constructivism and conventional learning kits are effective and the constructivism learning kit is more effective than the conventional learning kit in probability viewed from viewed from achievement and self confidence of students in vocational high school.

Keywords: *Learning Kit, Achievement, Self Confidence*

Introduction

Regulation of the Educational and Cultural Ministry (Permendikbud) No. 54 of 2013 states that to achieve national education goals required qualifications profile outlined in the ability of graduates Graduate Competency Standards (SKL). SKL is a qualifying criterion regarding the ability of graduates that includes attitudes, knowledge, and skills. SKL will be elaborated on their core competencies and core competencies which will be elaborated on the basis of competence achievement indicators. This also indicates that the achievement of the basic indicators of achievement of competence is very important to be able to determine the graduation of students in certain subjects, including mathematics courses for a particular material.

The achievement of the indicators related to the achievement of basic competencies of mathematics learning achievement of students. Regarding the importance of the study of mathematics, Lovat, et al. (2011, p.6) states that "since the early 1990s, there has been a concentration of effort aimed at maximizing student achievement in school education." That since the 1990s, the concentration of teaching in schools is to maximize the learning outcomes of students.

National Education Standards Agency's (BSNP) data on the reported results of a national exam (UN) mathematics vocational technical group in the city of Yogyakarta to material probability in the school year 2010/2011 showed that the absorption rate reached 55.94 and the absorption capacity of the school year 2011/2012 reached 58.38. For two consecutive years, the material absorption is low opportunities. One of the causes of low achievement of competency shown above is mastery of concepts by students is still low. Many students are confused where problems can be solved by permutation and which should be solved by the concept of combination.

In fact, apart from the cognitive problems as just described above, also need to be considered in terms of psychological problems or affective. Kloosterman revealed that self-confidence is very important for students to be successful in learning mathematics (Yates, 2002, p.5). This is supported by several previous studies revealed the existence of a relationship between self-confidence by learning achievement. Hannula, et al. (2004, Q17) revealed that the mathematics learning achievement is influenced by confidence in mathematics, especially by self-confidence in mathematics. Permendikbud No. 54 of 2013 is mentioned that one of the graduation competencies of the students which the students have confidence in life.

With regard to confidence, Nunes, et al. (2009, p.24) found "*one can form a measure of children's self-confidence by considering their answers about how much they like maths and also how good they think they are in the subject*".

The confidence of students towards mathematics is confidence in the ability of students to learn and deal with the problems of mathematics. The aspects confidence of learners towards mathematics, which are: (1) confidence in mathematical ability; (2) a realistic and rational thinking; (3) positive thinking; and (4) firmness. (Margono, 2005, pp.48-49; Lie, 2003, p.4; Ghufon Risnawati, 2012, pp.35-36; Preston, 2007, p.14).

Based on observations made in research on mathematics learning in class XI TKJ SMK Yogyakarta city is seen that at the time of learning, the self confidence of the students is still low. They are still afraid to express their opinions in class. This indicates that low self

confidence of the students because it is part of the confidence indicator. Therefore, when encountered a problem, the students with a sense of low self confidence are often reluctant to try to find a solution and chose to wait it out answer will be given the teacher or see the answers belong to another friend.

Constructivism learning is a learning model that tailored to the circumstances of students, the character of each indicator, and the competencies to be achieved in each indicator. Constructivist approach provides opportunities for students to construct their knowledge and understand through the experiences and thoughts on his experience (Matthews, 2003, p.60).

With regard to constructivism, Piaget (1971, pp.77-78) found:

For the genetic epistemologist, knowledge result from continuous since each act of understanding, some degree of invention is involved, in development, the passage from the one stage to the next is always characterized by the formation of new structure which did not exist before, either in the external worl or in the subject's mind. The central problem of genetic epistemology concerns the mechanism of this construction of novelties which creates the need for the explanatory factors which we call reflexive abstraction and self regulation.

With regard to learning constructivism, Vygotsky suggests three principles: (1) socially meaningful activity (Vygotsky, 1986, p.xxiii-xxiv); (2) ZPD (zone of proximal development) (Vygotsky, 1986, p.xxxv); and (3) mediated learning (Vygotsky, 1986, p.xxxv).

Vygotsky emphasized the importance of utilizing the learning environment. The neighborhood around the student includes the people, the culture, including experience in that environment. Other people are part of the environment, the acquisition of the student's knowledge stems from the social sphere, between individuals, and then the scope of the individual as an internalization event.

In its development, constructivism is widely used in learning. With regard to the principle of construction of knowledge during the learning process that refers to the theories of constructivism. According Karagiogi & Symeou (2005, p.24) that:

Today, learning is approached as a constructive, self-regulated, situated, cooperative, and individually different process. In a world of instant information, constructivism can become a guiding theoretical foundation and provide a theory of cognitive growth and learning that can be applied to several learning goals.

Some constructivist learning principles are stated by Clements and Battista (2009, pp.6-7), namely (1) Knowledge is actively created or invented by the child, not passively received from the environment; (2) Children create new mathematical knowledge by reflecting on

their physical and mental actions; (3) No one true reality exists, only individual Interpretations of the world; (4) Learning is a social process in the which children grow into the intellectual life of those around them.

Constructivism learning model through the following stages: (1) motivation; students are encouraged and motivated to put forward the concept of knowledge initially subject or sub-subject to be discussed; (2) discussion and inquiry; students are given the opportunity to investigate and discover the concepts and issues in groups; (3) presentation; students provide an explanation and a solution based on observations with explanations of teachers; and (4) application; students apply the concept of understanding the topic at that time with the help of a teacher. (Brown & Abell, 2007, p.58; Gagnon & Collay 2006, pp.4-6)

Based on the descriptions above, the goal of this research is to describe the effectiveness of learning (constructivism and conventional) and the effectiveness of constructivist learning device compared with the conventional learning opportunities on the material terms of aspects of the learning outcomes and the confidence of students in vocational schools. The research will be able to contribute to the learning of mathematics, especially those related to the constructivism learning, conventional learning devices, and how the effectiveness of the devices in vocational learning.

Method

The research is a quasi experimental pretest-posttest design with nonequivalent comparison-group design. This research was conducted at SMK Muhammadiyah 2 Yogyakarta from May to June 2014. The population was all students of Grade XI SMK Muhammadiyah 2 Yogyakarta academic year of 2013/2014 consisting of 5 classes. By choosing randomly, the students of XI TKJ 1 and XI TKJ 2 are selected as the sample of the research.

The independent variable in this study is the learning kits (constructivism and conventional) and the dependent variable are the learning achievement and self confidence of students. The instrument used to measure learning achievement is achievement test consisting of 13 essay questions. The instrument used to measure the confidence of students is student's self confidence questionnaire.

In this study, data analysis was done by describing the data and inferential statistical analyzes of the data obtained. Description of the data is done by finding the average, standard deviation, variance, minimum score, and the maximum score from the data obtained, both for the data prior to treatment, as well as to the data after treatment.

To test whether the learning kits (constructivism and conventional) is effective in terms of the learning achievement and the self confidence of students in vocational school used one sample t-test with the following formula:

$$t = \frac{\bar{x} - \mu_0}{\frac{S}{\sqrt{n}}} \quad (1)$$

(Tatsuoka, 1971, p. 77) where:

\bar{x} = the average value obtained

μ_0 = hypothesized value

S = deviation standard of the sample

n = the numbers of sample.

Rejection criteria of H_0 : if $t_{hit} > t_{(\alpha; n-1)}$.

For data prior to treatment MANOVA test to see if there are differences in ability between the two classes of samples early in the learning opportunities in terms of learning achievement and self confidence of students in vocational schools by using the following formula:

$$T^2 = \frac{n_1 \cdot n_2}{n_1 + n_2} (\bar{y}_1 - \bar{y}_2)' S^{-1} (\bar{y}_1 - \bar{y}_2) \quad (2)$$

Where:

T^2 = Hotelling's Trace

n_1 = the numbers of the first sample

n_2 = the numbers of the second sample

$\bar{y}_1 - \bar{y}_2$ = mean vector

S^{-1} = the inverse of covariance matrix.

After obtaining T^2 Hotteling's value, then the value is transformed to obtain the value of the F distribution with the following formula:

$$F = \frac{n_1 + n_2 - p - 1}{(n_1 + n_2 - 2)p} T^2 \quad (3)$$

(Stevens, 2009, p. 151), where p is the number of dependent variables.

Rejection criteria of H_{01} : if $F_{hit} \geq F_{(\alpha; p; n_1 + n_2 - p - 1)}$.

Having in mind that there is no difference between the two classes beginning ability samples, the test and questionnaire data after treatment were tested to see whether there are differences in the effectiveness of learning kits (constructivism and conventional) in terms of learning achievement and self confidence in vocational school students using MANOVA formula (2) and (3). Once it is known that there are differences in effectiveness, the data was

tested by t-Benferroni to know what constructivism learning kit is more effective than the conventional learning kit terms of these two aspects by using the following formula:

$$t = \frac{\bar{y}_1 - \bar{y}_2}{\sqrt{\frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1 + n_2 - 2} \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \quad (4)$$

(Stevens, 2009, p. 147).

Rejection criteria of H_{02} and H_{03} : if $t_{hit} \geq t_{(\frac{\alpha}{p}; n1+n2-2)}$.

However, before doing the analysis, first tested the assumption that the multivariate normality test and the test of homogeneity of variance-covariance matrix, for both groups before and after treatment. Multivariate normality test was performed using the Mahalanobis distance test (d_i^2) with the decision criteria that if the data is said to be normally distributed about 50% of the data have value $d_i^2 < \chi_{(p; 0.5)}^2$ (Johnson & Wichern, 2007, p. 184). Test homogeneity of variance-covariance matrix is done by using Box's M test with the decision criteria that the data is said to be homogeneous if the significance value of F is greater than 0.05 (Rencher, 1998, pp. 139-140).

Finding and Discussion

Implementation of constructivism and conventional learning kit are going according to the learning activities that have been defined. Although all of these learning activities have been implemented but found some limitations that constrain the implementation of this study, especially at the initial meetings, such as the allocation of time between learning activities less attention and students tend to be afraid to give feedback during class presentations conducted. However, at the next meeting the issue does not look up again.

Data description of learning achievement and the self confidence of student, for both classes of constructivism (KKT), as well as for the conventional class (KKV) can be seen in Table 1.

Table 1. Data Description of Learning Achievement and Self Confidence of Students

Description	Learning Achievement				Self Confidence			
	KKT		KKV		KKT		KKV	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Average	21.86	81.71	24.71	77.71	79.78	90.93	79.96	87.07
Maximum of Theoretical Score	100	100	100	100	120	120	120	120
Minimum of Theoretical Score	0	0	0	0	24	24	24	24
Maximum Score	42	86	36	82	103	105	103	105
Minimum Score	8	78	8	74	63	83	62	81
Deviation Standard	9.17	2.48	7.32	1.70	8.66	5.30	7.23	5.59
Variance	84.13	6.14	53.69	2.88	74.99	28.07	52.26	31.25

Based on Table 1 above, information was obtained that the average value of student learning achievement, both for class constructivism, as well as conventional class before treatment has not reached an average value of 75 and after the treatment has reached an average value above 75. For aspects self confidence of students showed that the average total score of the questionnaire, both for constructivism class, as well as the conventional class before treatment has not achieved an average score of 80 and after the treatment has reached an average score above 80.

Test assumptions for the two groups either class test for normality and homogeneity tests are reached. Because the test assumptions are reached then proceed to test the hypothesis. The test results on the effectiveness of the devices in terms of learning achievement and self confidence of students of vocational school are presented in Table 2.

Table 2. Results of One Sample t-test

Aspect	KKT		KKV	
	T	Sig.	t	Sig.
Learning Achievement	14.362	0.000	8.497	0.000
Self Confidence	10.915	0.000	6.693	0.000

According to Table 2, the results showed that the significance of t for all aspects is less than 0.05. Constructivism and conventional learning kit are effective in terms of learning achievement and self confidence of vocational students.

The test results on whether there is a difference between the two classes before treatment and after treatment are given in terms of learning achievement and self confidence of students in vocational school is presented in Table 3.

Table 3. Results of MANOVA Before and After Treatment

	<i>F</i>	Sig.
Class (Before Treatment)	1.473	0.247
Class (After Treatment)	30.946	0.000

Based on Table 3 note that the significance value before treatment is less than 0.05, There is no difference between the average of the two classes of experiments. Because there is no difference, then two classes are given a different treatment. After treatment, the data show that the significance is more than 0.05, means that there are differences in the effectiveness of learning kit in terms of learning achievement and self confidence of students in vocational school.

After that there are differences in effectiveness between the two learning kits, there will be a t-Benferroni test to see that constructivism learning kit is more effective than conventional learning kit terms of learning achievement and self confidence of students in vocational school. T-Benferroni test results can be seen in Table 4.

Table 4. Results of t-test Benferroni

Aspect	<i>t-Benferroni</i>	<i>t_{tab}</i>
Learning Acievement	7.049	2.0049
Self Confidence	2.650	2.0049

Based on Table 4, the information obtained t-Benferroni is more than t-tab. Or in other words, constructivism learning kit is more effective than the conventional learning kit in terms of learning achievement and self confidence of students in vocational school.

These results are consistent with the theory that the constructivism learning allows students to be more active and construct the concepts independently. The student's activeness will be able to increase the self confidence of the students. While the concept is constructed independently, it will improve the learning achievement of students in vocational schools.

Conclusion and Suggestion

Conclusion

The learning kits (constructivism and conventional) are effective and the constructivism learning kit is more effective than the conventional learning kit on the probability material in terms of learning achievement and self confidence of students in vocational school.

Suggestion

Although the results of this study are consistent with the study of theory, but as noted there are some limitations which become obstacles in the implementation of this study. Based on this, then there are a few things suggested, among other things: the allocation of time for each learning activity is taken to ensure that the allocation of time between learning activities are not mutually reduce each other and the teacher should be to convince the students not to be afraid to give a response at the classroom presentations.

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The Effect of Class-Visitation Supervision of the School Principal toward the Competence and Performance of Pangudi Luhur Ambarawa Elementary School Teachers

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Abstract

The success of a school is determined by the teaching-learning process in which the teacher becomes the most crucial component. As a key factor in the success of education, the teachers have to improve their professional capabilities. As the principals are having the main responsibility for improving the quality of education in schools, it is expected for them to provide guidance on teacher competencies so that the teacher will perform optimally. The founding on teacher's professional abilities can be done through supervision of classroom visitation so that it will have an impact on student learning achievement. The purpose of this research was to determine whether there were significant influences of the principal supervision toward the teachers' performance in PangudiLuhurAmbarawaElementary School. This research used a qualitative research approach with a qualitative descriptive method. The populations in this study were PangudiLuhurAmbarawaElementary School teachers. The sampling technique used in this study is a random sampling technique, taking 6 teachers or 38% of the total population. The data collection techniques were done by using questionnaires and interviews. Analysis of the data used in this research is a descriptive analysis technique. Based on the research findings, can be concluded that: (1) the implementation of the principal supervision was done by using a model of supervision approach either directly or indirectly with the class action supervision technique, (2) teachers' response toward the implementation of a variety of supervision were basically approves and supports the supervision in order to improve the professionalism of teachers, (3) the implementation of the supervision carried out based on the needs and potentials of the teacher, (4) the improvement of professionalism marked by the improvement of teachers' skills and the improvement of teaching performance. Based on the results of this research could be concluded that there is a significant positive effect of classroom-visitation supervision toward the competence and performance of PangudiLuhurAmbarawaElementary School teachers.

Keywords: classroom-visitation supervision, competence, teachers' performance.

Introduction

Education has a strategic role to improve the quality of human resources who have expected competence, performance, attitude and behavior in accordance with their duties and role of their job. In other words, the quality of human resources as the subject of development is characterized by the creativity and productivity that is realized in the performance of their work. This issue would be overcome if the human resources are able to produce a rational and productive work and have knowledge, skills, and abilities that generally can be obtained through education.

The Indonesian National Education which is based on Pancasila and the Constitution of the Republic of Indonesia 1945 has functions to develop the capability and to shape dignified character and civilization to educate the nation. It aims to develop students' potency to become people with faith, who fear of God, noble, healthy, knowledgeable, capable, creative, independent, and become democratic and accountable citizens. To carry out the functions, the Indonesian Government carried out a national education system as set forth in Law No. 20 of 2003 about National Education System.

To achieve the above objectives, the teachers' role as the spearhead of the success of education is critical. In developing excellent education, the need of professional education personnel is very crucial. They are expected to be able to share their knowledge, to develop students' skill and to shape students' character. There are some ways to be professional teachers. One of them is by developing teachers' competence and performance.

Competence is the ability to be possessed by the teachers in terms of planning and implementing the learning process. According to Glickman, professional teachers are teachers who are able to manage themselves in carrying out their duties. Teachers' competence can be defined as the determination of knowledge, skills and attitudes which are manifested in the form of intelligent action and full responsibility of a person to be a teacher as a profession (Depdiknas, 2006). Teachers' competence includes personal competence, pedagogical competence, professional competence, and social competence.

While performance is the ability to work or a work performance demonstrated by a teacher to obtain optimal results. The teacher's performance is a real teacher's behavior that can be observed in his duties as a teacher.

The behavior of teachers regarding to the implementation of the management tasks of teaching and professional development activities includes: (1) ability to make a teaching and learning program, (2) ability to present teaching and learning programs, (3) ability to

carry out the evaluation, (4) ability to carry out the analysis of evaluation result (5) ability to develop and implement students' improvement and enrichment program, (6) ability to make scientific writing in education, and (7) ability to develop the curriculum. These activities will be measured by a questionnaire done by the teacher or principal (Sahertian, 2000).

The implementation of increasing teachers' competence and performance needs support from those who have important role, in this case the school principal. The school principal is a person who has the main responsible for the whole school activities. He/she has full authority and responsibility for implementing all environmental education activities in the school.

One effort that can be done by the principal in improving the competence and performance of the teachers is by supervision service. By supervision it is expected that the teachers will improve their quality. The supervision can promote and develop the teaching process so that teachers can teach well and it will cause a good impact on the students' outcomes.

Jones, as quoted by Pidarta (1992) explained that supervision is an integral part of the whole process of educational administration which is intended primarily to develop the effectiveness of the performance of school personnel related to the main tasks of education. In the above definition, supervision is viewed as a subsystem of the system of school administration. As a sub-system, supervision cannot be separated from the administrative system that also involves non-teacher personnel, including the principal and administration staff. But the focus of supervision is the improvement and development of teachers' competence who are directly addressing the students. Through the improvement and development of teachers' competence and performance, the teaching process is expected to grow, ultimately have an impact on the effectiveness of the learning process.

Class-visitation is a visit at any time made by the supervisor (principal or superintendent) to see or observe the implementation of the learning process in order to obtain data for further follow-up in coaching (Burhanuddin, 1994). The goals are to observe how the teachers teach and to help teachers to cope with the problems they face, while the functions of the visitations are to optimize the learning technique and to help them to improve the professionalism.

There are three steps of class-visitation supervision: the preparation phase, the implementation phase, and the evaluation and reflection phase. The preparation phase includes creation of a framework and assessment instruments prepared by the supervisor, in this case, the principal. In the implementation phase, the teachers do the teaching and

learning activities based on the lesson plan that have been made, and the supervisor will observe the teaching and learning process based on the given instruments. In the final phase, the principal evaluates the things that happened during the observation in the classroom.

This paper is aimed to give illustration and knowledge to the teachers and principals about the importance of class-visitation supervision as it happens in PangudiLuhurAmbarawaElementary School.

Research Methodology

This study used a qualitative descriptive method to describe a phenomenon that occurs. Sugiono (2009) said that population in a qualitative research is called by "social situation" which consists of three elements: place, actors, and activity that interact synergistically. The three elements are being the object of research to find out what event is happening to achieve the research objectives. In this research, the place being observed was PangudiLuhurAmbarawaElementary School. This school is one of 67 schools owned by Pangudi Luhur Foundation, where its central head office is located in Semarang. This foundation was established and under the auspices of the FIC Congregation. While the actors on the research were the school principal and the chosen teachers, and the activity was the classroom-visitation supervision.

The samples in this study were six out of sixteen teachers (38%) of Pangudi Luhur Ambarawa Elementary School which were taken at random (random sampling). According to Sugiyono (2009), the determination of random sampling technique is intended to provide equal opportunities to all respondents in conducting research.

The variable in this study was the competence and performance of the class-visitation supervision of the school principal toward the teachers in PangudiLuhurAmbarawaElementary School. The instruments and data collection research were using interview and questionnaires techniques. The data analysis was performed using qualitative analysis. This analysis included the matters conducted by the principal in improving the competence and performance of the teachers in PangudiLuhurAmbarawaElementary School.

Research Finding and Discussions

After conducting interviews and distribution of the questionnaire, the following are the result:

1. The implementation of the principal supervision was done by using a model of supervision approach either directly or indirectly with the class action supervision technique.

In the implementation of class-visitation supervision activities in PangudiLuhurAmbarawaElementary School, there were two approaches done by the principal. The first one was direct supervision. It meant that the supervision activities carried out based on the schedule and it had procedures to follow with. The second one was indirect supervision, where the supervision was conducted not based on the procedures and schedule.

The first type of supervision, the direct supervision, was carried out as one of some conditions for teachers' promotion, for example, from orientation to prospective employees, from prospective employees to jobholder, and for a raise in employees' level. Few weeks after a teacher submitted a letter of promotion, the foundation would send a supervision schedule, where they would be supervised by a foundation supervisor, while the supervision of the principal was held a week before that. So, a teacher who promoted for a level rising would be supervised twice.

For the second type of supervision, it was done to fulfill the duties of the principal in providing an annual report of teacher's performance to the foundation. In the practice, the principal monitored or observed the classroom activity from outside the classroom when passing each class. This kind supervision was done without the knowledge of the teacher.

2. Teachers' response toward the implementation of supervision.

When the teachers were asked what supervision was, most of them said that the thing that comes to their mind was a kind of monitoring activity toward the teacher. For some teachers, supervision sometimes was a scourge, so they tend to be afraid of being supervised. Although they realized that the supervision would bring an improvement on their competence and performance, but that did not trigger the teachers' spirit to be supervised, they still looked tense instead.

The negative perception of teachers on supervision assumed that supervision was a model of monitoring that suppresses the freedom of teachers in teaching. The negative perception of the teacher could also be influenced by the attitude of the supervisor who is authoritarian, just looking at teachers' mistake and weaknesses, and consider his/herself to have a higher position.

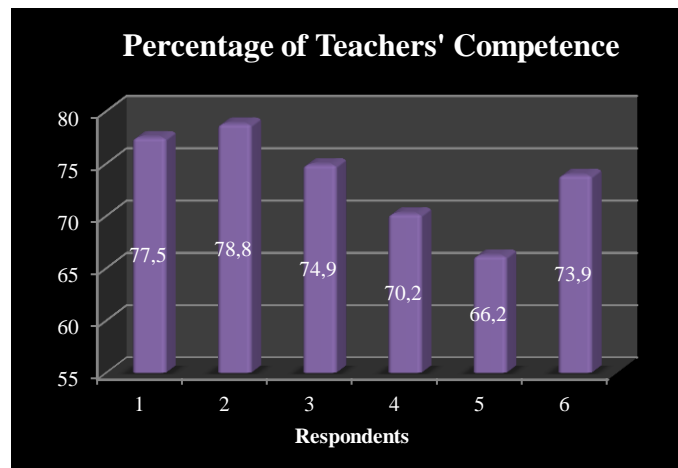
3. The implementation of the supervision carried out based on the needs and potentials of the teacher.

The implementation of class-visitation supervision by the principal was carried out when the teacher has special needs such as a promotion or competition in order to improve the teachers' professionalism and the quality of schools and the implementation also follows the procedures or stages in supervision activities. Beside because of the needs of promotion as mentioned in result number one above, the class-room supervision by the principal was done to fulfill the principal duties in reporting the teachers' performance and competence to the government educational office.

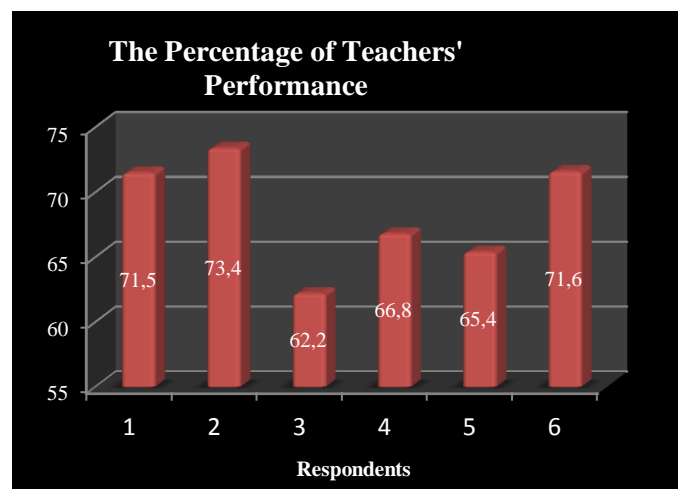
4. The improvement of teachers' professionalism and performance.

Based on the results of the research, here are the presentations of the data:

a. Before the Supervision

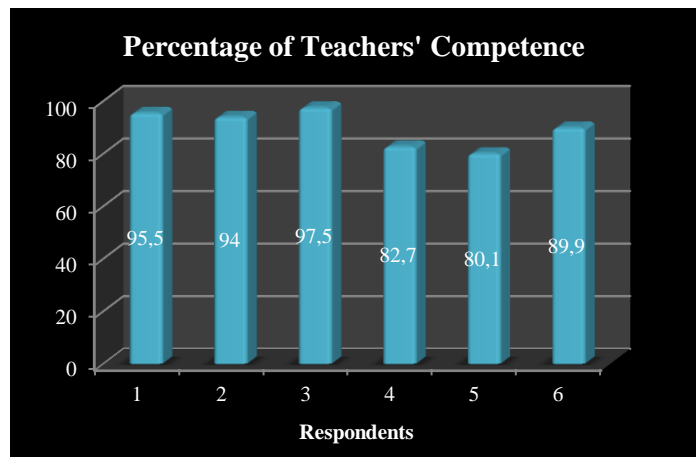


Graph 1. Percentage of Teachers' Competence

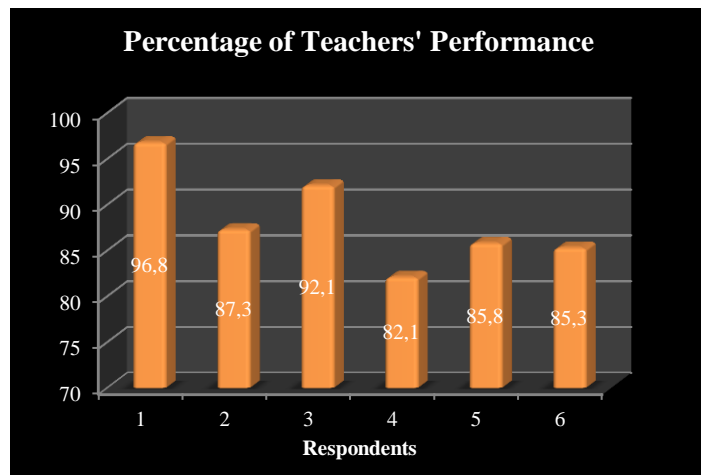


Graph 2. Percentage of Teachers' Performance

b. After the Supervision



Graph 3. Percentage of Teachers' Competence



Graph 4. Percentage of Teachers' Performance

This research activity was divided into two cycles. The first cycle was an assessment before the supervision conducted and the second cycle was carried out after the supervision. There were ten components to measure teachers' competence: the ability on mastering the teaching materials, the ability to manage teaching and learning program, the ability to manage the class, the ability to use media/learning resources, the ability to master the foundation of education, the ability to manage the interaction of teaching and learning, the ability to asses student achievement in learning, the ability to know the functions and programs of counseling services, the ability to recognize and organize the school administration, and the ability to understand the principles and interpret the results of educational research for teaching purposes. While the assessment indicators on the

performance consisted of five components: planning for teaching and learning program, the implementation of teaching and learning process, the evaluation of teaching and learning process, the implementation analysis process, and the implementation if improvement and enrichment toward the students.

The graph above shows that there was a significant improvement of teachers' competences and performance. It is undeniably though basically teachers have had professional capability in the implementation of teaching and learning activities, but still, they didn't improve their competence and performance maximally.

From the graph above it is clear that in the prior supervision (Cycle I), the average of teachers' ability was at the 'sufficient' level, although this was considered good, nonetheless as a spearhead in the renewal and improvement of the quality of education, teachers must keep improving their competence and performance. From the data it appears that after supervision (Cycle II) there was an encouraging significant improvement where the average ability of teachers' competence and performance are at a good qualification. This happened due to the teachers' preparation for the supervision both in terms of administration and method that will be used in the teaching and learning process. The material that would be presented was also being well-prepared. It didn't mean that when there was no supervision the teachers didn't prepare the program, but in their daily routines the preparation was not as extreme as when they were facing supervision.

Conclusion and Suggestions

After carrying out the research and discussion, here come several conclusions. First, the implementation of the principal supervision was done by using a model of supervision approach either directly or indirectly. Second, the teachers' response toward the implementation of supervision were basically approves and supports the supervision. Third, the implementation of the supervision carried out based on the needs and potentials of the teacher. Fourth, there was a significant improvement of professionalism marked by the improvement of teachers' performance and competence.

From the conclusion above suggests that the supervision is indeed an important way to maintain teachers' performance and competence. For that reason, the supervision should be done at school continuously. For the teachers come to suggestion that being supervised or not, the teachers should always keep maintaining their competence and performance in teaching their students. Additional suggestion is intended for the school principal, that he/she

should keep the objective of the supervision as a tool to help, stimulate, and support the teachers to improve their performance instead of giving fear and harsh judgments.

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THE 'REOP' ARCHITECTURE TO IMPROVE STUDENTS LEARNING CAPACITY

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Abstract

This paper reviewing about a model of teaching by scientific approach as an effort of educator to increase the students learning capacity. The leading role of education is to increase the capacity of students in terms of personality, the development of social, and academic learning. A lot of models of teaching which has been developed and applied to reach the goal. The models of teaching is able to affect the pattern of students learning. This model emphasizing child-centered learning with a flange on the model scientific research that can train students to develop hypothesis and the reasons in causality. The students are stimulated to conduct research and investigation with guidance from the teacher. A structure in this model have phases such as Research Elaborate Order and Publish (REOP) that can run in a series of teaching. The first phase, Research, explore the richness of the concept of students. The second phase, Elaborate, students with the teacher confirm the findings of a concept with empirical evidence. The third phase, Order, students discuss the results of confirmation with a friend. The fourth phase, Publish, students communicating the results of its research to others. Writer find result that students stimulated to active and independent in their learning. This model helps them identify conceptual problems and getting them to devise ways to solve problems. A model of teaching scientific research has educational dimension which is to make discoverer have some humility but with high integrity.

Keyword : *Reop, Models of Teaching, Learning Capacity*

Introduction

Education has played an important role in people's lives. Therefore, many developments toward teaching and learning process had been made throughout the history of education, especially in Indonesia. The proof of development of education in Indonesia can be seen through the changing of national curriculum in Indonesia. Since Indonesia's independence in 1945, there had been several curriculum changes such as in 1947, 1952, 1964, 1968, 1975, 1984, 1994, 1999, 2004, 2006, and the latest is 2013. Curriculum itself is considered as a tool to reach the goals of education and also as the guidance to the implementation of education. Thus, the changes of curriculum in Indonesia can be regarded as an attempt in searching for the most ideal education model to be implemented in Indonesia.

As for curriculum itself is seen as the tools to reach educational goals of a certain nation, then, curriculum has to be applicable in any circumstances and also has to follow the changing of times. For that reason, the changing curriculum was made along with the changing of teaching method and approach (in order to adapt to the country's recent condition and development). During the development of education in Indonesia, several different teaching-learning methods and approach were implemented. The most popular method was teacher-centered learning.

Teacher-centered learning is a one-sided learning process where the teacher's role is as the main source of information. According to Hadi (2007), many learners who are produced from this method are passive and not truly creative. Learners here may also be dependent learners who lack of courage or vision to learn by themselves or to conduct their own research. This might implicitly imply that the educators who apply teacher-centered learning method are barely creative themselves, because they only make use of lecturing technique in their teaching-learning process. As stated by Hadi (2007), even though some alterations had been made into this learning method, such as by combining lecturing technique with discussion and tasks, the maximum learning outcomes still cannot be achieved.

Subsequently, a teaching-learning process that can involve learners actively is needed in order to attain the best learning outcomes, to encourage learners to develop their own ways of learning, and to push learners to conduct their own research someday. Then, many educators feel the necessity to move toward student-centered learning method. In this method, learners are required to engage enthusiastically and actively in doing their tasks and class discussions. In addition to that, the main role of educators is also changing from the main source of information into learners' facilitator here in this method. As a result, learners will be accustomed not only to develop their own ways of learning, but also to obtain the ability to carry out their own study later on.

Related to student-centered learning, current curriculum used in Indonesia (curriculum 2013) put scientific approach to practice; here, scientific approach requires the students to follow several steps, such as mengamati (observing), menanya (questioning), menalar (reasoning), mencoba (attempting), membentuk jejaring (framing networks), and mengkomunikasikan (communicating). Through this scientific approach of curriculum 2013, learners are pushed to think more critically and learn more independently. In that case, any learning method in relation to scientific approach could go together smoothly in this new curriculum.

One specific learning method that shares similarities with the concept of this 2013 curriculum is REOP (Research, Elaborate, Order, and Publish). REOP is a learning architecture that was developed from student-centered method consists of four correlated scientific steps that could help learners to construct their new habit of research-based learning. By performing this method, learners are believed to be ready to face and solve any problem smartly and also to process any information through scientific research. Besides, if learners are accustomed to conduct this method, learners will also be accustomed to think and process all ideas and facts scientifically. As a result, a new habit is constructed. As mentioned before, the goal of this method is to build a new scientific habit to the individual who are accustomed to do it.

Optimistically, if REOP is applied in the era of this 2013 curriculum, many Indonesians, especially learners, will be comfortable with a new way of thinking scientifically and critically. Then, up to date REOP could be considered as a revolutionary replacement for the obsolete teacher-centered learning.

Method and Literature Review

The method used in this paper is a qualitative approach. We do exploration of activities in order to understand and explain about problems in this paper. A gathering of various data and information is done with the technique of the study of the literature and data sources.

The authors examine the concept of learning that applies to the teaching model with a scientific approach. The previous study findings supported the notion that active techniques do aid in increasing learning as in-class activities led to higher overall scores while lecture led to the lowest overall scores. The hypothesis about lecture that would be most effective on knowledge level questions was not supported. In fact, the lecture method was actually least effective as correct scores on knowledge level assessments were significantly lower than both comprehension and application. Active teaching can be an added bonus for teachers who are managing students with different learning styles.

According to Joyce, Weil, & Calhoun(2009), there are four important things that need to be considered in determining an effective teaching model by considering learners' way of thinking and environmental education, among other things: 1) The term constructivism becomes an important term when the teacher wants to unload notion of effective teaching models. Plato and Aristotle developed a theory about the purpose of constructing knowledge and how to perform it. Other experts who initiated the theory are John Dewey and Lev Vygotsky. The main idea of these ideas are in the process of learning, the brain store

information, its process, and the change of previous conceptions. Learning is not just a process of absorbing information, ideas, and skills; because the new material will be constructed by the brain. Constructivist attitude is not merely knowledge transmitted by teachers or parents, but would have to be built and displayed by the students so that they can respond to the information in an educational setting. 2) Meta-cognitive is related to constructivism in how effective learners are aware of how they should learn; they developed the devices and observed the progress of learning. Teachers have to really pay attention to the learning patterns underlining each model of teaching to help students develop meta-cognitive control over each model and try to help them learning to construct knowledge learned. 3) Scaffolding refers to the various ways that can be applied to help students acquire meta-cognitive control to maximum. This strategy is used to observe the ability of the students as a learner and to pay attention to their learning strategies. 4) Finding the most likely areas of development. The best procedure to encourage the development of the individual to the complexity and flexibility is to compare the rate of development of one's personality and the environment, while still trying to get the individual to enter the next stage of development. 5) The role of expert performance in selecting the destination. Essentially, this requires the performance of whatever thing that can be done to build curriculum step by step. The curriculum itself is designed to help students move toward a higher level of competence or anything the teacher delivered to the students in order to achieve the highest performance, while recognizing that the behavior of "expertise" is limited by the development of their ability.

One model of student-centered learning is by involving students in the original research problem, exposing them to areas of investigation, helping them to identify conceptual or methodological problems in these fields, and inviting them to devise ways of solving problems. From here, they can see how knowledge is created and built a community of scientists. At the same time, they will appreciate the knowledge as a result of exhaustive research process and may also learn the limitations and advantages of the present knowledge. The structure of scientific research in the teaching model has many forms. Basically, in the first stage, the students presented the research, which includes the methodologies used in the study. In the second stage, the problem began to be arranged so that students can identify problems in the study. At this stage, students will experience some of the difficulties they have to overcome, such as the interpretation of the data, or the establishment of data, or control trials, or formulation of conclusions. In the third stage, students are asked to speculate on the matter, so that they can identify the difficulties involved in the study. In the fourth

stage, students are asked to speculate on ways to clarify the problem, re-designing trials, process the data in a different way, generating the data, develop the constructs, and so on (Joyce, Weil, & Calhoun, 2009).

The first phase	The second phase
Students are shown one field of study	Students formulate problems
The third phase	The fourth phase
Students identify the research problems	Students try to clarify the issue

Table 1 Structure of The Research Model

Finding and Discussion

A structure in scientific approach of teaching model can be developed to be a learning architecture such as Research Elaborate Order and Publish (REOP).

The first phase, **Research**, explores the richness of the concept of students. This is the process of searching for and finding all the theoretical concepts that must be learned by teachers and students through literature that is useful to construct knowledge in the form of concepts or theories as a whole based on universal scientific standards. Teachers will have to learn the school curriculum or classroom curriculum that will be taught, while students learn necessary concepts in the context of universal science, not international. The steps in Research are:

1. Studying the structure of the existing science to the field of study or related subject, and choosing the concepts of science or field of study or subject area to be taught.
2. Select only the essential concepts. Non-essential concepts should not be used in this research.
3. Teacher and students should do in-depth study of the concepts that have been raised through library, searching on the internet, or asking to the expert of the specific field learned. Keep referring questions. For example: How do I obtain an explanation and definition of the concept? Do the explanation exist in the dictionary, encyclopedia, internet?
4. The results of the study (about the scientific concept) are made into concept map or sequence of logical thought, so a full understanding of the overall concepts taught can be achieved.

5. Write the concept map, the structure of thought or logical order in a way that the researchers can compare the structure of thought which made with each other. As a result, each students will be confident with the structure created with the help of teachers.

The second phase, **Elaborate**. Students along with the teacher confirm the findings of a concept with empirical evidence. This is the process to confirm the findings obtained previously (review) based on evidence that is laboratory or field work observation, interviews and other ways that meet the requirements of science. The results of this process will be the findings of knowledge which has been confirmed with the empirical evidence. Students in private or group will report the findings in writing scientific reports using a common standard. Steps taken:

1. Select the essential concepts that will be studied based on a logical sequence that has been made in the previous stage.
2. Find the real evidence from the daily life or conduct experiments (simple research) in the laboratory. Field work can also be done to verify the concept or theory learned.
3. Arrange the particular evidence in a logical sequence as to elaborate.
4. Students write the findings in the form of evidence in group or individual under customary rules of scientific writing.

The third phase, **Order**. Students discuss the results of confirmation with a friend. In this step, there will possibly be controversial issues found, because the step discuss mainly about the subject which sometimes is not in the same line with the study of spiritual values and religious, also moral and cultural values. For example: questioning about child, gender, family, human rights, justice, poverty, democracy, destruction and environmental integrity. This process is important because it has the intention to allow the students to make decisions based on their conscience as the foundation to act according to the conscience of the students. This means that the Order becomes an imperative internalization of ethical values.

The activities and sources on Research can be found from Library Research, e-library, website. The data sources for Elaboration such as Survey, Service learning, Experiment and Laboratorium project. Order activities by reporting, making tutorial, and writing.

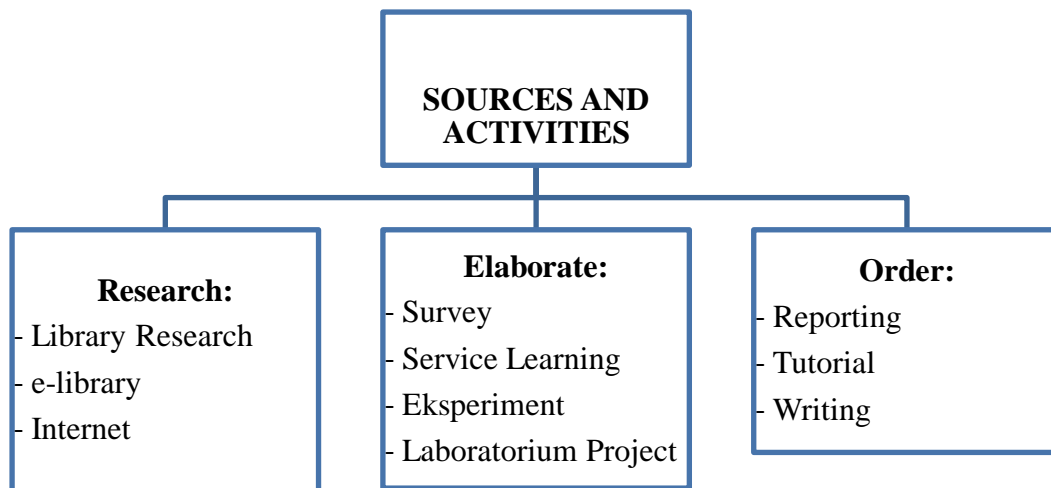


Figure 1. Sources and Activities for Research, Elaborate and Order

The fourth phase, **Publish**. Students communicate the results of their research to others. The process of discussing or reporting the findings obtained in step carefully in the form of discussions, tutorials with classmates by students. Alternatively, invite resource persons or experts in the field. The students will use a variety of medium on their own, for example through workshops, conferences, or seminars. There are opportunities for students to choose a more communicative and expressive medium, for example through painting, performance art, posters, and so on. All feedbacks obtained as the result of communicating the findings of the research-based learning has an educational dimension that is to make the inventors have humility along with high integrity. At this stage students develop the capacity of communication skills (oral and written), application of knowledge (qualitative & quantitative), utilization of IT, improving learning and performance, also the ability of working with others.

The flowchart of REOP learning architecture can be described as follows:

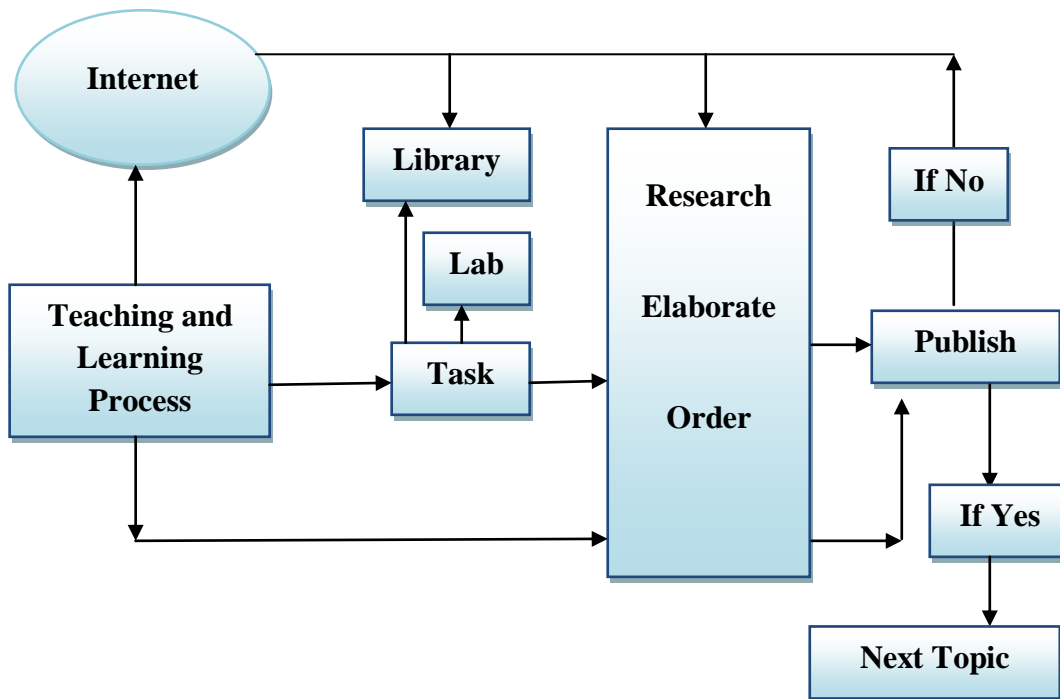


Figure 2. The REOP Flowchart

From the flowchart, it is shown that the teaching and learning process begins by the distribution of tasks. The sources to complete the tasks can be found through searching on the internet, doing laboratory experiment, or through some readings in library. Then, proceeds to Research process. Done with the Research, we then can Elaborate the result of the Research. Subsequently, the result of elaborating should be out in the correct order (following the correct steps of Order). Next, the final result can be published. If the result is accepted, there will be a continuation to the next topic; if the result is not accepted, a further study of the current topic should be made using the exactly same steps as previous.

Conclusion and Suggestion

All processes in REOP learning architecture can be considered as a way to develop a curriculum through scientific approach. REOP architecture is a highly appropriate model of teaching that promotes students' liveliness.

Educators need to be aware that the selection of appropriate teaching model will affect students' learning capacity (Hackathorna, Solomon, Blankmeyer, Tennial, & Garczynski, 2011). An understanding of learning (learning phase, the results of study) is needed in order to recognize how learning and knowledge building. Learning can be viewed from two theories, the theory of learned behavior and cognition theory. Underlying constructivism of learning theory is a theory of cognition, which assumes that learning is a process that follows the

model of information processing, where there is the transformation of inputs into outputs. Learning is a process by humans and is due to the interaction between the learner and the environment, and generates a response due to the interaction between the new information that has been stored in long term memory (Rustaman, 2005).

Teaching is a complex endeavor. Combined factors, such as students' motivation and the instructor's rapport with the students, have the potential to influence how effective any technique is (Tomcho & Foels, 2008). The need to update the learning approach involves the essence, content and methods of learning. This update on a floor by the findings / theories / concepts of the new growth of the brain and intelligence, and is triggered by a change in a multidimensional environment and life requires commitment and human capabilities (HR) is higher (Suryadi, 2007). In Students learning system, students being demanded active doing assignment and discussed with teacher as facilitator. If students active, their creativity will developed (Hadi, 2007).

The success of a teaching model to improve students' learning capacity is influenced by various factors. Factors that play a role in influencing the success of this learning are educational institutions, educators, and learners themselves (Hadi, 2007). The REOP Architecture can be used to develop a curriculum that leads to students' liveliness. A suggestion for further research is about how this learning architecture can be used for all levels of education starting from early childhood education into the college level.

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E-LEARNING-BASED TRAINING MODEL FOR ACCOUNTING TEACHERS IN EAST JAVA

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Abstract

The improvement of teachers competencies have been implemented through conventional training or “class” training. The model demands on high cost and limited participants. The survey result in East Java reveals that the majority of teachers seldom involve in training activities, meanwhile Information and Communication Technology (ICT) has been accessible and affordable in cell’s coverage area. The availability of ICT facilities provides opportunities to implement e-learning-based training for teachers. This research aims to use a development research and a test model of effectiveness by using an action research. The result of development signifies that e-learning model should concern in the capabilities of participants in ICT (Direct and Indirect Model). In common, both models contains component of online class orientation, training session and learning evaluation. The result of study shows this model is able to improve the teachers’ capabilities in Financial Accounting. Teachers with high capabilities in ICT are more easily adapted with e-learning, hence all processes might be implemented in online basis. Conversely, teachers with low abilities in ICT are vulnerable for failures in online training. Accordingly, an indirect training might be executed through a phase of ICT orientation and orientation of online class before conducting further phases in online training. The improvement of effectiveness in independent learning process requires a comprehensive content in e-learning and should be performed in sequential basis. Additionally, it is prominent to implement training at the same time with school schedule. Despite of the availability of ICT facilities at school, an academic sharing might be easily comprehended.

Keywords: *E-Learning, Teacher Training, Accounting*

Introduction

A variety of studies have stated that teachers have prominent role in the successful of the graduate students (Odhiambo, 2008; Heck, 2009). Considering the teachers’ significant roles in learning process, teachers are encouraged to simultaneously improve competencies in accordance with development of knowledge and technology. It is supported by Craig et. Al. (1998:12) revealed that a key success in teachers’ performance quality is the continuity of enhancement of teachers’ competencies. Teachers as agents of change in school should be the main priority in developing education quality, despite other available resources at school (Hooker, 2010). As a result, Indonesia government has employed several educations and training model for teachers. However, the training conducted primarily has been operated

under conventional model (class training) in which education is limited by space and time. The conventional training model also requires time, energy and high costs.

In order to mitigate the constraints above, the rapid development of Information, Communication and Technology (ICT) might be alternatives of solution as ICT is more widely accessible and is categorized as low costs. The application of ICT in training might reach more participants at lower costs. Chakupalesa et.al. (2013) states that the distance education might improve access quality at low costs. Besides, the ICT also creates academic sharing and experience among teachers in different ages, different abilities and different areas with distinctive problems. Lindquist & Long (2011:225) affirmed that the application of ICT might result in a “digital native”, a term to represent people who are growing up with information and technology.

ICT for learning has been implemented by numerous universities. E-Learning is a part of distance learning. Simonson, et.al. (2008:25) affirms that distance learning is a methodology and technique strategy which offers possibilities for delivering content and providing communication among participant in education process even the participants come from geographically diverse area. The study contribution in digital era might be observed in the outline of innovative method supported by ICT to maximize learners in dialogue approach in students-centered learning (Salmon, 2002; Sandholtz et.al, 2002).

Afifi (2011:365) observes by which e-learning is a principal device to be applied in overload teaching in a large number of universities in Egypt. The potential advantage of e-learning is the flexibility in large class and study time, the improvement of students' abilities in accordance with knowledge that are independently absorbed, the development of information retention, the delivery of education for local students, the mitigation of educational costs and the delivery of education for disable students. The learning process with e-learning encourages people to independently express ideas in virtual classroom and creates high quality in communication (Davis, 2012: 13). Apart from that, e-learning also broadens educational opportunities for learning via ideas sharing among colleagues and teachers. In its development, e-learning has been applied in training model. A study conducted by Li (2009) found e-learning in pre-service teacher training was successful because e-learning has capabilities to attain learning objectives. The capabilities of independent learning from pre-service teachers improved and students also actively participated. The distance learning program was also employed by Lakatos et.al (2003:28) with the aim of providing flexible learning in space and time. In developed countries and developing countries, e-learning has been widely delivered in service media to comply with

demand of upgrading knowledge, skill and qualification of teachers (Burns, 2011:9).Based on the above rationality, this research aims to improve e-learning-based training model which is supported by Moodle for accounting teachers in East Java.

Methodology

This research was carried out into 2 phases consisting of development model and a test model of effectiveness. The improvement of prototype model used a development research model Dick & Carey (1985). A product of this phase is a conceptual model, that is, e-learning-based training model for teachers and it is supported by moodle. In order to test the model, an action research design was applied. A targeted population for the test model of effectiveness is Accounting teachers in Senior High Schools in East Java. A random sampling results in sample of this study which covers Probolinggo, Pamekasan, Malang, Mojokerto, Banyuwangi, Tulungagung, Ponorogo, Situbondo, Blitar, Lamongan and Lumajang, which each area had 35 people as sample. Data collected by using documentation technique, assessment and questioner. Further research data was analysed by using qualitative analysis and quantitative analysis.

Results of Study

A. The Advantages and E-learning-Based Training Model

A survey result in 6 (six) cities in East Java shows that 56% of Accounting teachers have education background in non-Accounting area. Even teachers with work experiences more than 20 years, but there is a lack of efforts in improving teacher competency. There was 67% teachers have rarely participated in professionalism-related training for more than the last 20 years. It is indicated that the causes of the circumstances include limited funding, a large number of teachers and a high demand on additional competency that must be obtained by teachers nowadays.

The survey also seems to indicate that the majority of teachers have accesses to PCs, notebook, Internet at home, school and home environment at low costs. Even though there is a complete computer facility, but almost more than 50% of teachers have experiences neither in using ICT for learning objective nor other objective purpose. The condition is supported by data that signifies only 15% teachers stated they often have access to computer facility and Internet to attain information and communication. It is as a result of a fact that teachers have no comprehensive acknowledgment in operating ICT.

Considering the requirement analysis above, training prototype developed in this research uses WBM (Web Based Model). WBM covers not solely the use of computer as communication media but also online learning, online communication, e-mentoring, webinars, webchats, telecollaboration and teleresearch projects (Burn, 2011:53). There have been numerous WBM format might be used but this research uses Moodle.

A training class is designed in a form of e-learning pages comprising of main page, Orientation of Online Class and training sessions. The main page of e-learning provides general information including training subject, guideline, news forum and information about instructors. The main page aims to inform training participants to be physically and mentally prepared for being active and effective participants. Participants must aware that being independent learner and highly participate in this training model are compulsory. Each page provides menus for training materials, discussion, assignments, forum and other menus that are accessible for participants. The questioner result also signifies that navigation design enabled participants to find class content and inclusive features.

For participants categorized as newcomers in e-learning, the model provides Orientation of Online Class. The Orientation of Online Class is designed to provide opportunities for participants in understanding the content in e-learning in order to avoid further technical difficulties in the main session of training. A survey conducted by Li (2009) reveals that when participants independently learn materials, teachers/instructors supports are still in high requirements.

A main session of financial accounting training is organised in a form of training session. Each page provides learning components consisting of learning objective, materials, learning process and evaluation. The learning objective is displayed in every “entrance” of main page. Training materials are displayed in module, Powerpoint, tutorial video and linked articles. Tutorial videos are performed in TeacherTube. Synchronous and asynchronous model are used in learning activities, meanwhile a learning evaluation is conducted online by using features in Moodle.

B. The Result of Model Test

A model developed above has been tested for effectiveness in Accounting teachers covering 11 cities in East Java. The training was carried out into 3 cycle, comprising: 1) orientation of online class; 2) training in Accounting for Inventory; 3) Accounting for Fixed Assets.

1) Cycle 1: Orientation of Online Class

In this research, activities in Orientation of Online Class were online implemented. It signifies that participants joined the class from distant areas. There were three prominent activities in this cycle consisting of an assignment about biodatasubmission, an assignment about discussion forum, and an assignment about assessments and quiz. The result of test shows that only 8 participants were successful in submitting biodataon schedule, 10 participants had filledbiodata but unsuccessful to submit; 12 participants submitted biodata outside time required. The low participation in submitting biodata might be caused by: (a) Orientation of Online Class was online-based implemented thus participants withlimited skills in ICT had difficulties in the operation of computer technology; (b) participants had no efforts to read guidelines forbiodatasubmission; (c) participants who filled biodata but failed to submit because there was the last phase missed in the process of submitting.

Other fact shows that none of participants involved in an assignment about discussion. A similar condition also occurred in assignment about quiz. There were only 15 participants were active in completing exercises. The low participation in discussion forum might be as a result of: (a) e-learning-based training is a new media for participants and participants have lack of experience in sharing open ideas/information/advice in discussion forum; (b) a timid or unconfident feeling to express information in discussion forum; (c) the guidelines for Training Activity has been unread by participants thus an activity like discussion forum is considered as a complement not a compulsory. In order to improve the participation, the 2nd cycle encouraged participant for being active in discussion.

2) Cycle 2: The Training of Accounting for Inventory

A pre-test was performed first before training materials delivered. From 30 active participants in 1st cycle, there were only 20 participants had been involved in pre-test. The average score of pre-test in accounting for inventory was 4.33 and pre-test in accounting for Fixed Asset accounted for 5.9.

Furthermore, training activities were executed for materials of Accounting for Inventory by using synchronous and asynchronous format. The learning activities were carried out into 3 activities comprising of independent learning, discussion and assessment. In an independent learning, participants were able to access materials. The effectiveness of independent learning process might be observed in sorts of discussion topics raised by participants an the result of assignments and quiz. The majority of discussion topic relates to materials which have already written and discussed in modules and tutorial videos. It signifies that several participants had no comprehensive acknowledgment in materials. It is

indicated that there was a failure in the way of participants' learning. Participants watched video without reading modules first. In addition, participants also finished up assessment without a comprehension of modules. The design on materials delivery in e-learning which could be accessed at the same time was considered as an ineffective design. The final result of this was the result of assignments about Accounting for Inventory that only accounted for 4.2 (out of 10). Besides, the majority of teachers involved in e-learning when there was a schedule at school, meanwhile this training was delivered in school break schedule.

In order to reach an increase of participation in discussion, instructors encouraged participants in two efforts. The first effort was an announcement about a compulsory to participate in the discussion activities because it is a prerequisite for obtaining training certificate. The second effort was a regular display design about status of participation. Those efforts were considered effective as there was a mark increase in participation at discussion forum reaching for 10 people. The most preferable discussion topic relates to recording process of inventory that was excluded to be delivered in Accounting textbooks.

3) Cycle 3: The Training of Accounting for Fixed Assets

In this session, the number of active participants in training amounted for 20 people. In similar with Cycle 3, the learning activity was carried out into 3 activities consisting of independent learning, discussion and assessments. The independent learning process was improved by the design of accessibility materials in sequential basis. Module was designed as the first material to be accessed while other materials were hidden. Afterwards, materials in form of powerpoint was shown and followed video tutorials and linked articles. A forum discussion and assignments were opened after participants learned all training materials. This treatment was effective because it had a great impact on the average score of assignment reached 8.0 (the last assignment was 4.5) and post-test score was 7.94 (compared with post-test score in Accounting for Inventory which only contributed 5.90)

In 3rd cycle, participants' participations had a significant increase. Accounting for 8 people were actively involved in discussion forum with topic from instructors and 12 people were active in discussion forum with topic arisen from participant. The cases discussed were the treatment of Accounting for Fixed Assets in IFRS basis and other real cases related to Fixed Assets.

Discussion

As discussed above, it is stated that e-learning model applied in this research is WBM model. The quality of e-learning prototype developed, generally might be observed in 4 components, including content, communication, assessments and explicit learner support (Goldsworthy & Rankine, 2009).

1. Content

Mubarik (2012:1) stated that a good content is able to integrate explicit and tacit knowledge, and deliver to students as well as conventional learning which have the following characteristic:

- a. Accessibility/Shareability refers to content that is accessible from one location and sent to another location. The prototype model developed had been met the criteria of accessibility by using web browser such as Internet Explorer, Mozilla, Google chrome and other browsers. The training contents are accessed by registered participants, administrator, instructor and guess visitors. The ease of access in learning materials might be executed by using Learning Management System (LMS)-Moodle application has been considered as a well established and comprehensive and open source (Sutanta, 2009:4 dan Tsauri, dkk. 2009:2). It is also supported by reviewer of prototype that affirms the prototype model has attained the criteria of ease of access.
- b. Interoperability refers to content developed might be operated by using different tool in different operation system platform and might be operated in some sorts of operation system in several mobile facilities. This research has learning content comprising of text based and multimedia content. The content developed in this training model has been integrated all facilities that create interactive effect. Multimedia is more interesting and might motivate learners to participate in virtual learning process (Vamosi, et.all. 2004:7; AFT, 2000:18).
- c. Durability means the content is developed to sustain from development and alteration of technology. The implementation of moodle for the prototype is based on several considerations that moodle application is a free open source, enable for modification by instructors in accordance with the requirement, might be updated, and might be compatible with operation system and highly used by provider web hosting (Sutanta, 2009:14).
- d. Reusability, it is a content reused to make further development. The learning content developed in prototype model in this training involves material of Financial

Accounting in principle basis. The reusability criteria prepared in material of Financial Accounting because it is considered as a development plan to reach the next level of Intermediate Accounting.

e. Cost Effectiveness

Cost effectiveness is a content that might improve efficiency and productivity. Although e-learning is considered as a low cost media in term of learning process, but it demands on high initial investment to design and create LMS programs, the cost of developing materials, the cost of introduction, the cost of training and other related expensive costs (Sutanta, 2009:14). Apart from the high investment cost, time efficiency and cost efficiency in e-learning might reflects several conditions such as it excludes expenses in class facilities, and it reaches training students in isolated areas, the availability of instructors. In addition, training students are also able to independently manage study time (Effendi and Zhung, 2005 in Sutanta 2009:13).

2. Communication

In similar with face-to-face learning in conventional class, the success of e-learning-based training is determined by the role of communication between trainer (teacher) with students (learner), and communication among learners. Learning communication designed in this training uses synchronous and asynchronous model. Synchronous model assists learner to be participant without isolated feeling. It also avoids frustration in questions or answers in real time basis (Hrastinski, 2008). Communication synchronous media prepared by Moodle is Chat. Chat enables direct communication between learner and instructors and other learners in real time. Additionally, the direct communication also uses other medias such as handphone supported by Short Message Service (SMS), WhatsApp, Line and other similar medias. Asynchronous media in this research are in discussion forum and email.

3. Assessment

Assessment is a core of study activities and teaching. Basically, assessment in e-learning is similar with conventional learning but specifically, there is an e-assessment in e-learning. E-assessment is assessment supported by ICT to present assessment activities and record responses, including assessment process end-to-end from training participants' perspective and tutors (JISC, 2007:6). In this training model developed, the assessment of training result developed in Computer Based Assessment (CBA) which is associated with an

evaluation delivered and marked by computer; and Computer Assisted Assessment (CAA) that refers to an evaluation which is fully supported by computer. CBA is used in online Quiz in which the evaluation tool and evaluation process of study result are executed by moodle. Training participants might finish online quiz and directly observe the study result. CAA model in this model is assignments and discussion forum.

4. Explicit Learner Support

Explicit learner support becomes one principal component in the quality of e-learning. Explicit learner support focuses on e-learning to support learners in integrate e-learning (in this research uses Moodle) with software and (or) articles linked with other external programs (Goldsworthie&Rankine, 2009:340).

Explicit learner support must involve text-matching software, links to students support materials (internally provided) and links to students support materials (externally provided). This research is limited to links to students support materials (internal and external) thus it excludes text-matching software. Text matching software relates to assignment provided for learners that are supported by software to evaluate whether the students' assignments are free from plagiarism (Goldsworthie&Rankine, 2009:340). Text-matching software is excluded as assessment in the this prototype because there was no essay assignment that had subject to plagiarism risk.

This prototype also has links to students support materials (external) comprising of links to articles (reading sources), links to guidelines of assessment activity and links to other relevant information which meet class objective. Meanwhile, links to students support materials (external) developed is linked materials or articles from credible website. Students might search for link materials from other websites rather than articles provided in training. Additionally, participants have opportunities to access learning video which is supported by software screencast O-matic via link connected with TeacherTube.

In reviewing of the result, it can be observed that participants with high performing skills in ICT had advanced score in training. From 35 participants registered, there were only 20 people participated during the training. There is a possibility that distance learning from initial process in this training became one cause of the low participation. Participants failed to be involved in training full time because an orientation of online class online conducted. The low capabilities in ICT became constraints in learning process. Accordingly, e-learning-based training might be more effective if training participants have basic skill in ICT. For

participants with low skills in ICT, it is compulsory that Orientation of Online Class is conducted via face to face between instructors and teachers at school. It is in accordance with Li (2000) that reveals students might have difficulties in learning material independently, hence it is preferable if there was a guide to how to join e-learning before the real online class executed. According with the case, this online training model should be carried out into 2 models as follows:

a) Direct Model

Teachers with good skill in ICT are targeted for this model. Accordingly, all phases in e-learning range from orientation of online class to evaluation that might be directly online implemented.

b) Indirect Model

This model is suitable for teachers with low skills in ICT. Teachers in this group should engage in ICT first before following training session. The Orientation of online class might be conducted face to face in class (offline). Afterwards, the online class might be initiated if participants have good skills in ICT.

It is significant that an effectiveness of independent learning process should consider the sequence of e-learning content. It signifies that not all contents might be accessed at the same time, but must be displayed in sequence basis according to phases in learning process. It is a critical factor because an independent learning becomes an undeniable factor in the success of training. Chao et.al. (2006) reveals that students are influenced not only by study facilities but also by how the learning process is conducted. In depth, Schramm, 1977 (in Allay, 2004:15) explains the learning process is more highly determined by content and learning strategy available in learning materials rather than technology used to deliver instruction.

After participants comprehend material content in modules, powerpoint and tutorial video, participants might raise question or discuss material in discussion forum. The questioner result shows that 95% of participants were excited to hear opinion from others whose different background and ideas from others were considered as prominent assistant to comprehend a topic. Discussion materials were arisen by instructors or participants. It is in accordance with Li (2009) that reveals the implementation of online discussion might increase motivation of students.

The activity of discussion board covers weekly entry such as reading or discussion in latest issues (Godsworthy&Rankine, 2009). In discussion forum “online class problem” is

expected to be media for participants to solve technical problems from the beginning of the training initiated, hence participants have no disadvantages when joining the training just because technical problems. Considering activity of Discussion forum, it might be concluded that training participants have numerous questions or cases related to Accounting materials. The condition risen because there has been an application of new Accounting Standard and teachers have lack acknowledgement in that matters. This information is important for government or responsible parties to improve teachers' competency and to observe all requirements or constraints encountered by teachers in the implementation of professional tasks.

The result of test also shows that a schedule of training failed to be executed on time because the training was applied in school break schedule, meanwhile the majority of teachers (training participants) accessed e-learning at school. It therefore, it is critical to consider that the training schedule should meet school schedule. Although there was a failure in reaching schedule, but the result of test revealed the score of post-test increased and it signifies that e-learning-based training enables the improvement of teachers' acknowledgment and comprehension in material of Accounting for Inventory and Accounting for Fixed Assets. The success of this training supports a research conducted by Li (2009) that shows the use of e-learning in pre-service teacher training is successful since e-learning might reach the expected learning objective. Similarly, Moon (2005) also conducted e-learning in workplace-based for manager in Small Medium Enterprise in Europe. The distance learning was also applied by Lakatos et.al (2003) with a view to providing more flexible learning over space and time. In developing and developed countries, e-learning has been widely delivered as a part of service facility to meet the requirement of upgrading knowledge, skills and teachers' qualifications (Burns, 2011)

Conclusion

The availability of ICT and teachers capabilities in ICT leads possibilities of improvement in e-learning based training model that assists teachers develop the skill via a training from distant areas supported by ICT. The e-learning-based training is effective only if students have good skills in ICT particularly in how to operate MS Office. A group of teachers who have lack of how to use ICT effectively was the most barrier in this sort of training. A treatment of this is the group should be engaged in Orientation of Online Class that includes materials of ICT before the real class of training is initiated.

In order to improve the effectiveness of training for teachers and school, the training materials should consider teachers' demands. The training materials might be designed in form of modules, powerpoint or macromedia flash, tutorial video, link materials or link articles from credible websites. Those materials are displayed to participants in sequential basis, beginning from modules then followed by powerpoint then tutorial video and link website. It is significant for participants to access and learn all materials in a correct order thus the acknowledgment of materials might be well attained.

In difference with a conventional training, it is suggested for e-learning-based training model to be executed in school days (not in school break schedule). It is as a result of the majority of teachers only access e-learning at school. The implementation of ICT at school might deliver substantial positive effects and also enables an existence of collaborative learning among teachers from different schools.

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CONCEPT AND CONTEXT RELATIONSHIP MASTERY LEARNING AND THE RELATIONSHIP BETWEEN BIOLOGY AND PHYSICS CONCEPT ABOUT MANGROVE FOREST

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Abstract

The destruction of mangrove forest ecosystem function is very influential in both aquatic and terrestrial biota and also cause decreased function and benefits of mangrove for the people and the environment. Therefore, it is essential for all the parties such as the government, parents, teachers, and community to take an active role. The Thematic learning is a teaching and learning activities which is combining multiple subjects material in one theme that also can involve parents and the community. This study developed a thematic learning designed of mangrove forest and also held outside the regular school learning. The purpose of this study is to describe the mastery of concepts, relationship between concepts and contexts, and the relationship between the concepts of Biology and Physics of mangrove forest on student at SMP Kristen Bellae. Kab. Sangihe. This study, use the method of research and development of thematic task-based learning with substitution or integration of local elements of targeted school and environment. The result shows a relationship between the two variables measured, where the relationship between the average indicator reaches 0.41 with enough correlation criterion.

Keyword : *Thematic Learning Task, Mangrove Forests, Concept and Context.*

INTRODUCTION

Mangrove forests are one of the forest types that grow in tidal areas which are inundated during the high tide and free from water-logging during the low tide, which the communities plan can adjust with salt (Purnobasuki, 2012). Dahuri, 2003 in Kordi 2012 suggests that mangroves are found in coastal areas that are protected from the onslaught of waves and sloping areas. Therefore, it is often that the destruction of mangrove not only occurs naturally, but also because of the human activities that occur in coastal areas.

The destruction of function the mangrove forest ecosystem is very influential in biota habitat, both aquatic and terrestrial biota, as well as a decrease in the function and

benefits of mangrove for the people and the surrounding environment. Combating the problem caused by the degradation of mangrove forests are certainly not always put emphasis to the local government, but we as community must have self-awareness, motivation and responsibility to utilize and conserve mangrove forests. Therefore, the role of education is very important. Notoatmodjo, 2003 in Yasin, 2012a expressed aims of education imparting knowledge or understanding, opinions and concepts, changing attitudes and perceptions

The implementation of the curriculum in 2013 with a thematic approach to learning becomes the opportunities and challenges in the learning development of mangrove forests. Poerdawadarminta, 1983, Calmness, 2012 suggests an integrated thematic learning is learning that uses the theme to link the several subjects to provide a meaningful experience to the learners. The theme is the big idea or main idea that becomes a moot point . Shanahan, 1995, in Madellu 2013 suggested that the thematic learning is a method of organizing learning around a theme or topic that allows for intergrated a cross- field study instructions. Yasin, 2012b suggested that thematic learning more emphasis on student involvement in the learning process actively, so that students can gain a hands-on experience and trained to be able to find themselves a variety of knowledge they have acquired. Through hands-on experiences, students will understand the concepts they learn and connect with others who have understood the concept.

Sudrajat (2008) suggested that thematic learning has the following characteristics : student-centered , providing direct experience , the separation is not so clear subjects , presents the concept of a broad range of subjects , and flexible nature , learning outcomes in accordance with the interests and needs of students , and using principles of learning and fun while playing . Furthermore, still according to Sudrajat, said implementation thematic learning in school has several implications, which is the implications for teachers, implications for students, implications for infrastructure, learning resources, and the media, the implications of the arrangement of the room, and the implications for the selection of methods.

Madellu (2013) suggests a thematic approach developed as a strategy to improve students' understanding of: the relationship between the concepts learned in the context of each field of study and the relationship between the concepts of multiple fields of study on the concepts.

Anonymous, 2005a in Madellu, 2013 suggests that the basic steps to develop the thematic learning method is choose a theme, set a time frame for the implementation of activities, ensure the theme and the time frame so the instructor can conduct extensive research, do the field trip, the students began to play a role as the center stage of activity. After all the students have the opportunity to absorb new information, students split from the group and implement the learning function independently. There are some characteristics in the learning process of groups as proposed by Burden and Byrd, 1999 in Asri (2009), which is each group must have a purpose, even though there may be members of the group there is no access to the destination. A group that does not have the purpose of the group, is not a group, and each group has a norm.

According Madellu (2013) the stage of thematic development task included formulation of the theme, the determination of the assignment scope of thematic material, translation of assignment material in the form of integrative topics or interaction, formulation choice of learning methods approach, the task of designing thematic instruction, formulation and process indicators performance indicators, and the development of evaluation instruments. From the description above, the goal of the research is to describe the relationship mastery of concepts and the relationships between the learning context and the relationship between biology and physics concepts of mangrove forests.

METHODS

This research is a development (Research and development) thematic task -based learning that includes a two-stage design, implementation, and evaluation of processes and outcomes. The design phase includes the design standard thematic task instructions and task instructions thematic development of the substitution or integration of local elements of the school and school environments were targeted research / learning

Subjects were Christian Junior High School eighth grade students Bellae. Eighth grade students assumed to have been or being followed regularly in the classroom learning about the concept of diversity of living creatures and plant organs that become contextual enrichment activities conducted on the concept of learning in the classroom on a regular base. The subject of parents as partners in student learning mangrove forest research activities in the design of thematic tasks, parents and community also play a role as a facilitator of student learning, together with teachers and researchers.

Data collection instruments were : Student Task Sheet (LKS) , Observation Data Format , Format monitoring activities observation / measurement in the field, a test to evaluate , and interviews .

Processing techniques and data analysis: Data analysis includes quantitative and qualitative analysis. Quantitative analysis used to describe the research indicator variables, the correlation between the indicators from the initial meeting to the final meeting. Qualitative analysis used to explore and describe the patterns of students' attitudes and perceptions towards design activities, implementation of learning and the role of parents / community using hypothesis testing using the formula:

$$\rho = 1 - \frac{6\sum D^2}{n(n^2-1)},$$

ρ = rho correlation coefficient

D = difference in rank between the variables X and Y for each subject

6 and 1 = rate constant

N = number of cases or samples

(Ipaipah, 2011)

FINDING AND DISCUSSION

Finding

1. The ability to identify living things in the mangrove forest and mangrove forest types, derived from 11 students 0:53. The results considered as a strong correlation.
2. Relationship over function of mangrove forests concept with destruction of mangrove forests, 0:25 obtained from 11 students. The results of this correlation are enough.
3. Relationship mastery wave measurements and identify living things in the mangrove forest , and the destruction of mangrove forests by identifying and comparing the living creatures in the mangrove forests , types , functions of mangrove forests , mangrove forest destruction and wave based measurement and identification of factors that influence on the field . 0.53 obtained from 11 students. Result of this correlation is strong.

4. Relationship mastery of biological concepts mangrove forests (identification of living organisms in mangrove forests) to physics (wave). A strong correlation retrieved from total 11 students that 0.51.
5. Relationship mastery of biological concepts mangrove forest (mangrove forest types) to physics (wave). 0.53 obtained from 11 students, considered as a strong correlation.
6. The relationship mastery of biological concepts mangrove forest (mangrove forest functions) to physics (wave) of the total 11 students is 0.35. The correlation categorized enough.
7. Relationship of biological concept of mangrove forests (mangrove forest destruction) and physics (wave) 0.21 obtained from a total 11 students, the correlation categorized weak.

Discussion

1. The abilities to identify living things in the mangrove forest and mangrove forest types. At first, the learning implemented in the class, which the researchers describe in general living beings and any type of mangrove forests that exist within the mangrove in Indonesia. Ask students to answer the activity of forms in accordance with experience and references of each other. Then the learning is doing in the outside classroom again. In complement of forms this activity; students also engage parents and the surrounding community as a resource to assist in the task, so that the good performance of the students as there is also help from parents.
2. Relationship mastery of concepts function of mangrove forests mangrove forest destruction. Learning implemented first in the class, explaining in general what are the functions of mangroves for natural (environmental) and for other living things, including humans, and any human activity cause damage to mangrove forests, and natural factors that cause any damage to the forest mangroves. After that ask students to answer the activity of forms according to the experience, as well as from other sources of each student, then learning occurs outside the classroom again to complete the entry form, and provide value.
3. Relationship mastery wave measurements and identify living things in mangrove forests , types , functions of mangrove forests , destruction of mangrove forests by identifying and comparing the living creatures in the mangrove forests , types , functions of mangrove forests, mangrove forest destruction and wave based measurement and identification factor- influential factor in the field. In general, the concept of waves, among others, how

to measure the amplitude, wavelength, frequency and wave speed, using the Student Task Sheet contains about the concepts taught.

4. Relationship mastery of biological concepts mangrove forests (identification of living organisms in mangrove forests) to physics (wave). Describes in general about living creature in the mangrove forests, and how the sea waves effect on living creatures in the mangrove forests and how it influence living beings to the spread of mangrove forests.
5. Relationship mastery of biological concepts mangrove forest (mangrove forest types) to physics (wave). Generally explain how mangroves reduce wave, and how well the type of mangrove forests in reducing the huge tidal wave.
6. Relationship mastery of biological concepts mangrove forest (mangrove forest functions) to physics (wave). Explaining the function of mangrove forests for other living things, including humans, and for the natural (environmental) example is the function of mangrove forests to protect residential areas from the onslaught of the waves and the function of mangrove forests as a protective shoreline.
7. The mastery of biological concepts mangrove forest relationship (mangrove forest destruction) and physics (wave), explain what causes the destruction of mangrove forest either from natural or human. Also as a consequence of the mangrove forest dredged; for example when there are mangrove forests around coastal settlements and destroyed the existing ecosystem around the mangrove forest will definitely damaged and disrupted by the brunt of the waves are great because there is no more mangrove forests to reduce wave.

The description of the discussion about the relationship concept mastery and learning context and the relationship between biology and physics concepts of mangrove forests, giving the impression that an important role in learning is needed for the involvement of parents and the community in building a good interaction for the success of learners. Also in building a good relationship between the school, parents, communities, and governments in understanding the importance of the student's knowledge, parents, and society about the importance of conservation of the site for living things, which includes humans?

Djulia (2005) in Laksono, et al (2013), Conclude that the scientific concepts that people can overcome the limitations in the context of learning in school. It is intend that the approach to science learning in schools in the context of the culture and the place of the students are learning very important and well.

Application of a thematic approach to learning that is done by Haji, 2009, from the case study research subjects SD and SD N 69 N 70 the city of Bengkulu, obtaining results that stated that learning to use a thematic approach is better than that taught by using ordinary learning. Further research conducted by Rumidani et al, 2014 on the implementation of the thematic-based learning environments to enhance motivation and learning outcomes through questionnaires, achievement test, and observation. It proves that implementation-based thematic learning environments can enhance learning motivation and student learning outcomes in the implementation process learning experiences that involve students directly so that students are able to discover for themselves the concepts covered in the lesson.

Some relevant research results above show that in carrying out a thematic approach to learning, teachers must be able to innovate so that learning is done to obtain good results and meaningful for students, parents, community, and government.

CONCLUSION

1. The achievement of student learning outcomes are very good, in terms of student participation in answering questions about the biological concept and concept mangrove forests, biological concepts to the context of the relationship between mangrove forests and fields of study.
2. There is a relationship concept and learning context mangrove forests and relationships between concepts of biology and physics of mangrove forests.

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THE EFFECTIVENESS OF TEACHING MULTIMEDIA ON TOPIC OF THREE DIMENSIONS IN TERMS OF THE MATHEMATICS LEARNING ACHIEVEMENT AND INTEREST OF STATE SENIOR HIGH SCHOOL

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Abstract

This research aims to: (1) describe the effectiveness of the use of multimedia in terms of the mathematics learning achievement and interest and (2) investigate the difference of the effectiveness of mathematics learning achievement and interest on the teaching using multimedia and that not using multimedia. The research population was six classes of the tenth grade students of Senior High School 1 Aimas. Classes XA and XF were established as the research sample randomly. Class A received the lesson with multimedia and class XF received lesson without multimedia. The research instruments were a mathematics achievement test and a questionnaire for the students' interest in learning mathematics. The result of research shows that: 1) teaching mathematics using multimedia is effective in terms of mathematics learning achievement and interest; 2) there is a difference in mathematics learning achievement and interest in learning mathematics of the students taught using multimedia and those taught without using multimedia; 3) teaching with multimedia is more effective than that without multimedia in terms of students' mathematics learning achievement and interest.

Keywords: *Multimedia Learning, Three Dimensions, Achievement, Interest.*

Introduction

Mathematics is one of compulsory lesson in Senior High School. The students are obliged to learn mathematics from X-class until XII-class, although in future they will choose major of social science or language. Thus, the students have to learn it. However, there are any observations revealed that students still difficult to learn mathematics, it can be seen from their learning achievement result which in general their mathematics score are not exceeding other lesson scores such as Bahasa, English, Economy, Biology and so on.

The student's obstacles when studying mathematic is important to be revealed, thus recovery can be held in order to improve student's learning achievement related to mathematic lesson. In addition, the research about it necessary to be reviewed from various

aspects to indicate it. Hence, a difficulty that experienced that may be just come from learning / conventional, which is monotonous means teacher do not create an atmosphere of learning which active, innovative, creative, effective and pleasing or it can also because the subject matter that is fairly abstract for some students.

Although fairly abstract, and a mastery of mathematical concepts to be ruled by such a student who listed for the purpose of learning a standard in, because it is important for students to understand math and things pertaining to it themselves. Because of that required a high and patience teacher in learning so students can master the concept.

Pertaining to the purpose of learning and to expand it, the mathematics geometry is one component that matters which requires to be studied in mathematics. Material spatial dimensions three is part of geometry and measurements. One of the reasons the importance of study geometric is to develop skill space on our daily lives. This is in accordance with the opinions Kennedy, Tipps, Johnson (1993, p.98) that geometry provide a close relation to the world. The aspect of practical and esthetical on geometry found in art and architecture, design the exploration of space, planning a house, and garments and the car. The topic is interesting students and can be used to develop student's knowledge and skill, geometry understanding the space of students and the ability of completion of problem solving students.

Useful aspect think geometry is building and manipulated the mind through object infinite-dimensional two and three, and perceive objects of different points of view (NCTM, 2000, p.41). Basic subjects of geometry learned in Senior High School level and related to object infinite-dimensional two and three spatial dimensions is three.

Based on observation in SMAN 1 Aimas (Senior High School 1 Regency Aimas), material spatial dimensions three hard enough studied for most students, because it is an abstract while the ability of the teacher own in conveying the subject matter with visualization are lacking. A picture produced the teacher was exciting and possible only occur inaccurate delineation of it is drawn on the board. In addition, teachers are less have in making teaching media knowledge for students. As manifested by Amin & Wan (without years, p.1) that the teacher is still lacking the skillful use of ICT in their experiences. Teachers usually only teaching in an conventional method so that add to the difficulty of students in learn mathematics.

Although in Piaget theory that students age 15 -18 years (equal to Senior High School) has been in stage operation formal, but no harm to clarify concepts taught teacher using media to the concept of an abstracting nature that may be understood and pre-sighted students. It means that learning school math also deals between the nature of mathematics

that abstract and the intellectual development of students. So there are things / subject matter in mathematics that not every student can understand in the abstract, but requires media / aids to understand it.

As happened in the learning landscape with matter dimensions three in most schools still has not yet reached the purpose of learning mathematics. Most high school students still have difficulties in learning the dimensions of the three. The fact that is powered by the data from the National Examination academic year 2009/2010 on any material dimensions three. On this material only be tested competence with an indicator absorptiveness: "Calculate the distance point to a line in the plane geometric" with absorptiveness students SMAN 1 Aimas at 0 %. This result indicates the need to be researched factors what is the cause low-self the attainment of competence on any material dimensions three in SMAN 1 Aimas district mizzen. Low-self the attainment of competence students to the matter is also very influential to low-self student's achievement, and could be interest students against that matter is low.

Based on the fact that can be found in one of the students at SMAN 1 Aimas, the poll, by pre-survey was to attract the students to learn that lesson in the mathematical dimension three especially still low. Students tend to pay less than the lesson to the teacher to student competency completeness effect in three dimensions, the only lesson 0% percent of the total 65 of Minimal Completeness Criteria that which is prescribed.

Completeness whose competence very low caused by interest learn that is low. It is proven by the results of a survey on the kids SMAN 1 Aimas that has been or never joined the activity of learning with matter dimensions three. The survey interest learn from this material through poll said that interest the students to a criterion low on this lesson.

Students who have interest on certain objects tends to impart a higher profile against that object. Matter mathematics, learning mathematics, math teacher, book mathematics, duty mathematics, about/duty mathematics, and test. mathematics is the object of interest on mathematics. Thus, students who have interest on mathematics are likely to pay more attention towards an object related to math.

The low interest learning about mathematics result in low students achievement. A fact reveal that high school student at a value of the final exam national on mathematics under some another lesson as Bahasa and English. This shows that student's achievement on mathematics is low.

As anticipation step, since early needs to be done an attempt in such until students interested in three subjects, spatial dimensions to be implied to optimality the results of study.

This will create when the student did not undergo an obstacle or difficulty in learning. A learning disability experienced students can only because of learning that does not attract students.

In a learning process in the classroom he paid his dues to find an alternative to deal with the achievement of the students. Learning that both are learning it enables the student to be active innovative, creative, effective and fun. The alternative is a lesson to be taken to make active creative, effective and fun is to develop the appropriate and dissect in order to improve the learning students.

One strategy to learning attractive and exciting and in order for the purpose of learning mathematics high school achieved then to be able to achieve this is to use multimedia in the process of learning.

Learning to use multimedia is learning by using computer aids, as for presentation, as props and so forth. By using computer in learning, then the advantage gained is a computer can accommodate students sluggish accept the study, because it can give effectiveness in their experiences in a more individuals, never forget and never bored, very patient in running instruction as desired program used, computer can also stimulates students to do exercises, performs activities laboratory or simulation because availability animation charts, color and music that can add realism, besides control being at hand students learn that speed students can be adjusted to level master, computer also have the ability recording the activity of students individually and were attributed to other apparatus like video tape, flash disk, and others (Euis Ismayati, 2011, p.15).

Learning with multimedia has developed lately and has proved benefits to help teachers in teaching and help learners in ease understand the concepts and subject matter. As the result showed that learning after using multimedia interactive increase test scores of 42 % and there was a very significant before and after the use of learning multimedia of the standard trust 95 % (Dwi Sudarmanto, Yetty Widya KS. & Yuni Ekawati, 2006: 54).Excellence multimedia with aids computer, learning make more meaningful, because it capable of presenting a kind of classroom interactive. Under observation the utilization of multimedia in learning is expected to add level mastery mathematics, in other words learning use multimedia significantly affect increase study result of the students.

If seen from its function learning by using multimedia it has a dual function in learning, namely (1) a function media pure, namely as media learning interesting and fun and (2) train students to know technology, and so students not being human “stuttering”

technology. Multimedia interactive medium that is very good at heightens the learning process (Zaidel & Xiaohui, 2010: 11-16).

Multimedia in learning mathematics used to simplify resources abstraction performed by a student. Text, images and animation used to help students in understanding matter, to arouse interest learning and are expected to improve performance learning students. The multimedia used is macromedia flash 8 who makes learning being attractive because there are features interesting to be attentive students. Use multimedia with macromedia flash 8 need aids namely computer. From data pre-survey of availability in focus not optimized, teacher more dominant do learning conventional. If linked with existing problems, that this is very possible for teachers to do learning by using multimedia in which computers as tools so hopefully its use can optimized.

Based on description above, the and there are a few issues that need to be considered, such achievement is low interest in learning, the absorption capacity of the three dimensions, as one branch of geometry, and lack of multimedia utilization not as a result of the media in teaching learning and interest achieved, students study algebra to question the effectiveness of learning to use multimedia viewed from three dimensions of learning and interest achieved students at SMAN I Aimas, Sorong Regency.

Research method

It is quasi experimental research with *pre-test –post-test non equivalent group* design. This research is conducted in SMAN 1 Aimas, Sorong Regency at academic year 2012/2013 from April until May 2013. The population is students of class X, SMAN 1 Aimas at academic year 2012/2013. It is consists of 6 classes. Sample is selected in random way; it two classes from 6 existing classes, and obtained class XA and XF. And then XA selected as class/group which learning with multimedia and class XF selected as class/group which learning without multimedia.

Instrument used is test and non-test instrument. Test instrument of learning achievement is question with optional choice and essay which given at early treatment (pre-test) and end-treatment (post-test). The obtained score is converted into score range between 0 – 100. It will be grouped into criteria based on Minimal Completeness Criteria (KKM) set up by school. The KKM score of mathematic lesson is 65. This score used to decide student's percentage who achieves completeness criteria.

Non-test instrument is questionnaire about student's learning interest towards mathematics by Likert scale. It is used to measure student's interest towards mathematic. After be calculated and converted, the obtained interest score as follows:

Table 1.

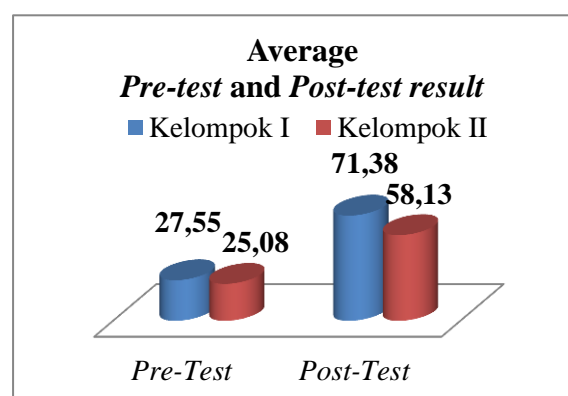
Score Criteria of Student's Learning Interest Towards Mathematics

Interval	Criteria
$80 < X \leq 100$	Very high
$73,33 < X \leq 80$	High
$53,34 < X \leq 73,33$	Medium
$40 < X \leq 53,34$	Low
$20 \leq X \leq 40$	Very low

Before given treatment, all students in class XA and XF are asked to fill out questionnaire about student's learning achievement towards mathematics and solve pre-test question. After given treatment, all students in both classes are asked to fill out questionnaire about student's learning achievement towards mathematics and solve post-test quiz.

Research Result and Discussion

To give description about initial and final condition of student's learning achievement towards mathematics, this following picture provides test result of student's learning achievement towards mathematics (*pre-test* and *post-test*).



Picture 1.

Diagram of *Pre-Test* and *Post-Test* score average

Based on analysis result and the picture 1, it is revealed that result average of student's learning achievement towards mathematics on group with multimedia after given treatment is

met defined standard of minimal completeness criteria (KKM) which is 65. While on group without multimedia after given treatment is remain not yet met defined standard of KKM. Based on students who met KKM standard, most of students on class XA who met defined standard of KKM is 86.21%, while students on class XF who met defined standard of KKM is only 12.5%. Therefore, can be concluded that there is improvement due to student's learning achievement towards mathematics on both classes/groups. The result also indicated that average of student's learning achievement towards mathematics on class with multimedia is much better than class without multimedia.

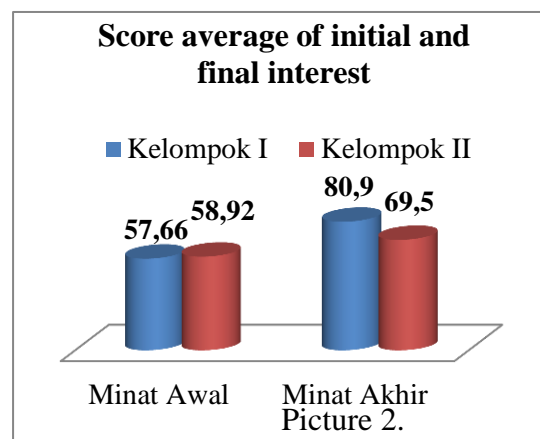


Diagram of interest score average

Based on analysis result and picture above, it is revealed that average score of student's final interest after given treatment on first group and second group is highly different. On first group, the average score is 80.90; it belonging to very high criteria, while on second group, the average score is 69.50; it belonging to medium criteria. It is indicates that there is quite significant alteration from initial interest to final interest on group I ; group which using multimedia in their learning process, while on group II; group which conduct learning process without multimedia, there is alteration from initial interest to final interest, but it is not too different as happened on group I.

Table 2.
Distribution of student's learning interest

Group	Exp.	<i>Pre</i>	<i>Post</i>
		%	%
Group with Multimedia	ST	0	48,28
	T	0	41,38
	S	27,58	10,34
	R	72,41	0
	SR	0	0
Group without Multimedia	ST	0	8,33
	T	0	20,83
	S	91,67	70,83
	R	8,33	0
	SR	0	0

Based on table 2, compared with group which use multimedia, students on group without multimedia have no percentage as well as on group with multimedia. It because on group with multimedia, interest criteria percentage belonging to very high criteria; it reaches 89.66%, while interest criteria on group without multimedia is only 29.16%. It means that students on group with multimedia have more interest towards mathematics compared than students on group without multimedia during learning process.

And then the research data is analyzed in order to find out effectiveness of each learning group. It is conducted by one sample t test with SPSS 16 for windows. Hypothesis examined using one sample t test can be conducted if normality assumption is met. Based on normality test result using *Kolmogorov Smirnov* test, all of significance value is greater than 0,05. It means that all of data is distributed normally. Thus, one sample t test can be conducted. And the result of one sample t test as follows

Table 3
Test Result of Learning Effectiveness With Multimedia and Without Multimedia

Group	Variable	t_{count}	t_{table}
With Multimedia	Achievement	4,32	2,31
	interest	6,16	
Without Multimedia	Achievement	-5,00	
	Interest	-2,28	

From summary of analysis result using *SPSS 16 for windows* on table 3 above, it indicates that learning with multimedia have t_{count} value is greater than t_{table} , so can be concluded that learning with multimedia is effective if viewed by student's learning achievement and interest. While on learning without multimedia, the t_{count} value is smaller than t_{table} . So, it can be concluded that learning with multimedia is not effective if viewed by student's learning achievement and interest.

To compare learning effectiveness with multimedia and without multimedia, it is used univariat test (*independent samples t test*). Before execute univariat test, prior to conduct average difference test towards score data before given treatment using MANOVA test of T^2 Hotelling criteria. If the result conclude that both classes is different, score data analyzed to compare learning effectiveness is score data after given treatment. And then, multivariate test T^2 Hotelling can be conducted if assumption test is met. Assumption test must be met is homogeny and normality test.

Homogeneity test is conducted towards score data obtained before and after given treatment using Box's M test. From that test, it is obtained significance value is greater than 0,05. So, it can be concluded that variants-covariant matrix of both populations is homogeny.

When assumption test of score data before and after treatment is met, it is followed by multivariate hypothesis test. This following table provides hypothesis test result using T^2 Hotelling.

Table 4.

Hypothesis test result using T^2 Hotelling

Condition	Value	F _{count}	Sig.
Initial	0,106	2,660	0,080
Final	1,137	28,430	0,000

Based on test result using SPSS 16 for windows software on table 4 above, significance values is greater than 0,05. It can be concluded that student's learning achievement and interest towards mathematic of class XA before given treatment is not different with student's learning achievement and interest towards mathematic of class XF. For *Hotelling Trace* (T^2) test towards score data after given treatment is obtained significance value smaller than 0.05. So, it can be concluded that there is difference of learning effectiveness with multimedia and without multimedia.

To find out which learning is more effective, it is conducted univariat test (*independent sample t-test*). Beforehand, it is conducted homogeneity and normality test. Homogeneity test is conducted towards score data obtained after given treatment using levene test. It is obtained result as follows:

Table 5
Homogeneity test result using *Levene's Test*

	Variable	<i>Levene's Test</i> (Sig.)
After given treatment	Achievement	0,637
	Interest	0,592

Homogeneity test result toward final score data on student's learning achievement and interest using *levene* test is obtained significance value greater than 0,05. Based on these results, then can be concluded that variant both population is similar, while results test normality use *kolmogorov smirnov*, it is obtained that significance value is greater than 0.05. Therefore, data can be distributed normally. It because data score homogeny distributed normally, then test hypotheses use independent t test samples can be done with the result as follows:

Table 6.

The results hypothesis test using independent t test samples

Variable	t _{count}	df	Sig.
Learning achievement	6,464	51	0,000
Learning interest	5,591	51	0,000

The results of comparison learning test with effectiveness of the value of significance smaller than 0.025, so that it can be concluded that multimedia learning is more effective than learning without the use of multimedia review of achievement learning about mathematics and interest learn students.

Conclusion and suggestion

Conclusion

Based on the result analysis of data and the then inferred some things as follows: (1) learning use multimedia effective review of achievement learning about mathematics student's learning, and interest (2) learning without the use of multimedia ineffective review of achievement learning about mathematics students learning, and interest (3) there are differences effectiveness of learning that use multimedia and learning without the use of multimedia review of achievement learning about mathematics students learning, and interest and (4) learning that use multimedia more effective than learning without the use of multimedia review of achievement learning about mathematics and interest learn students.

Suggestion

Based on the result of the study, and findings suggestion that can be conveyed is as follows: (1) advised to the math teacher to apply learning to use multimedia by increasing the interest of students to learn mathematics which implied to increase students achievement, (2) on learning that use multimedia nor did the teacher must be able to facilitate the needs of a student to be able to understand the material, (3) the teacher began to make multimedia to the matter another so that the learning more interesting to trace expected implied to understanding the student will be learned, matter and, (4) the need for training the manufacture of the media learns in the form of multimedia to teachers Senior High School.

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BUILDING THE STUDENT CHARACTER THROUGH THE ACADEMIC SERVICE

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Abstract

A character education is an education which not only transferring knowledge, but also building the character and behavior of the students. This kind of education has a plus point for the students because it involves many aspects such as cognitive, affective, and psychometric skills of the students. Nowadays, this house concerns of this case by attempting to improve the quality of education in Indonesia. All of these efforts are due to create the generation who has a good character and behavior. As carried out by the academic service center in many universities in Indonesia, they try it by describing clear duties for academic supervisors. Clear duties for every AS help him or her in supervising the students' study. The involvement of the AS ends with a graduation of the students. The interaction between the AS and the students is flexible, as an effort to improve the effectiveness of the academic bureaucracy system. The aim of this article is to give a view and also provide a solution for the educational executors in solving the problems related to the educational policy.

Keywords: *Character Building, Student, Academic Service.*

Introduction

A character building is one of the aims of national education. As stated in the first section of educational statute, one of the aims of national education is to build the potency of the students in order to have high intelligence, and good character and behavior. The role of education in this statute does not only create an intelligence generation but also a good character one. The generation brings out an authentic cultural and religious value.

In fact, there are many educational institutions which have a priority only on some particular subject competences. The other problem faced here is a lack of communication between the AS and the students. The intensity of the relation diminishes by replacing the role of real teacher to the computer based teaching. Amien (1995) states that in order to create competent graduates, an AS is demanded to (a) aware of academic staff duties as a facilitator in teaching learning process, (b) give a willingness to focus on excellence, and (c) give counseling and guidance to the students. The ASs have to show their willingness, sincerity and dedication to the education.

The problems related to the AS are caused by unclear description duty of them. The first example problem is there are many ASs who have not been officially pointed by the high official. This problem creates an anxiety and hesitation felt by the students who are

supervised by them. The second problem is related to the irresponsible ASs who have not been aware about their real duty as the guidance and counseling teacher for the students. These ASs only play their role for administrative necessity such as when the students deal with their semester credits. Besides the administrative necessity, the AS has many other roles. As stated in academic rule in many educational institutions, the duties of the AS are (a) create the scientific figure students who are free to expand their field and skills, (b) at the beginning of every semester, the students are helped by the AS in managing the upcoming credits they have to take, (c) During the semester, the AS has a duty to monitor and guide the students. The monitoring and guiding are needed to help students facing the academic and non-academic problems, (e) while at the end of the semester, the AS has an authority to decide whether the students may or may not take a final examination.

Based on the problems above, it is necessary to find the solutions regarding the character building for the students. Starts from giving a good service from the academic service center, it is hoped to be able to support students' success.

Theoretical Review and Discussion

Competency Based Learning.

A competency is a solving problems capability that is found in every person. It can be seen in how a person finds the best solution for their own problems. On the other word, the competency of a person encourages him/ her to be a wish man in deciding the best decision by using an effective way. In line with this statement, Spencer Jr. (1993) defines a competency as underlying characteristics of an individual that is actually related to criterion-referenced effective and/or superior performance in a job or situation. Moreover, Puskur (2001) explains that a competency is an individual character that appears in their performance. Hence, the competency in this study is an individual ability that is shown in her/ his knowledge, skill, and intellectual views.

Regarding to this study, there are four characteristic of competency. They are 1) personal 2) not compartmentalized in particular components 3) continuous 4) applicable and contextual.

The first is personal. Competency is personal and unique. Developing pattern of competency is unique because it is various based on the personal learning experiences. The individual interest, tendency, ability, learning speed and style, and the problems faced by them affect the individual competency. Hence, the competency-based educator attempts to develop every student's potency.

The second is unrestricted learning method. The competences are developed without limited by subject, time, learning styles, age, genre or profession. It means that education services are unlimited by those factors. It is because learning can be held in anywhere, in anytime and for anyone.

The third is continuity. The competences develop continuously in a human whole life. A child reaches their maturity by learning his/ her previous experiences. Education motivates children be a long life learners.

The fourth is continuum and accumulative. Competences concern academic and non-academic factors. Both factors cannot be separated. An academic skill of a person can be reflected in his/ her behavior or attitude. The accumulation in this case defines as the competences which are continuations of the previous process. It means that the education has to give a real and complete learning experience based on the individual characteristic. This potency involves generic life skills and specific life skills.

The fifth is applicative and contextual. Competency naturally is a crystallization of learning experiences, so that each learning experience affects the individual adaptation and anticipation skills. It gives an individual transferrable skill to solve his/ her problems.

Based on those characteristics, an education or learning based competences can be defined as an effort to equip a program and to give maximum services for every student. On the other word, the learning services must support every student in their own proficiency.

Personal Proficiency and Individual Characteristic.

Every human was born intelligent. There is no exception at all. A child who has mental defect actually has intelligence. For detecting his/ her intelligence, we cannot see from the academic aspect only, but others. God will not something useless. A book titled “Membangkitkan Kejeniusan di dalam Kelas” by Thomas Armstrong argues that sometimes we are trapped by our limited thought in understanding such case. When we are in teaching learning process, such belief will affect how we treat our students. We will make some blocks, and divides particular students into particular groups. And this kind of treatment will affect students’ developing area.

The Armstrong idea realized us about how we thought before, we denied God’s will. We blocked particular students and thought that the intelligences were owned only by what we call “smart people”. In fact, the unlucky people are more than “the smart ones”. For example in 30 students in a class, the students whom we called “smart students” are only 10%. They are the ten best students. While the others, 70% of the students, we usually call

them “the stupid”. The smarts always receive best services while the stupids don’t. Other stupids come from a group of students who got bad mark in Science or Math. Although this kind of students one day got a high score in other study, example Art, they would not be appreciated, in contrast, they will be judged as cheats. While if the “smart students” who always got best mark in Math or Science got a low score in art, they would be stimulated to get a higher mark. And finally, the smarts always be the winner. The intelligences are only owned by some people. Brilliant! It can be categorized as a character murder and structural systematic stupidity. If we are aware of those cases, there will be no discrimination in teaching and learning process.

We were born equipped by our own unique potency given by God. It means naturally a human is a champion itself in their special proficiency. A selection system using a particular scare is used by human being to measure an individual ability. It produces a smart students group and a stupid students group. We are trapped by a thought which states that IQ is more important than other intelligences. If it keeps happening, there will be larger effect caused by it. There will be no less than 70% students lose their opportunities to be professionals in their field.

Surely, we have duty to promote 30% students who have academic proficiencies but not only those, we also have to promote the other 70% students based on their uniqueness. Therefore a new mechanism and strategy is needed to make teacher easier in finding individual uniqueness.

Creating learning atmosphere using proportional promotion will be one of the examples. The enthusiasm of autonomy and decentralization in managing the educational systems supports the development of democratic education.

Regarding to this problem, the superiority of a school in service system is not merely in choosing “raw input”. Ideally, the education system does not matter about the input quality. The students with any condition must be superior to be served based on their potencies. By detecting the weaknesses of students, we also find their strength at the same time. There must be strength. Our duty is solving their weaknesses and promoting their proficiencies.

In Thomas theory, there are 12 characteristics of human intelligences: curiosity, humor, imagination, creativity, amazement, wisdom, vitality, flexibility and joy. According to him, a genius creates a joy for others. In Greek, “*genius*” means *to cause to be born; to sire a child; to be*. These words are related to the word “*happen*”. Historically, the word “genius” has many variations in its usage. The ancient Romans use the word “genius” for the spirit

keeper who protects them in their whole life. In Middle East, the word “genius” is a symbol of individual uniqueness. God gives the uniqueness of everybody without any duplication.

Naturally, every individual is a winner. A person is called as a genius if he/ she is able to find their own characteristic. So that he/ she will be an expert. The learning process in the school is an attempt to help the students finding and developing their uniqueness. Every human has valuable things for his/ her life. If multiple intelligences are similar to the rainbow of the learning that means a genius is a golden jar at the end of the rainbow. The learning process in the class aims to help students find their golden jar, so their life will be brighten. A genius will be obtained in a joyful learning.

Curriculum as a Teacher Learning Aid

A curriculum or Competency Based Curriculum has been designed to aid the learning process. Using curriculum, we can plan and reconstruct our teaching and learning activities easier and make it fun for students. On the other word, the learning atmosphere which is more joyful gives a mean for the students. In this case, the curriculum defined as a vehicle to reach the objective which is developing students’ potencies. As a vehicle, the curriculum does not standardized particular procedure or learning process. It is because it will create discrimination for the students. A standard procedure or process gives many advantages for only the “smart” students.

In order to give a freedom for the teacher and not exploit the students, it is necessary to know the situation and the condition where it is implemented. In curriculum, any situation or condition is important. The curriculum accommodates any uniqueness, any individual potency or any situation and condition around the students. It is called “curriculum for life”.

Curriculum for life is a curriculum designed for optimizing an individual potency development. In this case, a curriculum is placed as a mind mapping , program, tools or a vehicle to reach the expected aims. The achieved learning output can be seen as a dynamic product which supports the strength and motivation improvement to develop students’ skill. In order to prepare the students in facing any condition, the learning process aims to give services for all students in maximizing their potencies.

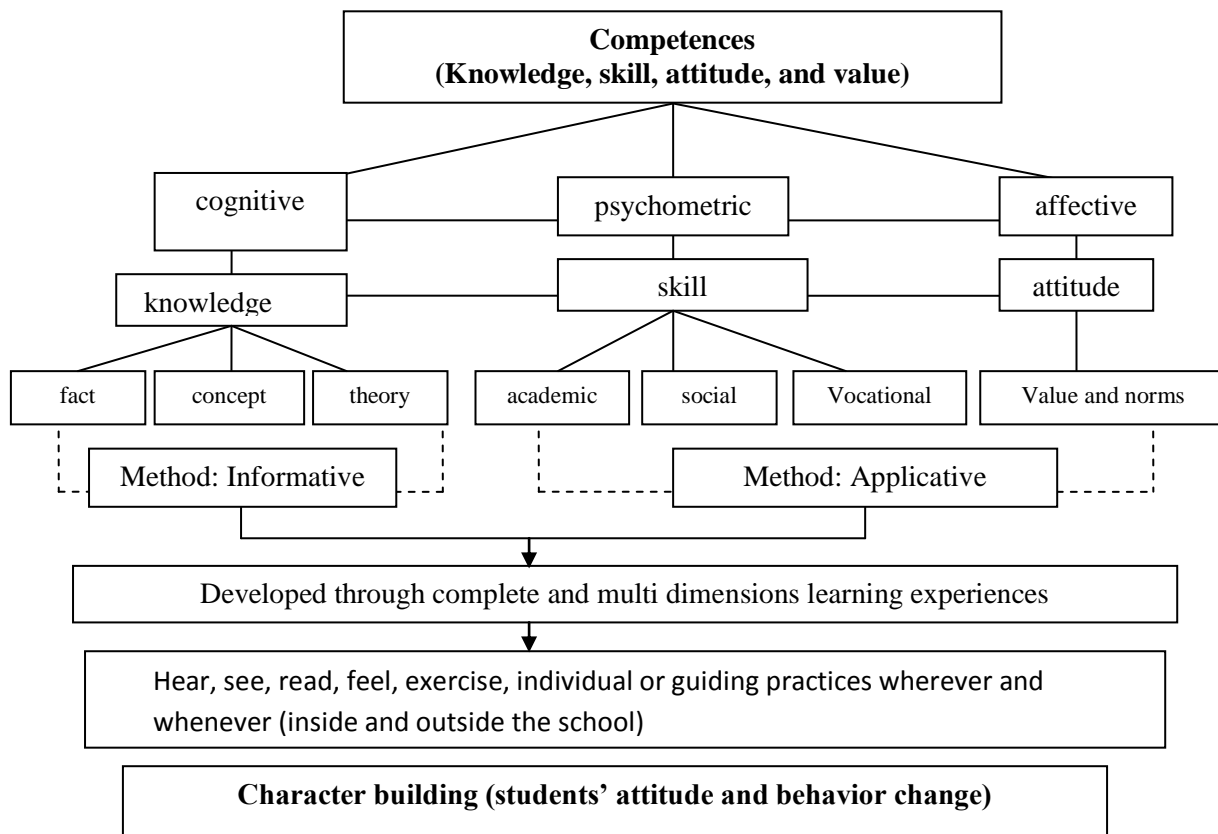
Learning Experiences

The last objective is a measurement for the learning success. The learning success depends on the students’ behavior change. Learning is not only a matter of knowing but also implicating the knowledge in the real life, creating students’ identity, and creating a

harmonious life. Because of those reasons, learning must be constructive. It is based on the idea that every student must be autonomous. The education role is to motivate them recognizing their potency as early as possible and give the suitable services to support it.

Competency formula as a guideline in a curriculum must direct toward the character building, performances and be a good measurement for three skills. They are cognitive, psychometric, and affective. The unity of those three skills are completed each other's.

Competency achievement can be described as diagram below.



Notes:

Cognitive skills can be developed by the knowledge which includes facts, concepts, and theory. Its development is informative. It can be heard, seen, and felt. Psychometric skills can be implicated and reflected using our knowledge. It aims to explore and develop individual potency. The affective skills can be developed by practicing the students to use their knowledge in real life. These practices based on their own norms and values.

Hence, the effective learning process is a matter of giving learning experiences to the students. This process is based on the continuous development so that the learning stages are determined by the individual progress. What being taught today is a continuity of a previous achievement. It means that the learning process has an objective to give a response in every

learning result based on the evaluation. Therefore, the portfolio becomes a main reference in serving individual students.

Learning Design

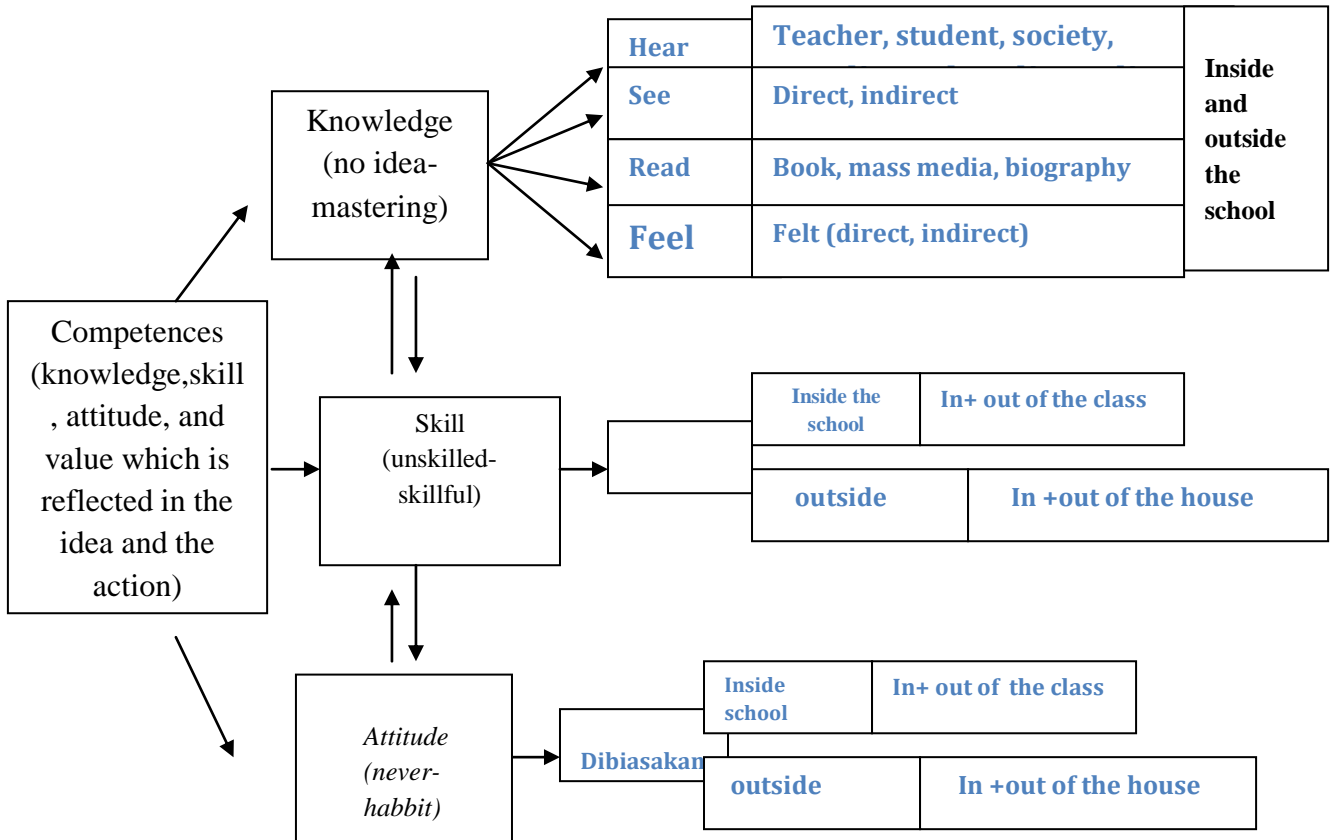
In line with the education objectives, the learning design aims to give a complete learning experience. In a study of “The relative effectiveness of the primary sense” it states that:

<i>We learn :</i>	<i>And people generally remember</i>
<i>1.0 % through taste</i>	<i>10% of what they read</i>
<i>1.5% through touch</i>	<i>20% of what they hear</i>
<i>3.5% through smell</i>	<i>30% of what they see</i>
<i>11.0% through hearing</i>	<i>50% of what they see and hear</i>
<i>83.0% through sight</i>	<i>70% of what they say as they talk</i>
	<i>90% of what they say as they do a thing</i>

It shows that the length of the teacher speech time affect only 20% of the students’ character building. From the data, the students will develop their competences up to 80% if they are given a chance to learn based on their own ways. A face to face meeting/ direct meeting and the teacher actually are not the main sources of learning. The main roles of the teacher are: 1) giving new materials that cannot be acquired by the students’ independently 2) giving a confirmation of wrong concepts 3) helping students to solve their problems 4) developing students’ motivation to develop individual competency.

Teachers need to condition the teaching learning process. The method is by inserting affective skill in the assessment. For example, in learning a social science, in order to arouse students’ empathy, we have to ask them imagine the real condition of particular event. Then they have to write it on paper.

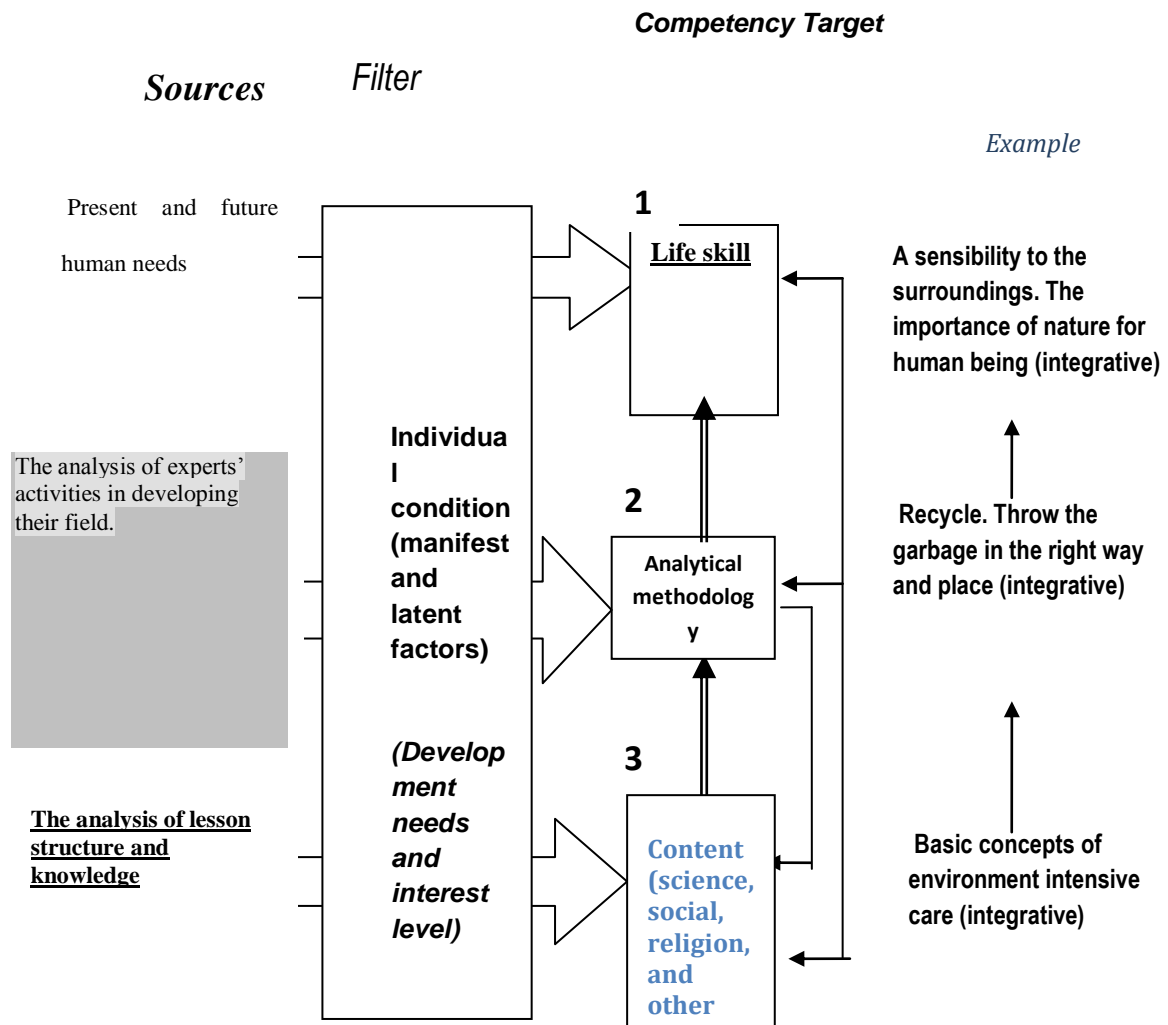
Learning design can be described as diagram below.



In planning a learning design, we cannot separate the learning process inside the school and out of the school, in their real life learning. Or between learning proces in home and in the society is a unity. And so does the relationship between inside and outside school activities which are integrated. What students learn outside the school can be a main point in supporting the development of students' skill inside the school. For example, a variety of students' games actually have a consistent unsure. They are similar in the role of the game and in teaching how to be a discipline person. It is in line with the developing competences which is unlimited in time, space, and method. The challenge now is how to build a parallel learning atmosphere which connects both worlds (inside and outside the school).

Learning Design

In designing learning model as above, life competences development can be used as follow.



Notes: Life skill is the main aim of every lesson. It contains three skills which are cognitive, affective and psychometric. Life skill education has three objectives 1) mastering the basic knowledge. The basic knowledge is built based on the essential materials. The essential materials are integrated from the body of knowledge. It is general, so that it can be used or connected to other studies (transferable). 2) The second, mastering the life skill method/process. This skill is generic ability which is a requirement for every student in all grades. It helps students to have the adapt ability and cope ability in learning how to learn. Using these dimensions, the students are expected to be motivated to practice their knowledge in real life. Both dimensions are not obtained in discrete or in well order but simultaneously. It is because the first dimension cannot be obtained if they only memorize a material without inquire it

using the second method. 3) The third is applying the life skill concept and process in daily life, so that the learning process uses contextual based. In short, the students accustomed to have the skill behavior. It means there is no distance between the knowledge and daily activities.

School Management and Atmosphere.

The effectiveness of teaching and learning process requires school autonomy. Schools have to organize and build the teaching learning atmosphere in order to accommodate students. In relation with this matter, schools considered as a social unity which have many uniqueness. It means a school is different from other schools. Every school has its own social and cultural atmosphere. On the other word, the school management in every school may be different and that is what *PMBS* expects.

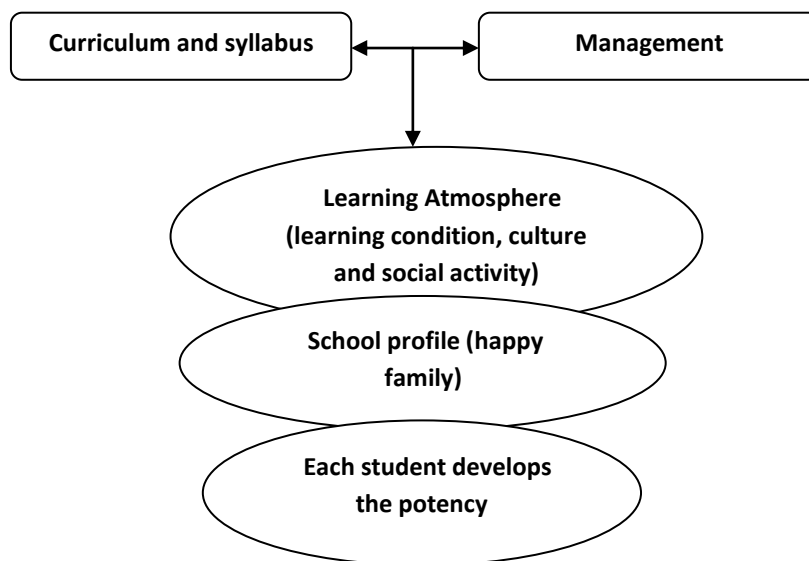
Education and cultural ministry applies the policy in improving school based standard quality. The foundations of this policy are: 1) By given the larger autonomy for every school, the school must be more creative in improving school quality. 2) Flexibility. By given larger flexibility in managing their resources, the school must be more flexible in arranging and taking the advantages of the resources optimally. These efforts are used to improve school quality. 3) the schools are easier to understand their strengths, weaknesses, chances and the threats. Therefore thy can optimally use the resources to make the school better. 4) the schools are also easier to understand their needs, especially educational input which will be developed and used in educational process. 5) The decision making which is held by the school is made for students' need. It is because the school is the one who knows the best. 6) The use of educational resources is more effective and efficient if it is controlled by the surrounding society. 7) The involvement of the school community and the society in making a decision can create a high transparency and democracy. 8) The school must be responsible of the educational quality to the government, the students' parents and the society themselves. Therefore the school must maximally reach the educational quality target. 9) The school is able to compete against other schools to improve their quality. It needs innovative way supported by the students' parents, society and the government. 10) The school is able to respond the society aspirations which are quickly change (National Educational Department, 2003).

The decision making as above is based on the empirical evidence about how weak the school centralistic management today. It can be clearly seen in the district autonomy policy the expected changes of this policy are stated in the table below.

Previous design	New design
Sub-ordination	Autonomy
Centralized decision making	Participative decision making
Not flexible	Flexible
Bureaucratic approach	Professional approach
Centralistic	Decentralist
controlled	Self-motivation
Over regulation	Deregulation
Control	Influence
Guide	Facilitate
Avoid the risk	Risk management
Spending all of the money	Efficient
Depends on the individual intelligence	Team work
Closed information	Shared information
Hierarchy organization delegation	Horizontal organization productivity.

School Culture

Regarding the learning effectiveness, school based quality improvement policy requires the school culture development which is suitable for its own character. Thus, the chance of each student to develop his/ her potency will be bigger if there is a conducive and humanistic atmosphere in the school. The relationship between learning and the school management is shown in the diagram below.



Curriculum provides many alternatives for every student to develop his/ her potency to become an expert in the field. Therefore, Students are easier to choose their own life roles. Learning will be effective if it is supported by a good management which accommodates their uniqueness. The atmosphere must be humanistic, full of creativity and contextual so the school will be a good institute which interacts with the surrounding. It is in line with the school role as the reformer agent. The larger effect caused is all school are able to create high quality people and the developed society.

Conclusion and Suggestion

Conclusion

Regarding to the student character building, it is necessary for academic officers consider about the policy on improving school quality that requires the implementation of school atmosphere. There are four characteristics that must be applied in the school atmosphere. 1) Personal, 2) Unrestricted, 3) Continuity, 4) applicative and contextual.

In order to create an ideal academic society, it is required a) a healthy, harmonious relationship among society, b) a healthy and harmonious relationship between academic norms and society norms, c) the understanding of academic society (students, teachers, educators, and staff) about their own roles comprehensively.

Suggestion

Academic counseling is not merely assigning the semester credits, but also considering about discussing the learning experiences and individual characteristic that can

build the motivation and the interest of students to keep learning. Moreover, academic administrators also have a duty to help the students finishing their study faster. Today, the supervisors are helped by the internet access in accessing the information in their busy day. The interaction between the supervisor and the student can be managed together anytime.\

The academic counseling must be reported to the dean of each faculty together with the suggestions related to the students. Reformulation in the function and the role of the supervisor is needed. It will be done in stages, from the narrow area such as the relationship management between the lecturers and the students, to the wider such as the relationship management in particular department, faculty and university level.

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THE TEACHING EVALUATION OF GERMAN TEACHER IN MALANG

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Abstract

Teacher's self-evaluation is a way to guide teachers in identifying strengths and weaknesses in learning. Improving teacher's professionalism started by recognizing and realizing the weaknesses in learning, and by a willingness to enhance self-competence. This article is a result of a research that examined four domains that affect student achievement, namely the strategies and teacher's behavior in learning, planning and preparation done before learning, reflection on learning, and collegiality that supported teacher professionalism. This study aims at describing the strengths and weaknesses of teachers in learning process, and describing the need for teachers to increase professionalism in teaching. The data was obtained by an instrument in form of a questionnaire of teacher's self-evaluation. Respondents consisted of 28 senior high school German teachers of the IGBJI Malang branch, 7 principals and their staffs. The instrument used has been validated. The results showed that most of the teachers carried out most of the components contained in the strategies and teaching behaviors and implemented teaching planning and preparation. In teaching planning and in learning process, however, teacher colleagues were still rarely involved for professional development. Reflection on the learning process and planning is rarely conducted jointly with colleagues. For further improvement of teacher learning, more intensive discussions with colleagues, principals, and supervisors are required. Besides, teachers can observe teaching process of other teachers, obtain feedback on learning not only from colleagues, but also from principals and supervisors, and coaching done by the principal or learning expert.

Keywords: *Self-Evaluation, Teaching, Improvement, Professionalism, Strengths, Weaknesses, High School's Teacher.*

Introduction

The success of learning can be observed from students' achievement. Academic scores achieved by the students through learning process are products that measure education quality. Djemari Mardapi (2008: 10) described that year by year development of education quality remained the same. Even though it was fluctuated, it is still considered low. There is lack of national analysis upon education evaluation result to find accurate information toward education improvement. Therefore, schools did not receive any information about their detailed weaknesses. As a result of it, the learning process slightly change year on year.

There are many supporting and completing factors which determine the success of learning. Teachers as the vanguard of learning process could cooperate maximally if they are supported by internal and external factors. According to the studies that were conducted by Darling-Hammond (2010) effective teachers, in general, have these following characteristics: (1) high intelligence, supportive verbal competence to arrange and explain ideas, and observing and diagnostics thinking competence; (2) in depth knowledge toward content of the subject they teach; (3) knowledge on how to teach the subject to other people (pedagogical knowledge), especially to develop high order of thinking skills; (4) understanding toward learners, how they learn, and their development, including the way to score and facilitate the learning process, to motivate students who have different learning styles or difficulties, to motivate students who lack of understanding on the instructional language to study language and its content; (5) adaptive mastery which enable them to make decision about what to do in responding students' need within the context.

Gurney (2007) elaborated five key factors which give the basic of good learning process: (1) teachers' knowledge, enthusiasm, and responsibilities to learn, (2) motivational class activities in learning, (3) motivational assessment activities on experience based learning, (4) effective feedback which build learning process in the class, and (5) effective interaction between teacher and students, create respective environment, motivate and stimulate experience based learning. According to Sato Masaaki (2012: 21) the factors that determine learning qualities were: (1) the quality of assignments given to the students or lesson plan, (2) learning in a good relations (dialogues and collaborations), and (3) students' participation, spirit, cognition and emotion. Based on Sato Masaaki observation (2012: 22) it was quite frequent that teacher in Indonesia asked their students to copy what was written in their textbook and paste to their worksheets. This kind of teaching cannot be categorized as high quality learning. In order to fix that problem, Anderson and Kumari (2009) suggested a solution to acquire the aim of learning, students' achievement, through continued investment of class teachers' and personnel' knowledge and skills development, who gave learning leadership, .

It is important for an institution or an individual to conduct evaluation to measure the target achievement. Information acquired from the evaluation could be applied to

identify the strengths, weaknesses, and opportunities to improve the result. Besides, the evaluation results can be used to recommend the further policy, whether it should be continued, improved, enlarged, or stopped. The evaluation result of a new program can be applied to observe the usefulness of the program. Therefore, it determines the next development steps. Evaluation may also be able to find out the effectiveness and efficiencies of particular program. Evaluation could be done before, during, or after the program is conducted.

The research objectives are: (1) to describe teachers' strengths and weaknesses during learning process; and (2) to describe teachers' need in improving their learning professionalism. The researcher used modified components of evaluation, proposed by Marzano, Frontier and Livingston (2011), as the evaluation components. There were several considerations to decide it: (1) learning evaluation is stated in Minister of State Apparatus Empowerment and Bureaucracy Reform Decree No. 16 of 2009 which covers learning plan, execution, and assessment whereas, colleagues role in improving teaching professionalism is not stated in the evaluation; the elements stated in each area from Mazarno et al model could be the elaborations from indicators of Teacher Performance Assessment (*PKG*) working instruments; (3) the evaluation orientations were within the learning process and focused on teachers' effort to conduct it; (4) this evaluation could help teachers to identify learning problems completely using adapted elements from Mazarno et al elements; and (5) to plan evaluations based on the identified elements.

Self-Evaluation

Teachers self evaluation is a process where they make a decision upon the sufficiency and effectiveness of their knowledge, performance, trust, and influence toward their personal improvement (Freddano & Siri, 2012:1143). In a self evaluation, teachers identify, interpret, and decide the information toward the practice of their teaching themselves. Teachers made their own criteria framework, standard (to decide the sufficiency of their beliefs), knowledge, skills, and effectiveness. In the end, teachers decide the characteristics of profession development activities as consequences from self-evaluation themselves.

Imai (2008: 48-49; 1998: 27) explained that identifying the need is the starting point of improvement. It appears from problem identifications. If there is not any problem identified, there will not be any acknowledgments made for the need of improvement. Once we notice the problem, it is a half way to success. It is not an easy job to notice the problem since teachers work in the class with students without any feedback from other parties. Teachers need instruments which contain elements of learning process in the class to help them apprehend the problems. Therefore, it can help teachers to identify arose problems. According to Liker & Hoseus (2008: xxix) problem would not be identified without any tools in the process. It makes people reluctant to develop their thinking and problem solving skills.

Teachers are guided to identify their strengths and weaknesses so that they can recognize their need to improve their professionalism. In order to recognize them, teachers' self-evaluation should be based on the belief that: (1) teachers need opportunities to grow in their profession; (2) teachers want improvements of their teaching practice and knowledge; and (3) teachers want and need information of their knowledge, performance, and effectiveness. Without any of those beliefs, self-evaluation could lead into inappropriate information for profession improvement since teachers give inaccurate information upon the real conditions.

Teachers' self evaluation toward the learning process could be conducted through students' assignments like what Deming (1994: 145) had conducted. According to Deming, teachers should not read the students' work to give them scores but use them as self-evaluation tools instead, to discover what teachers have done as a teacher; why they did not succeed and how to improve their teaching; to discover students who need special aids; to observe the assistance toward them; to discover students who make a well preparations and give them a reward upon their hard work. Self-evaluation becomes a media for teachers to reflect the subjects they have given to students and identify everything that has been achieved, what they have done, what the students have learned so far, and which target they have achieved, etc. Self-evaluation is the moment when teachers plan their new activities, set the target in the future, and decide which skills need to be improved.

Learning Evaluation

Marzano, Frontier, and Livingston (2011) classified learning evaluation into four areas, they are: (1) strategy and class behavior, (2) plan and preparation, (3) teaching reflection, and (4) collegiality and teacher professionalism. Mazarno et al model emphasized on what happened in the class, especially teachers application on their strategy and behavior to improve students' achievement. The emphasis differ this teachers evaluation model with others. The area of strategy and class behavior is associated with what the teachers do in the class.

a. Area of Strategy and Class Behavior

The area of strategy and class behavior is related to what teachers do in the class and it had a direct impact toward students' achievement. The first segment is routine teaching activities which contain (1) learning objectives and feedbacks, and (2) rules and procedures. On the second segment, material content which covers: (1) interaction with new materials, (2) practice and knowledge elaboration, and (3) application and comprehension test. The third segment is about the behavior such as, (1) students engagement, (2) rules and procedures obedient, (3) teachers-students relation, and (4) high expectation.

b. Area of Plan and Preparation

Learning process can be optimized if it is well planned and prepared. Effective plan and preparation determine students' high achievement as the objective of learning. Plan and preparation covers three segments, plan and preparation of (1) subject materials and sub-materials, (2) learning media implementation, and (3) students' special need fulfillment.

c. Area of Learning Reflection

The area of teaching reflection depict teachers' concern toward their teaching practice and their ability to transfer their concern into their profession development plan which are supervised and decided well. There are two segments in this area: (1) evaluate individual performance, and (2) develop and apply profession advancement plan.

d. Area of Collegiality and Teacher Professionalism

Collegiality and professionalism are indirectly connected with students learning achievement. This area, however, gave an effective atmosphere to implement the

strategy and class behavior. Collegiality and professionalism do not only describe school characteristics but also individual and administrator responsibilities.

Danielson (2011) and Mazarno et al (2011) explained that teachers should maximally employ their colleagues' roles in learning plan and supervision in order to improve teachers' professionalism. The Ministry of Education and Culture decree does not state any optimization of colleagues' role within Subject Teachers Forum (*MGMP*).

Teachers or schools could use the result of learning evaluation as a self reflection media. According to Mazarno (2011: 46) there are two aspects that teachers' should concern with, evaluate self -performance, and develop and apply professional advancement plan.

Research Method

This study used descriptive quantitative method which described German learning process in Senior High School. The respondents of this study were German teachers of Senior High School who join in The Association of Indonesian German Teacher, Malang. They were consist of 28 teachers, 7 school principals, 7 heads of school quality assurance unit or academic development and evaluation, and 7 vice school principals. The data was collected using questionnaires and interview guidelines.

Lavrakas (2012: 653) elaborated that questionnaire was the main instrument to collect data in a survey study. Gilham (2004: 2) and Schwab (2005: 38) stated that it was another way to acquire information from people (or answering research questions). The information obtained from teachers' self evaluations questionnaires covered strategy and teachers' behavior in the class, learning plan and preparation, reflection, collegiality and professionalism. Self-evaluation instruments had been validated using focus group discussion, Delphi technique, and two tryouts. Self-evaluation instruments consist 96 questions with three-answer types; the first one is Aiken and Hage scale. Miller (1997: 277) showed the activity frequency starting from never-rarely-occasionally-frequently-always, noticed and unnoticed (Yes-No) activities frequency, and essay type. The last two parts from that instrument contain improvement plan related to the four areas and teachers need to support the improvement that would be conducted by teachers. The self evaluation data would be analyzed using descriptive analysis in form of percentage.

Based on Johnson and Christensen (2012: 198), interview is a data collection method where interviewer (the researcher or someone works for the researcher) gives questions to research participants. The interview was conducted toward school principals, heads of school quality assurance unit or academic development and evaluation, and vice school principals of curriculum affair. It was conducted in order to acquire information about learning plan, learning process, and implementation of learning quality assurance at schools. Also, It acquired strengths, weaknesses and problem encountered, collegiality life to support teachers' professionalism, and the efforts to conduct learning quality assurance.

Findings and Discussions

a. Strategy and Behavior in the Class

Self evaluation was conducted to discover teachers' strengths and weaknesses based on their own perspective in the four areas. In the area of strategy and teachers' classroom behavior, there were several informations acquired from teachers. Those informations were: delivering the learning objectives and giving appreciation to students in the beginning of the lesson, strategy to introduce new topic, application of the rules, and implementation of the agreed rules. Furthermore, the information also covered knowledge practice and reinforcement, knowledge application, student's engagement within learning process, communication building with students, showing respect to students, learning result assessment, and learning satisfaction.

The result of the questionnaires given to 28 German teachers in East Java showed that some teachers had applied most of strategy and class behavior aspects in the class. Teachers start the class by delivering the learning objectives to students. There were 48.15% of teachers who always deliver their learning objectives, make notes of students' improvement in learning, and map them out. All the teachers, however, did not make any learning contract in the beginning of the semester. In the beginning of the learning process, teacher did not compose any class rules with students as it is part of the main routines. Also, teacher did not arrange the classroom setting which enable students to move easily, and decorate the classroom with students to make them focus on the subject.

There were some strategies applied by teachers to direct the students to interact with the new materials. They were explaining what the material use for in the beginning of the lesson; dividing materials into sub-materials to make students comprehend them easily; and observing students comprehension through group work. Besides, teachers also guide students to draw conclusion and create new materials visualizations (graphics, pictographs, flow charts), and ask questions. The result of data analysis showed that the most common strategy used by teacher was inquiring (85.9%) and the rest strategies were hardly ever chosen by teachers.

Teachers need to apply other strategies in order to reinforce or apply students' knowledge toward new materials. Those strategies are: arranging students group to finish reinforcement tasks; observing their performance within the group; giving home works and monitor their accomplishment; guiding students to compare and observe diversities; acquiring reasons; and giving project and monitor its accomplishment. This strategy belongs to the area of cognitive analysis. Data showed the explanation of the use of material about to be discussed was rarely conducted by teachers (according to 81.48% teachers). Also, teachers infrequently divide students into small groups to discuss new sub-materials, never monitor students' ability to integrate their prior knowledge to the upcoming materials, and give assignments which require students' analysis competence.

Teachers should give attention not only to the strategy of comprehending the materials, but also the implementation of the knowledge towards students' daily lives. However, they rarely or never conduct that strategy which requires analytical level of Bloom's taxonomy skills. Particular strategies such as ordering students to make hypothesis of problems related to the knowledge they have got or engaging them into complex tasks (decision making, problem solving, experimental investigation, and research) which require them to test their hypothesis are the strategies that can be applied to develop students' analytical thinking to identify a problem.

Teachers need to involve the students into every learning activity in the class because it is for students themselves. Learning by playing games, debate, using unique story, are some strategies that can be applied to motivate the students to be actively participated in classroom activities while teachers monitor students' focus and assessing

their performance. In this case, teachers should exactly know the time when students are less motivated. The data showed that majority of teachers rarely use those strategies.

However, 96.30% teachers monitor students' participation in classroom activities, 88.89% teachers exactly know when students are less motivated, and 88.89% teachers show their enthusiasm when students try to explain a material related to their interest.

In order to know the degree of students' obedience towards a rule or procedure, teachers are required to: (a) showing withitness (teachers are aware of the variation of students' behavior which may raise potential problems and able to solve them), (b) implementing consequences for any violation of a rule or procedure, and (c) giving an appreciation of students' obedience towards a rule or procedure. 92.59% teachers state that they often reprimand the students when they disobey the rule and 85.19% teachers give consequences constantly and fairly when students disobey the rules. Moreover, 70.37% teachers give rewards to students who obey the rules by giving points or any other kinds of rewards. 70.37% teachers monitor students' awareness towards classroom environment and identify some possible problems. 81.48% teachers try to discover the causes of students' indisciplinaries.

In order to build a communication with students, teachers may design some activities which can correlate the materials and students' interest. However, there are only 59.26% teachers who conduct this. The majority of respondents stated that they rarely bring humor to the class and rarely give smiles to the students. Classroom was totally under teachers' control. Teacher's respect shown in teaching and learning activity can emerge the feeling of being respected among the students. Majority of teachers (92.59%) could identify students who belong to low achievers and show attention verbally or non-verbally. Those low achievers receive special attentions from teachers so that they can actively participate in learning activity. Teachers try to help those students by making simple and easy questions and giving them extra time to answers those questions. 74.07% teachers were not satisfied with their students' achievements.

b. Planning and Preparation

Teaching and learning activity can be carried out if it is well planned and prepared. Things that need to be prepared are the content of the materials, media, and students' specific needs. The result of teachers' self-evaluation shows that most of teachers (96.30%) always choose the materials related to students' actual condition, 66.67% teachers choose the strategies that students like, 85.19% teachers consider the correlation between previous materials and the new materials, 48.15% teachers arrange the materials into some subs materials in order to make the students easier to understand those materials, 66.67% teachers make the indicators based on learning objectives so that students are able to achieve the minimum standard score (*SKM*).

51.85% teachers construct teaching design with other teachers of the same subject in order to improve their professionalism. In this planning, 70.37% teachers try to find the available tools and materials and 66.67% design the way to use those tools and materials to improve students' comprehension. The different characteristics of the students were considered by 85.19% teachers in planning and preparing teaching and learning activity. Nevertheless, most teachers rarely consider students' individual needs and their process of adaptation towards certain materials.

c. Learning Reflection

The third aspect to the successful learning activity is self-performance evaluation. Marzano (2011:46) stated that there are two aspects which should be noted by teachers: evaluating self-performance and developing and applying professional development plan. When teachers evaluate their self-performance, they should describe it into systematic action. There are two activities belong to this aspect: (a) developing developmental plan in written form, and (b) monitoring the progress of professional developmental plan.

The result of self-evaluation of German teachers to the area of learning reflection showed that almost all respondents ask about students comprehension to the content of material that they have learnt recently, realize the weakness to teach, ask their colleague to overcome teaching weakness (51,85%), identify their failure causes of teaching from students' achievement (70,37%), ask the students about unpleasant things while learning that they have done (66,67%), evaluate the effectiveness of delivering material

(66,67%), ask the students about teaching strategy that they do not like (59, 26%), and change teaching strategy and give attention to individual differences of the students in the class (66,67%). However, 62, 96% teachers gave the students assessment to the comprehension by assessing technique that did not have variations, and less than a half teachers provide more time to the students whose scores have not reached minimum standard score (48, 15%). More than a half respondents rarely make profession development plan with particular targets in written form (62,96%), rarely make a progress note of profession development (51,85%), and rarely discuss profession development plan with colleagues/ senior.

d. Collegiality and Professionalism

The forth area that indirectly gives important role to high achievement of the students is collegiality and professionalism. It colors the other three. It means that in the learning process, colleagues have a big role in giving information for learning process conducted by a teacher. A teacher knows the strength and the weakness through colleagues' observation in the learning process.

The result of teacher's self-evaluation showed that to build a positive job environment, teacher should have positive interaction with colleagues, students, and students' parents. Some of the respondents (59,26%) decided learning material, analyzed the material, and discussed problems they faced with the colleagues to map out and prepare the lesson. Besides, only few teachers (25.93%) need feedback to realize sharing ideas and teaching strategy in the class, and 74.07% gave suggestions to their colleagues who ask for related to teaching strategy. 55,56% teachers need to develop their professionalism.

Based on the result of self-evaluation, teachers plan to improve on those four areas, especially for the following elements.

Table 1
Improvement Plan

No.	Improvement Elements	Teachers
1	deliver the learning objectives of the class so that students could understand	25%
2	make each of students' note/graphic development in achieving their learning objectives	50%
3	map out each of students' learning improvement within the class	35,70%
4	throw questions toward students to check their efforts	14,28%
5	decorate the class altogether with students to make them more focus on the subject	10,71%
6	set a mini debate among students to maintain students' participation	10,71%
7	consider students' different characteristics	14,28%
8	compose lesson plans with other teachers of the same subject	32,14%
9	create a design of tools/material utilization to improve students comprehension	10,71%
10	consider students' individual learning needs	17,85%
11	conduct course analysis with colleagues	25%
12	save a special time for students whose score below minimum passing grade	17,85%
13	make a personal profession improvement record	35,71%
14	discuss with the colleagues about the problems faced in the teaching	21,42%

From that table, we know that teachers will improve the learning process, from planning, executing, and reflection. Half of the respondents realize that map students' capability out had not been applied. Therefore, teachers will map students' achievement out in the class, make an improvement graphic, and ask the teachers' colleagues to advise or suggest about the lesson, plan together, and discuss learning problems. The importance of feedback from colleagues, principal, supervisors, or learning/ subject experts could be seen from the expectations that were stated by teachers as follows.

Table 2
Necessary Supports

Necessary Activities	Frequency
intensively discuss with colleagues	53,57%
observe other teachers' teaching	39,28%
feedback from colleagues	42,85%
feedback from principal/supervisor	17,85%
learning method/evaluation training	21,42%
German learning method workshop	60,17%
continue study to the higher degree	32,14%
coaching by principal/supervisor/expert	21,42%
guidance by principal/supervisor/expert	14,28%

Conclusion

The objective of learning process at school is to reach students' maximum achievement. According to the four areas as the basis of this study, the researcher discovered that teachers have done most of the elements activities within those areas. The information about the weaknesses could guide teachers identify the aspects which need to be improved further learning improvement. There were several weaknesses of German teachers of senior high school in Malang. (1) Learning innovation, especially for senior teachers, which was less optimum, and gave less attention toward students different characteristics; (2) Lesson plan and preparation: arranging lesson plan was held once a year in form of workshop, and knowledge or skill facilitating was not based on teachers need but based on local department of education program. There was not any content validity mechanism upon individually composed lesson plan. (3) Reflection: proper supervision mechanism which should be conducted by principal and supervisor was to fulfill administration requirement only. It had not reached learning process in the class. It caused the teachers did not receive any feedbacks upon their teaching either from principals, colleagues, nor supervisors. (4) Collegiality and professionalism: implementation of education and training (*diklat*), workshop, and seminar by schools or education department had not been related to teachers' actual need in the class. The assistance toward new or incompetent teachers was far from optimum. The Association of Subject Teachers (*MGMPs*), as the professional learning community, had not been

optimally contribute neither in plan and preparation of a learning, process of learning, or give feedbacks for each member.

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SUPPORTING PHYSICS STUDENT LEARNING WITH WEB-BASED ASSESSMENT FOR LEARNING.

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Abstarct

Quasi-experimental research has been conducted to determine the effectiveness of the model of WEB-based Assessment for Learning (AFL). Research with posttest only control group design involves 113 freshmen at the UM Department of Physics as the study sample. All groups get the same syllabus and teaching materials. Controlled group got traditionally assessment, home work on problem solving. Experimental group could access umeac.com, the website that prepared to hold the WEB-based AFL. AFL activity for this group are as follows. 1. Working preflight before the first face-to-face in a week. 2 Working selftest and discussion forums after the first meeting in every week. 3 Work on self-assessment and formative tests after the second meeting in every week. The results showed that WEB-based AFL was effective to improve the mastery of basic concepts of physics.

Keywords: *assessment for learning, WEB-based, concept mastery of physics*

Introduction

Assessment has been recognized as important factor in conducting effective learning (Popham, 1995: 7, Dunn et al. 2004: 16). Assessment can help teachers understand the strengths and weaknesses experienced by students in learning and decision making in learning (Lambert& Lines, 2000: 122). Assessment also provide feedback to students about their learning progress and steps taken to achieve a predetermined competence (Harlen,2003: 20, Cowie & Bell, 2002: 82). The importance of continuous assessment in the learning emphasized explicitly in the Minister of National Education No. 20 of 2007 on Education Standards Assessment (Regulation of the Indonesian Minister of National Education No. 20, 2007).

Today teaching and learning problems is the lack of assessments that provide immediate feedback on the progress of learners, known as assessment for learning (AFL) (Black & William, 2009, Khumaidi, 2005). Today's assessment is more dominated by summative assessment (assessment of learning) compared with formative assessment / AFL (Yorke, 2003). Preliminary results of Kusairi (2010) showed that some of the things that led to the difficulty to implement AFL are 1) a large number of students, 2) AFL takes

time in preparing and implementing instruments, 3) implementation of the AFL requires special skills, 4) lack of automation systems/software developed to support the AFL. Implementation of the AFL, which requires the provision of realtime feedback by teachers is difficult without the support of adequate tools and technologies (Sorensen & Takle, 2005, Denton et al., 2008).

In an effort to prepare qualified physics teachers, AFL and analysis to obtain information for the strengths and weaknesses of students learning physics is required. This is because the characteristics of the physics subject matter that abstract and tiered (Ornek et al., 2008: 30). The subject matter at the beginning is a prerequisite for studying the next subject matter. If a student was having trouble at the beginning of the material and do not get help, it is likely students will experience difficulties when studying the next material. If learning difficulties do not get treatment, the achievement of students will be low (Dufresne&Gerrace 2004, Wagner & Vaterlaus, 2012).

One innovation that can be done to support the implementation of the AFL is the utilization of information and communication technologies, especially the WEB. Heinrich et al (2009) and Denton et al (2008) reported that the use of e-tools AFL help manage tasks and save time. The use of quizzes and feedback modes to help students better mastering the concepts Nagel & Eck (2012) and encourage students to become independent thinkers (Whitelock, 2007). The implementation of self-assessment in the AFL also reported a positive effect on student learning (Basnet et al., 2011). Peat and Franklin (2002) also reported the use of self-assessment quiz is liked by the students and help them learn better. So far the use of a comprehensive Web-based AFL in a learning not yet reported, especially learning physics.

Kusairi (2013) have developed a model of WEB-based AFL to support teacher and students carry out the basic physics lectures better. The model has the following characteristics. 1. Provide opportunities for students to know the purpose of learning. 2. Provide information on the faculty of the prior knowledge possessed by students. 3. Provide a forum for students and faculty to discuss it. 4. Provide opportunities for students to practice understanding the concepts learned. 5. Provide students the opportunity to conduct self-assessment. 6. Provide information on mastery of the material and the difficulties experienced by the students after the class ends. Model of WEB-based AFL is

accessible to students outside the lecture. Model of WEB-based AFL is integrated with face-to-face learning with activities such as preflight tests, discussion forums, selftest, self assessment, and formative tests.

This study aimed to examine the effectiveness of the Model of WEB-based AFL that have been developed. Some questions are as follows. 1. Are there any differences between the groups using these model and groups using traditional assessment? 2. Is the student scores on the WEB based AFL effect on student concept? 3. Is the frequency of student activities in the Model of WEB-based AFL effect on their mastery?

Methods

To test the effectiveness of the model of WEB-based AFL that have been developed, quasi-experimental research design with posttest only control group design One hundred and thirteen undergraduate students that take a basic physics course be sampled in this study. They consist of Physics Education Program' students and Physics Science Program's student. Students from offering B (physics education) and Class N (Physics science) are designed as an experimental group, while students from offering C and offering M are design for controled group. The number of students is the experimental group are 59 people and the number of students in the control group are 54 people. The research design can be described as follows.

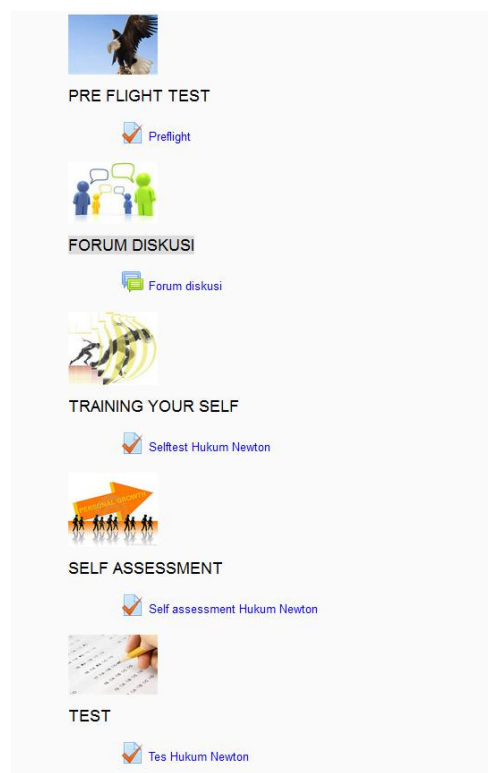
Experiment Group	X	O1
Controled Group		O2

Students on the experiment group and control group learner with the same syllabus. They also studied with the same reference book. They attend facetoface course two times a week. Teaching material and the order of presentation is not much different because the lecturers follow lesson plan and guidelines developed jointly. Students of the experimental group led by the researchers, while the control class students are guided by researcher colleagues. Teaching content involved in this study include motion in one dimension, two and three-dimensional motion, Newton's laws of motion, application of Newton's laws of motion, energy and labor, as well as the momentum.

Students of the control group and the experimental group get different treatment in terms of the assessment conducted by a teacher. Students on the control group get conventional assessment in the form of problem solving tasks given in the form of a

homework assignment. These tasks were collected in the next week, these tasks will be corrected by the teacher and returned to the student. Tasks, where students have difficulty, generally will be discussed before next meeting.

Students in the experimental group receive treatment in the form of assessment for learning is based on web technology. They can access internet sites UMEAC.COM outside the face-to-face course as they complement structured tasks. Within a week they had to do the preflight test, self test, self-assessment, and the formative tests. They were also given the opportunity to ask or discuss matters relating to the subject matter on the discussion forums. In umeac.com, student also given lectures objectives for each lecture material and how to achieve these goals by means of assessment for learning is based on web technology. Links related to the tasks that must be performed by the students can be seen in the image below.



Implementation procedure of WEB-based AFL in the learning process is as follows. 1. Before entering the lecture on a kind material, students are asked to access the preflight. Preflight contains items that related to misconceptions experienced by students. If students are having problems with an item in the preflight, the lecturer will discuss it in class. 2. Immediately after the first meeting in a week, students can access discussion

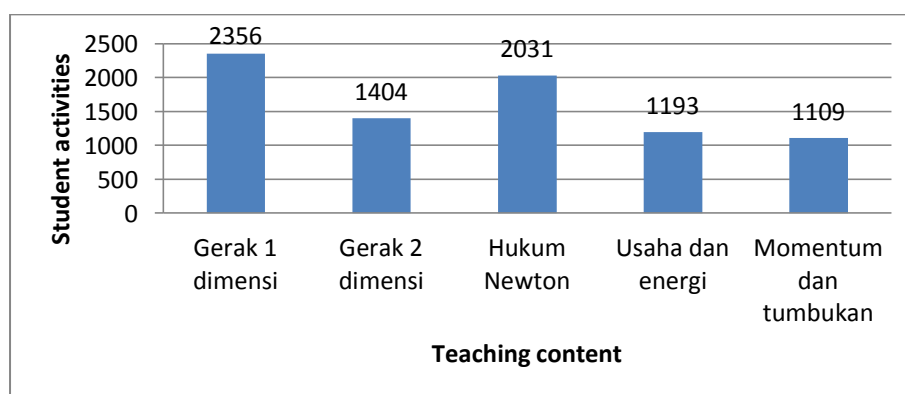
forums and self-test. The discussion forum is intended to allow each student to discuss the matter on the week, while self-test contained items that can be used by students to practice physics problems. 3. Immediately after the 2nd meeting of the week, the students have a duty to assess themselves through self-assessment and doing the test called formative tests.

The study was conducted for 5 weeks or ten meetings covering material Motion in one dimension, Motion in two and three dimensions, Newton's laws of motion. Applications of Newton's laws of motion, Energy and Work, and Momentum and Impulse. In general, students do not have problems with this model of Web-based the AFL, but some technical difficulties can occur between them. 1. Students lost password, 2. Students dropped out of the network while taking a test, and 3. The pictures on the tests can not be accessed if the network is weak.

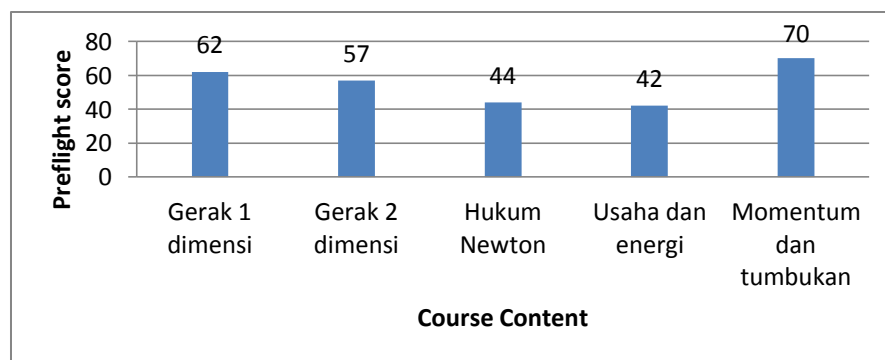
The main data in this study are data on student mastery of the physics related to the concepts learned. This data was collected by conducting written test on students involving 30item multiple choice test. Tests involving experts validity guaranteed. Prior to further analysis, it is also ensured that the tests used meet internal consistency. Data mastery of this concept will dikomparasikan using t-test in SPSS software.

Result and Discussion

The results of the trials for several weeks showed that the activity of the students tend to decrease. In the first week, there were 2356 activities undertaken by all students. At 5 weeks decreased to 1109 activity. Decreasing the amount of activity in the use of the model can be caused by a decrease in student interest and other factors such as students have more current using the model. Student activity data can be seen in the following figure.

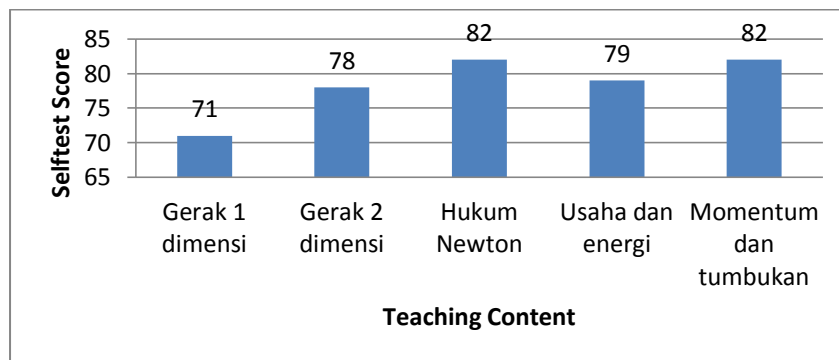


Preflight is a quiz that associated with a trend of misconceptions that experienced by the students. Usually preflight is a true-false test. Preflight can be activated several days before the first of two lectures in one week. If students do preflight and send (submit it) they will get a feedback of scores obtained. Explanation has not yet earned by students in order that students will be motivated to prepare their learning. For teacher, the results of preflight is the feedback that will be followed in the course they complement. Here are the average scores of students in connection with the service preflight from week to week.



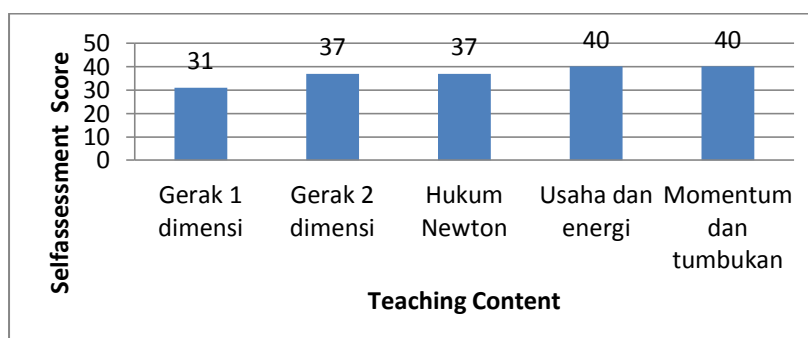
The mean score of preflight shows that for every teaching content, mostly students always have misconceptions. Misconceptions can be detected by looking at the low mean score on some matter of the preflight. Next, is the task of the lecturer to engage the student difficulties in face to face meetings.

As soon as the students and teacher are conducting the first face-to-face meetings in a week, a teacher activate self-test link. These links are provided in the hope students can independently test their mastery of concepts learned. Usually self-test are true-false test or multiple choice test. Immediately after doing self-test, students will get feedback in the form of a score and an explanation of the matter. Students can repeat the self-test if necessary. If students have difficulty relating to the self-test, the students were also given the opportunity to discuss in forum for each teaching content. The mean response of the students to the self-test can be seen in the image below.



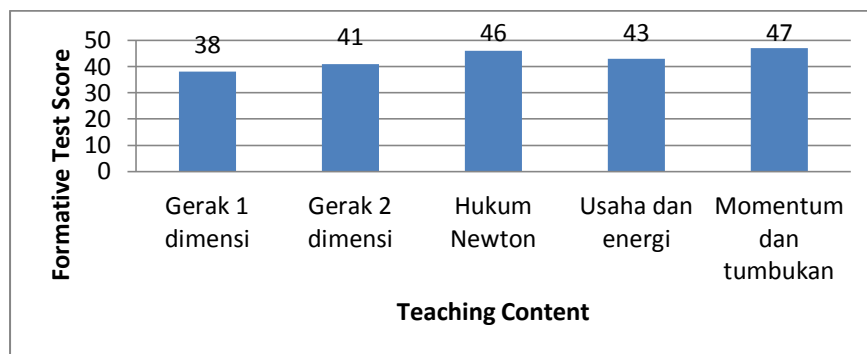
The results of self-test scores is quite good considering the students are given the opportunity to repeat this self-test maximum of one time. So, basically this link is only intended to allow the students stimulated to learn and discuss. However, the results showed that the frequency of the students in the use of discussion forums is very low.

Self-assessment is one link in umeac.com developed to allow students to do self-assessment with regard to their learning. Self assessment ask student whether they are not yet understand, need other help, understand, or can teach other about sub content. Self assessment can be completed by students immediately after the second face-to-face meeting of each week. It is necessary to increase the autonomy and responsibility of students in their own learning. For faculty, this may be a reversal of how much students have confidence related to student mastery of the material. Here is the average student answers related to self-assessment.



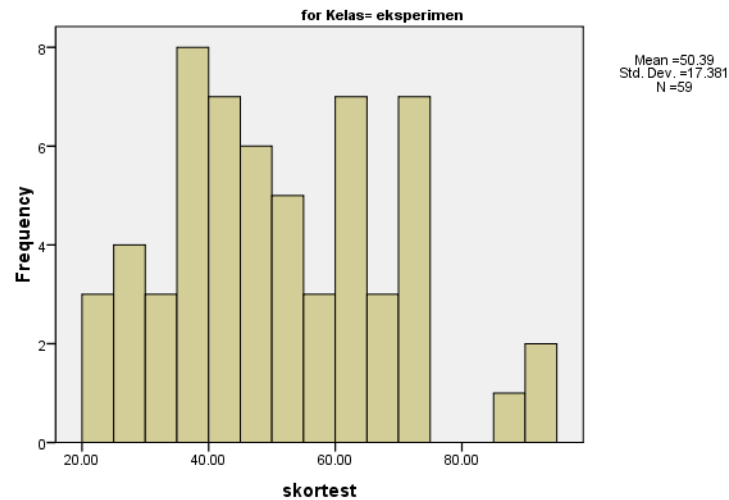
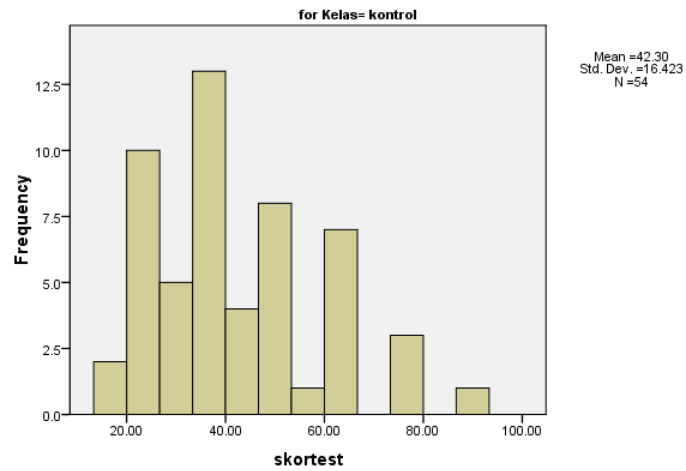
Self-assessment scores 75-100 has the meaning that students have mastered the material and can help others. Score of 50-75 means that the student has mastered the material. Scores of 25-50 indicate that students still need help and a score of 0-25 indicates a student does not understand the material at all. Average in the graph indicates that students generally still not confident with his ability in mastering the course material.

Formative test is one link in umeac.com which aims to test student mastery of the material in a lecture before the others learn the lecture material. Formative tests are also given by the lecturer immediately after the second meeting of each week. Formative tests can only be accessed once the limited time in hopes students will not cooperate in working it. The following figure shows the mean score of the experimental group students formative tests.



Formative test results show that the bulk of the students still have problems with mastery learning content. Students are expected to achieve mastery when they reach the formative test results of more than 80. The low yield is expected to give feedback to the students to learn better and give feedback to the faculty associated with the conduct of the course is done.

After treatment in the form of assessment for learning is web-based technology, measurement of student mastery of the basic concepts of measurement carried out in the experimental group and the control group by giving multiple choice questions. Here are the measurement data the experimental group and control groups



The control group had a mean of 42.29 with a standard deviation of 16.4, while the control group had a mean of 50.36 with a standard deviation of 17.38. Statistically, it can be shown that the data came from a population that is normally distributed and homogeneous. T-test results also showed a significant difference between the experimental group and the control concept of the control group. There is the influence of the use of WEB-based AFL models the student achievement of the basic concepts of physics. Students who learning with the WEB-based AFL model has a better mastery of concepts compared to students experiencing traditional assessment

The results of data analysis showed that treatment of WEB-based AFL effectively to improve student mastery of the basic concepts of physics. This is consistent with the findings of a meta-analysis of Black & William (2009) which states that generally

assessment for learning can help students to learn better. Implementation AFL is a form of learning how to learn (Lambert & Linn, 2000), information about the successes and failures of the individual will increase the level of student motivation as a result of student mastery of the basic concepts to be increased. These results are also consistent with studies of the importance of feedback in a timely and specific learning (Min and Jaw-Kuen, 2012, Cowie & Bell, 2002, Nagel & Eck, 2012).

Overall WEB-based AFL model has adopted key elements of assessment for learning (William, 2007). Preflight test is a way to know the difficulties of student lecturers and follow these difficulties in learning. The discussion forum is also a need for discussion or implementation of good communication between students and faculty and among students. Self-assessment is a vehicle for students to reflection about its efforts in learning. While the self-test support students to always be active in learning. Learning goals and how to achieve the learning objectives are also part of the model that allows students to learn. Finally formative test is how teacher provide feedback to students related to the learning objectives in some teaching content. The results obtained in this study is consistent with some findings related to the use of e-tools in the assessment (Hatzia Apostolou & Paraskakis, 2010, Heinrich et al, 2009, Denton et al, 2008, Lowry, 2005).

WEB-based AFL model has been successfully addressing the problems of assessment in which teachers are difficult to provide feedback that is timely, specific, and individual (Kusairi 2010, Khumaidi, 2009). WEB-based AFL model also helps teacher to fulfill duties as specified in the Regulation of the Minister of National Education No. 20 of 2007 on Education Standards Assessment (Regulation of the Minister of National Education No. 20, 2007). In this case the model has been to develop an appropriate instrument, has been implemented on the student, providing feedback to students and follow up on student difficulties. This is done in a sustainable manner in the learning.

Although the model has been significantly shows its effectiveness compared with traditional assessment strategies, the value of the average student in this study is still a problem. WEB-based AFL model has not managed to deliver students to achieve mastery in learning. Mean scores of students are about 50 percent. This needs to be followed to obtain further examine whether the measuring instruments used need to be repaired, or if students have problems in learning physics. The study of the implementation of

standardized tests in the department of physics (Supriyono, et al, 2014) also showed that the students also have a mastery of the physics department of the basic concepts of physics that low.

The results of this study also need to get further study given the treatment in this study only a few meetings. There needs to be a wider study involving more students and a longer treatment duration. Quiz material in this model also needs to be developed further by collaborating with the results of other studies.

The results also show that the difference in scores AFL tasks affect the development of the basic physical ability than the intensity or absence of diligent students in doing the task. If the student try hard to learn from the feedback provided by the model, such as working in earnest self-tests and formative tests, it is helping students to develop basic capabilities physics. Seriousness of students in using the model also needs to be studied further AFL remember though students lack confidence in doing self-assessment, but very minimal student who utilize discussion forums.

Some possible reasons why students are not active in the discussion forums are as follows. 1. Students who do not master the material well are less likely to express difficulty in faculty and friends. 2. Students are difficult to express the problem in lecturer or other students in writing. 3. Students are too busy to meet the demands of the task AFL and do not have time to use the discussion forum. 4. Students have difficulty in accessing the internet.

WEB-based AFL model can be a solution for lecturers to provide a good learning on college campuses. However, this model requires support in the form of easy internet access for both lecturers and students. Technical problems related to internet access will become an obstacle and additional jobs for lecturers. WEB-based AFL model need to be developed and validated web well before use by students. If it has been running, it is difficult for lecturers to improve the instrument on the model given time is critical.

Some students feel that the tasks in this model is pretty much AFL, time consuming, and makes students depressed. This is especially true in the formative tests and subsequent preflight. By the time the students are still working on the formative tests, has emerged link for preflight nengerjakanbeikutnya meeting. But this is certainly not a problem if the student has a high motivation to learn. WEB-based AFL model is expected

to eventually be able to change the student to be more autonomous and more responsible for their own learning.

Conclusion and Recommendation

The conclusion of this study are as follows. 1. WEB-based AFL model is effective to help students improve mastery of basic physics concepts. 2. High student scores on tasks AFL effect on increasing mastery of the basic concepts of physics. 3. Frequency of students in using the WEB-based AFL model does not significantly affect student mastery of the basic concepts of physics.

Here are recommendation relating to the implementation of model of WEB-based AFL and advanced research to do. 1. Given the use AFL is effective and significant on the mastery of basic concepts of physics students, teacher are encouraged to use and further develop models of webthis model. For the teacher of physics, the model has to be adopted and adapted to local needs, those of other lecturers, the model can be adapted, but the instruments need to be developed and assembled in the model. It is advisable to first develop a model before the lecture took place. 2. Given the importance of efforts to provide feedback to the students, this model needs to be disseminated. There needs to be training for lecturers to use and develop WEB-based AFL model. 3. Undertake research to assess the effectiveness of the WEB-based AFL model with more number of students. 4. Undertake research with treatment time duration is longer. This model is encouraging autonomy and responsibility for student learning. It took long enough for students to get used to study regularly and discipline as well as reflect and are responsible for their own learning. 5. Need to develop a model that involves primary diagnostic test diagnostic learning difficulties of students, in the course include the basic physics of diagnostic misconceptions. In the models that have been developed can only involve multiple choice questions. In the future, the model is expected to be integrated with the matter in the form of a three-tier or isomorphic meaningful so as to provide more specific feedback about the difficulties experienced by students. 6. Need to develop models on self-test feedback that helps students learn better. Feedback and remediation to assist difficulty of students in the WEB-based AFL model is only in the form of text. For some students remediation and scaffolding text may not be enough to help their plight. Model remediation can take the

form of animation or video making it clear to students. 7. There needs to be further research to examine other aspects in addition to mastery of the basic concepts of physics. Aspects such as self-regulating aspect, self-efficacy, and other psychological aspects that may be affected by the implementation of the model is based on web technology AFL needs to be studied further.

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**AMONG LEARNING AS A CULTURE BASED LEARNING OF
TAMAN MUDA TAMAN SISWA AS CONTRIBUTION TO THE
LEARNING PROCESS OF 2013
CURRICULUM AND CHARACTER EDUCATION OF THE
NATION**

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Abstract

Elementary and Secondary Education is currently busy with the implementation of the 2013 Curriculum with its variety of problems. A conceptual academic debate emerges about the use of the Scientific Approach as the only approach to the learning process of the 2013 Curriculum. It is considered to simplify the learning problem; academically each subject or even any themes/topics might need different approaches and learning processes. The crisis of character that occurs is identity crisis as a dignified nation. The 2013 Curriculum stressed the importance of characters education and learning to prepare the next generation. The Among learning is a culture- based learning, it is needed to strengthen the values and character of the nation. A qualitative approach is used, the researchers conducted a study of documents, observation, interviews, open questionnaires and focus group discussions. The conclusion was that since the beginning of its history, character and values education is held at Taman Muda Taman Siswa. The learning process in schools today tend to be intellectualistic and westernized because of the use the teaching Models from out side. The Among learning concepts, principles and techniques based on nation's culture are needed to refine the learning process in school. What is called authentic assessment as a model of educational assessment is highly recommended by the 2013 Curriculum, it has become part of the Among learning in Taman Muda Taman Siswa.

Keywords: *Among Learning, Culture, Taman Siswa, 2013 curriculum.*

Introduction

When a nation or a state face a cultural crisis, then most likely the people or nation, will experience the death of a character (Aziz, 2011) and drove into a crisis of identity. Young generation will not know his true identity, he grows to adulthood without ideals; could become a lost generation, does not contribute anything in life; even if he is involved in negative things he can harm lives, contributing setback of civilization. Discussion of the causes of the weakness of the nation's character has invited a variety of opinions. Meirawan (2010)

argues that religion is not the cause, because the propaganda spread everywhere. Money is not the cause, there is a lot of money eventhough from the borrowing and lending. Politics is not the cause, because the presidential and legeslatif election running rampant, parliament is excited by a multi-party system. Neither are education and learning, many Indonesian students become champions in various international Olympics. The main causes and the fundamental problem is the weakening character and the culture of the nation, especially the human dignity is neglected (Soepanji, 2007).

Therefore, it is necessary to strengthen the ownership values, build character of the nation, through the process of acculturation and education. The process of acculturation is an enculturation through socialization and habituation in a variety of informal activities. Formal education played a central role in directing, building and internalize human character. Lickona describes when someone tough fighter he can be called as a man of strong character, a people who had a good character will has the following characteristics: knowing the good, desiring the good, and doing the good (Saptono, 2011).

Born on July 3, 1922 until the time of independence, Taman Muda Taman Siswa (TMTS) provide education based on national values for the young generation of Indonesia. Taman Muda Taman Siswa is the result of routine communit y discussion every Selasa Kliwon, it is chaired bay Ki Ageng Suryomentaram and RM Soewardi Suryaningrat or Ki Hadjar Dewantara (KHD) as secretary. As part of a national movement KHD criticized colonial policies, especially in education. Ki Hadjar Dewantara and Taman Siswa activist supports the ideals of independence and show noon cooperative movement. Yonkman said that within 13 years standing Taman Siswa has hundreds of schools and branches not only in Java, but also in Madura, Sumatra, Kalimantan, Sulawesi and Bali. At that time, Taman Siswa has hired 700 teachers who provide lessons to 17,000 students (Dewantara, 1994). The performance Taman Siswa as an educational institution is the untold wealth of the nation.

The commitment of Taman Siswa in the development of national

education continued after the independence of Indonesia; KHD educational philosophy continue to be studied and preserved in Taman Siswa education. Among system has a natural spirit of familyhood based on freedom. In the hierarchy of education Taman Siswa has its own terms: *Taman Indrya* is the level for children under 7 years, *Taman Anak* is the level for children ages 7-9 years or grade I-III, and *Taman Muda* is the level for children ages 10-13 years or grade IV-VI, the level of SMP named as *Taman Dewasa* (Dewantara, 1964); then fitted with a high school level called *Taman Madya* and and higher education level or university called *Sarjana Wiyata*.

Taman Muda Taman Siswa (TMTS) pioneered by KHD is then called as Taman Muda Ibu Pawiyatan Taman Siswa. Values and character education in TMTS is based on local wisdom. Tradition of Art Education, with teaching *Macapat* song, *Dolanan* song for Children, Dance, Painting, Karawitan, and so forth are effective means to convey the noble values of the nation. Character is always born of local forces that are processing, evolved to form local wisdom. Character education in Taman Muda Ibu Pawiyatan can become inspiration for the formation of character, identity and building the character of the nation. The learning in TMTS is open to ideas, methods, models of learning from the outside. Multi methode applied in the classroom, such as lectures, discussions, question and answer, group work, sociodrama, observation, problem analysis, interviews, drills or exercises, social activities, demonstrations, rallies, experiments and promoting manners (Nordiana 2006). The results of the implementation of Among learning are good characters, cohesiveness, mutual cooperation, unity, social sensitivity. Factors supporting learning in TMTS are: Pendapa Agung Taman Siswa that can be used for many artistic activities. There are gamelan and other musical instruments, there is a museum and it is used to be the house of Ki Hadjar Dewantara and there is *Griya Kirti* library.

The changes of curriculum from KBK, KTSP to 2013 Curriculum is an attempt to answer the internal and external challenges faced by the education in Indonesia; as an effort to prepare the next generation who will play a role in

the future of the nation. Therefore, the population growth factor in Indonesia became one of the important considerations; the growth of the productive population in the next 20-30 years is quite large. They will face many challenges that have started today and will continue to be stronger in the future. such as: Globalization, WTO, ASEAN Community, APEC, CAFTA; environmental issues, advances in information technology, the convergence of science and technology, knowledge-based economy, the rise of the creative and cultural industries, the shift of world economic power, the influence and impact teknosains; quality, investment and transformation in the education sector (Depdiknas, 2013).

Taking into account the challenges, education must be responsive, able to prepare the next generation and equip them with the necessary competence in the present and the future. The competencies required include: the ability to communicate, the ability to think clearly and critically, the ability to consider the moral aspect of a problem, the ability to be responsible citizens, the ability to try to understand and tolerant of different views, the ability to live in a globalized society, has broad interest in life, have a readiness to work, according to intelligence aptitude or interest (Depdiknas, 2013). The learning process in 2013 Curriculum touches three domains, namely: attitudes, knowledge, and skills; the learning outcomes of students who gave birth to a productive, creative, innovative, and affective students through the strengthening integrated attitudes, skills and knowledge. It was explained that the realm of attitudes developed so that learners "know why", the realm of skills developed so that learners "know how" and the realm of knowledge developed so that students "know what." The final result is the increase in soft skills or the ability to be a good man; and an increase in the hard skills are the skills and knowledge for learner to live worthy. In addition the 2013 curriculum emphasizes the modern pedagogical dimension in learning, namely the use of a scientific approach to learning that includes: to observe, to question, to reason, to experiment, to make presentation and form a network for all subjects (depdiknas, 2013: 139,145). However, the

determination of the Scientific Approach as the only approach to the development of the learning process invites lengthy discussion especially when learning is discussed as a system.

The 2013 curriculum gives recommendations to teachers to use authentic assessment. Teachers are expected to assess the level of student thinking ranging from low to high levels, emphasis on questions that require deep thinking not just memorization, measure the process and the work of students in portfolio assessment. Authentic assessment of learning requires authentic learning process. In authentic learning, learners are asked to gather information with a scientific approach to understand various phenomena or symptoms and their relationship to each other in depth, as well as linking what is learned to the real world that exists outside of school. Authentic assessment consists of a variety of techniques: 1). Direct measurement of skills of the learners related to long-term educational outcomes such as success in the workplace. 2). Assessment of the tasks that require the involvement of a broad and complex performance. 3). Analysis of the process used to generate the response of the learners on the acquisition of attitudes, skills and knowledge. Authentic assessment encourages learners to construct, organize, analyze, synthesize, interpret, explain, and evaluate information and turn it into new knowledge (Depdiknas, 2013).

Philosophical-conceptual study on Among system in TMTS have been carried out, but not many studies about the practical issues. Government's appreciation to KHD ideas was still very symbolic, expressions of his brilliant but still a very popular phrase, like a *mantra*; known, disclosed and listed in the policy document. This study describe: 1). Concepts, principles and techniques of Among learning in TMTS. 2). Opinions of teachers on Scientific Approach, Authentic assessment as recommendations of 2013 curriculum and Among learning in TMTS. Learning models recommended by the 2013 curriculum, many of them are "imported" from outside. The results of this study are expected to be able to affirm appreciation from practitioner in education to the Among learning as culture based learning which has been initiated by KHD, the Father of

National Education of Indonesia.

RESEARCH METHOD

This study used a descriptive qualitative design (Denzin & Lincoln, 1994). Researcher analyzed and describe concepts, principles and techniques of the Among learning and how to be understood by the officials as the manager of learning in Taman Muda Ibu Pawiyatan Taman Siswa. In the method of phenomenology researcher conducted three levels of self-liberation in the form of: (1) self-liberation from subjective elements, (2) self-liberation from the confines of hypotheses, theories, or propositions of science, (3) self-liberation from the traditional doctrines. The three kinds of liberation are useful to obtain a pure phenomenon, a phenomenon that can be approached without being bound by the prejudices (Dimiyati, 1977). Researcher study a number of subjects and involved directly and relatively long in it to develop patterns and relationships of meaning. In this process, the researchers ruled out prior personal experiences so that he can understand the experiences of participants that he researched (Creswell, 2010). The main location of the study is Taman Muda Ibu Pawiyatan taman Siswa (TMTS) in Perguruan Persatuan Taman Siswa located at Jalan Taman Siswa No. 25 Yogyakarta, Tel (0274) 377 120, 55 151 ZIP code. It is the forerunner institutions of Taman Siswa which spread across Indonesia to day. In the academic year of 2013-2014 TMTS has 127 students, which is raised by 18 people comprising 6 grade teachers from grades 1-6 and 12 subject teachers, assisted by 3 administrative staff 3 and 2 jennitors (the Profile TMTS, 2013). The other locations are the Islamic Elementary School 1 Malang (MIN Malang 1) and the Public Elementary School (SDN Merjosari 1 Malang).

The data was collected through: (1) Observation, which allows the observer to see the world as seen by the subjects at the time, (2) Interview, researchers involved informal discussions with respondents, (3) Completion of an open questionnaire, researchers gave freedom to the subjects to pour his opinion even feelings, (4) Focus group discussion is conducted as necessary,(5) Field Notes,

qualitative researchers relied on observations and interviews and compiling field notes, (6) The use of documents, consisting of internal documents (such as memos, announcements, instructions, rules); and external documents containing materials, information of an institution, such as magazines, newsletters, statements, and news broadcast to mass media (Sugiyono, 2009; Moleong, 2011). Rsearcher conduct an Inductive and comparative data analysis; tabulated, grouped according to the variation of the answer then created a summary (Gibbon & Morris, 1987). The credibility of the data is checked by the extension of participation, persistence observation, triangulation, peer review, and the adequacy of reference (Denzin & Lincoln, 1994).

RESULTS AND DISCUSSION

The Concept of Among learning

The concept of Among system consist of all components and activities of the system include: philosophy, the basic purpose of education, equipment, methods, atmosphere, teachers and students. The Among system includes all activities in the Perguruan Taman Siswa as a whole, rather than as a methodological aspect only (Teams Taman Siswa, 1982). The word Among itself comes from the Javanese word meaning someone whose job *momong* or *ngemong* (Dewantara, 1977) who devoted his soul to his job. In this sense a *pamong/guru* is described as caregivers, who takes care for children with full devotion.

The foundations of Among system are: (1) Natural gives; belief in the natural strength of man as God's creatures, as a give and the basis for growing, maintaining the progress of his life. Man can seek safety and happiness physically and spiritually, both for themselves personally and for the community. Education is conducted so that we can achieve the perfection of life, so that the lives and livelihood of our children as students in harmony with his world.(2) Independence; a man is born free, greeted with happy life, to build a peaceful and orderly society, order en Vrede, toto tentrem. Freedom means: (a) Do not live under command, (b) Standing upright because of his own power, and (c) Proficient in organizing his life in an orderly manner (Dewantara, 1977).

The learning process TMTS is called Wiraga that is rhythmically in maintaining body and exercises for the perfection of sensory habituation; this process is implemented in Taman Anak. The next process is called wirama is an orderly trait, appropriate, coherent or harmony, the nature of life berwirama in behavior. All of that facilitate the work of the body, support the motion of the mind, turn on the intellectual character and the power of the human spirit. The use wiraga or wirama or a combination of both would strongly consider the phases of child development (Dewantara, 1977). From this concept will appear a variety of learning methods with spirit of kinship in the interaction of teachers and students (Soeratman, 1989). The relationship between tutors and students is based on love and trust each other, away from the authoritarian situation or freedom which creates indulgent. Teacher or pamong needs to have personal ideal traits as a prerequisite to educate their students, so that later he will produced a qualified person (Pujiastuti, 1998).

The roles of pamong in learning are: (a) as a teacher, it means as educating teachers, (b) as educators who foster Trisakti (creativity, intention) the soul of the students, (c) through behavior *ing ngarsa sung tuladha ing madya mangun karso, and tut wuri handayani*, which means give example in front, develop intention in the process, give motivation from behind to achieve an independent of life (Kuswandi, 2009). Educating in Among system is defined as make an effort intentionally to promote the growth of life the cultivation of character (feeling, mind, and spirit) and the child's body by instruction, example and habituation, not punishment or force command.

Principles and techniques of the Among Learning

Many principles associated with the Among learning originated from Javanese language and culture (Boentarsono, 2012). The Among learning system in Taman Muda apply *silih asih*/compassion, *asah*/Sharpening and *asuh*/Fostering. Conceptually practically in education, pamong followed from behind while giving motivation. The Trilogy of leadership in education, namely: *Ing ngarso sung tulodo, ing madyo mangun karso* and *tut wuri handayani* which means give

example in front, develop intention in the process, give motivation from behind. This is in line with the findings of Masrukhi (2010) which states that the role of school leadership is exemplary; to motivate, to provide facilities, as well as to create and enforce regulations in the school environment. The phrase of *Tut Wuri handayani* used as the symbol of education in Indonesia by decree of the Minister of Education and Culture No. 0398/M/1977 dated back on September 6. The Among system as a system of education was initiated by KHD and dedicated to all people of Indonesia through the Ministry of Education and Culture (Team Taman Siswa, 1982).

Other principles that strengthen the Among system are: avoid *tri pantangan*/tri forbidden namely, abuse of power, finance, act or affected bay bad thing. *Lawan sastra ngesti mulya* means the science or literature aspires to happiness. Science/literature can be used to promote a better life and achieve glory. *Suci tata ngesti tunggal* which means the sacred heart, orderly life aspire to unity and perfection. This expression taught students to prevent their hearts from various prejudices and unorderly life. *Tetep, antep, mantep* which means determination, become a qualified person or in favor to quality; after that came *mantep* or steady with choice or decision. *Ngandel, Kendel, Kandel*: which means to believe in God, brave, and resilient; it shows that the concepts of KHD are very religious. *Ning-neng-nung-nang*: which means having a quiet mind, no emotion, firm, and gain the victory (Dewantara, 1977). The principles teach us that it is necessary to have a clear mind and feelings, determination would be a capital towards success. The other one is *Bibit, bebet, bobot* which means it is necessary to have a good seed, a good origin/ancestor and quality. This principles teach us that learners need to be observed from the start/recognize students entry behavior; pick a good origin and quality not to discriminate but to move precisely towards a better condition (Boentarsono, 2012).

Some terms that can be categorized as the learning Among techniques such as: the application of *Tri nga* in class: *ngerti*/understand, Children understand what is learned. *Ngrasa*/feeling: make sure the children experience the benefits of

what they studied. *Nglakoni*/implementing give opportunity to children want to implement what they learned. *Tri N: niteni*: Children recognize what is learned, *Nirokke*: Children emulate or implement what is taught. *Nambahi*: Children will strengthen or broaden their understanding and skills. The application of *Tri ko* in the classroom: *Cooperative*: Children cooperate with each other. *Consultative*: Children ask advise from the teacher. *Corrective*: Children willingness to accept suggestions. Among various techniques are also used in learning activities outside the classroom; in curricular and co-curricular activities, and even expected to enrich life in society. Strong influence of *Tri Ngo* in teaching and learning character, so Akbar (2013) has been following up the *Tri ngo* concept by developing a learning model namely *Triprakoro* in adherence to values and character in Elementary School. Akbar's model was tested on a large scale, the result shows that the model was very valid according to experts, users, and students.

Various concepts, principles and techniques become the body of knowledge which gives direction of thought, activity or action for students in Taman Siswa in managing the learning process and the implementation of education (Kuswandi, 2009). The idea of KHD is a fairly complete, it is a combination of cultural and educational theories, leadership theories culminated in the formation of the *grand theory*, that is the noble character of the learners. The result of thei kind of education is the maturity of students' soul which can promote an orderly life and give benefit for others (Dewantara, 1977).

In the Among system, pamong work based on the Panca Dharma of Taman Siswa namely: (1) a give from nature, (2) Independence, (3) Culture, (4) Nationality and (5) Humanity. The description of characters in the National Curriculum has been a part of the implementation of education and learning in the Taman Siswa for a long time. The lesson plans/RPP made by pamong in the TMTS follow the format and the structure of RPP from Process Standards and Assessment Standards of the Department of Education. But many terms of Among learning techniques do not appear in the lesson plan made by pamong. Taman Muda Taman

Siswa (TMTS) has a commitment to meet the 8 (eight) aspects of national standards of education gradually. As educational institution TMTS will provide educational facilities, sufficient operating funds, as well as promote public participation and give opportunities proportionally (Profile TMTS, 2013).

Opinions Toward Scientific Approach, Authentic Assessment and Among Learning

Informations presented in this paper are the contribution of pamongs in TMTS and two other elementary school teachers namely MIN 1 Malang and SDN 1 Merjosari Malang. The pamong in TMTS have a good understanding of the concepts, principles and techniques of Among learning, they contend to apply them in teaching-learning activities in TMTS. Only the young pamong graduated from outside Sarjana Wiyata say that they are not familiar with the details information of Among learning; there is no path which leads them to understand the Among learning except they learn about it themselves. Senior pamong are generally able to explain the concepts, principles and techniques of learning and gives examples of the application inside and outside classroom. Various terms created by KHD are based on Javanese culture; researcher is trying to classify these terms into concepts, principles and techniques of Among learning, and ask confirmation from pamong, and pamong considered the grouping is appropriate. The pamong of TMTS stated that the concepts, principles and techniques of Among learning is relevant to be implemented of education not only in TMTS but also in other institution. However, when preparing lesson plans, pamong bound to the standards that have been prepared by BSNP. Adjustments to the National Standards of education have eroded pamong' attention to the special characteristic of Among learning.

Pamong also stated that integrated learning in elementary school recommended by the National Curriculum has become the part of the educational practices in TMTS for a long time. The Perception of pamong in TMTS on the national curriculum is quite positive. The changes in educational policy,

including the emergence of a new curriculum taken for granted along with the times. However, about the Scientific Approach as a recommendation Curriculum 2013, there are statements from pamong that need to be observed. The socialization of 2013 Curriculum in TMTS is not evenly distributed, the process to understand the 2013 Curriculum is not optimal. Several pamong do not understand Scientific Approach and its phases. One or two days of socialization is not enough; pamong who in charge on curriculum browsing information from the internet. Because the 2013 curriculum is a new thing; to apply a scientific approach pamong should be careful, in this approach students should be able to think logically in favor of reasoning not imaginary. Students are able to think critically, analytically to understand and solve problems on their own. Students should be able to understand, implement, and develop rational mindset and objective in responding learning materials. An outdoors learning is important for students to observe; guess, raise question and answer with pamong freely and Pamong *Tut Wuri*/following from behind. There is statement that the Scientific approach basically has been existed in the Among learning system; *Tri N* and *Tri Nga* are the indicators.

Art and culture is special characteristic of KHD ideas in implementing the educational system in Tamansiswa. Children are not robots, they have independent souls which deserve to be smooth in handling and determining the direction of his life. Independence and courage of children need to be based on the ideals and affection. Games for children have a function developing children mentality. By playing, children have freedom to show their personality. A collection of songs *Dolanan Anak*/Children games are not just singing and games because the lyric full of advise advice to develop character. Through *Dolanan* song, children will learn about the culture and local language, this way children participate in preservation of the game itself. Guidance of *Sekar Macapat* and traditional dances teach children a love their own culture and traditions, build refinement, patient, noble character, courtesy, love to the environment, care for the community.

An authentic assessment can be done in a variety of techniques: 1). Direct measurement of the learners skills, 2). Assessment on tasks and complex performance. 3). Process analysis, observing learner response as the acquisition of attitudes, skills and knowledge. Authentic assessment encourages learners to construct, organize, analyze, synthesize, interpret, explain, and evaluate new information that becomes knowledge. Pamong responded positively to implement authentic assessment, because it gives a holistic assessment (cognitive, affective and psychomotor, not only the results but also the process) of the students learning have become part of the Among learning in TMTS. As Hill, Ruptic and Norwick (1998:16) makes a summary that assessment are: collecting information, collecting samples, recording observations; Evaluation: Reflecting on the data, making instructional decisions, encouraging self evaluation, celebrating growth, setting goals; Reporting: summarizing, interpreting, communicating. But pamong of TMTS still have difficulty to develop appraisal formats appropriate for each learning theme; not to mention the progress reports must be made when the report cards to be shared. Considered the difficulties, pamong require special assistance in order to implement scientific Approach and authentic assessment.

According to pamong in TMTS socialized the Among learning is relevant for the teachers in other schools, the relationship between student and pamong in Among learning will be closer so that will foster self-confidence of students. Education is not only concerned with the intellectual aspect without regard to aspects of self-development and character formation. It is expected that the development of intellectual aspect of education can be achieved, without neglecting the development of self-education, character formation and moral education. The Among learning promote the intellectual development of learning coupled with a love of learning culture and traditions, build refinement, patient, meticulous, noble character, courtesy, love for the environment, strengthen social awareness.

Teachers from SDN and MIN as participants of the socialization of the

Among Learning; was increased insight about the Among learning that has been widely recognized, but only briefly. In their study as college student they did not/have not been studied specifically about KHD ideas, and feel grateful for the opportunity to examine the history and the role of KHD in Taman Siswa. They understand Panca Dharma as the basis of education in the TMTS; understand the concepts, principles and techniques of the Among learning, even expect anyone to develop syntax or steps in using the Among techniques. The teachers came to know that the elements of art and culture became an integral part of Among learning. Set of *dolanan* songs containing the words as an advice and inculcate manners. Through *dolanan* song, traditional games, guidance of *Sekar Mocopat* as traditional song, traditional Javanese dance among teach children to love their own culture and tradition; children learn about the value of culture, local languages and involved in conservation efforts. Teachers feel that children today have affected by foreign cultures that do not comply with the national culture, education should provide basic education for students to experience and appreciate the art and culture of the nation.

Teachers MIN and SDN understand the general messages carried by 2013 Curriculum, the emphasis on the development of students character is very appropriate. Unfortunately in the socialization of 2013 Curriculum they hear the bad expression of socialization officer who vividly underestimate the previous curriculum. Researchers have also heard that expressions when the socialization 2013 curriculum on the campus; the socialization officers arrogantly say questions: "In our education we had KBK/Competency Based Curriculum and KTSP/School Based Curriculum, what are the results? Where are the results? " this is unwise speech and undermeaning attitude, away from good character, because it did not appreciate many practitioners and educators who work hard for better education; in contrast to the ratification of the 2013 curriculum that emphasizes character development. Important changes that need to be accomplished through a curriculum in 2013 include: (1). There are social and spiritual messages in any subject matter, (2). Each subject support competencies of

attitudes, skills and knowledges, (3). The content should be taught in related and integrated with each other, (4). All subjects are taught through a scientific approach: to observe, to question, to reason, to try/experiment, to create, to presents and to build a network. These changes could be added without launching the new curriculum.

Recommended use of the scientific approach taken by teachers in reasonable manner. Some teachers say that such an approach is likely too intelektualistic; but in the phase of networking have strong affective charge because it involves feelings of likes/dislikes to recruit friends. The scientific approach is very necessary given the culture of students who are not accustomed to asking questions and being critical. It is important for teachers to use the approach with creativity and effectivity, so that the students are also become innovative, creative and productive. While other teachers respond to this approach with a critical stance stating that the use of a scientific approach to all materials in all subjects is too pushy; each material/themes may require a different approach. Specific subjects such as sports, cultural arts, craft skills, *aqidah-akhlaq* or religion requires a different approach, the scientific approach is not always appropriate to the material and the purpose of learning of these subjects. The opinion of these teachers in accordance with the theoretical knowledge of instructional design which explains that learning is a system it has a number of interrelated elements (Dick and Carrey, 1985. Kemp, 1985). Determination and selection of the learning approach and model will depend on the other elements of a the learning system, it depend on who, what material, and what the learning objectives. Various approaches and learning models are offered in designing learning (Joyce & Weill, 1985). Science of Instructional Design is abbreviated ID, which can also be considered as an extension of *It Depend* which mean dependent on the other elements of the learning system. Is the scientific approach recommendation for all subjects contain a theoretical mistake? If we do not know, Allaah knows best.

From the deep analysis of teachers to the scientific approach in

teaching and learning in 2013 curriculum, and understanding the description of Among Learning in TMTS; they argued that the Among learning can be a good supplement for 2013 curriculum. The Among learning become necessary to promote balance between intelektualistic learning and culture-based learning. In the use of authentic assessment, teachers in SDN and MIN have an opinion that is not far away from what has been expressed by pamong in TMTS. Conceptually and academically, classroom-based assessment is very good and adequate to assess not only on results but also on the learning process; but it is quite complicated to develop instruments and write the final report. They also expect special assistance in order to implement authentic assessment.

CONCLUSION

Taman Muda Ibu Pawiyatan Taman Siswa, as a forerunner institution in Perguruan Taman Siswa founded on July 3th, 1922 as the results of the discussion *Selasa Kliwonan* one of the activists was KHD. This community came to the realize that in aspiring to the independence of Indonesia, it is not enough with the struggle in politics, diplomacy, and physical struggle; but the Indonesian nation must be educated, gain the sprite of freedom as a God-given nature to humans, through education.

Conceptually the Among system is all components and activities that include: philosophy, the basic purpose of education, equipment, methods, atmosphere, teachers and students interactions. The Among learning with its various techniques are based on people culture. it is very relevant to education today which has to face many global challenges. The concepts, principles and techniques of Among Learning are an intellectual heritage of KHD, it is not only to be preserved, but also should to be examined carefully because it could be a necessary alternative to the process of education and learning that emphasizes the importance of character education. The new curriculum was launched in 2013 with all its strengths and weaknesses is an effort to improve the quality of education so that students become a man who is ready to face the challenges of his time.

Recommended use of scientific approach and authentic assessment in learning of 2013 curriculum being accepted wisely by elementary school teachers. After examining the Among learning at TMTS, teachers found that the people culture-based learning is required to prevent the use of scientific approach to learning in 2013 curriculum become too intellectualistic.

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THE PERFORMANCE OF THE BACHELOR EDUCATION IN-SERVICE TEACHERS PROGRAMME (ICT-BASED BEITP) BACHELOR GRADUATED AND ITS DETERMINANT

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Abstract

The Bachelor of Education In-service Teachers Programme (BEITP) is a program of accelerated increase in teachers' academic qualifications into a Bachelor Degree. The Bachelor Degree of Elementary School Teacher Education Program, the distance learning system, known as ICT-based BEITP is used. The problem in this study were: 1) What level of success BEITP graduated Bachelor Degree, and 2) what factors be the determinant? This factors were involved: Curriculum, Course Materials, Devices lectures, teaching and learning process, facilities and infrastructure, Assessment, Qualifications Lecturers, and Program Management. This study was conducted based on the assessment of alumni who had attended BEITP. The data source is 32 graduate alumni of BEITP Satya Wacana Christian University (SWCU). Data were collected through a self-rating scale consisting of 32 items that have been proven valid and reliable; Data analysis was descriptive analysis and stepwise multiple regression models aided by SPSS for windows version 20. Performance BEITP graduated bachelor degree are at high level. The high success is determined by three factors, namely: the course material, faculty qualifications, and learning tools; This gives the effect of a variable 60.40% - 83.30%. 5 Other variables, namely: curriculum, teaching and learning, facilities and infrastructure, assessment and program managers have no effect, therefore, distance learning institutional development should focus on the lecturer, teaching materials and learning tools.

Keywords: *Distance Learning, Performance, Courses Content, Teacher Qualification, Learning Tools.*

Background

The Bachelor of Education In-service Teachers Programme (BEITP) the conduct of the lecture through distance learning education degree is deemed worthy of yielding equivalent to regular on-campus graduate programs. BEITP was acceleration program enhancement teachers' academic qualifications into Bachelor Degree. In Indonesia have been carried out by various universities; since 2009 by 55 universities. One effort to

support the acceleration of academic qualifications for in-service teacher has published Rules of Ministry of Education No. 58 of 2008 on the implementation of the Teacher Education Courses In Title. In The regulation states that the college can provide recognition organizers Work Experience and Learning Outcomes ever obtained of students. The special recognition is given to teachers in Higher Education program participants that organizers have regulated by the Minister of National Education No. 015/P/2009 on Higher Education Establishment Operator BEITP.

For the improvement of teachers' academic qualifications ES through the Primary Teacher Educational Program, using distance education system known as ICT-based BIETP. To find and measure the feasibility and success of the program has also been carried out monitoring and evaluation activities in 2010, 2011, 2012 and 2013. One of the results of the monitoring and evaluation of the development of the number of participants is not significant, for 5 years has resulted in as many as 76 605 people graduate of program participants as much as 86 454 teachers (Kemendiknas Badan PSDMPK & PMP Pusat Pengembangan Profesi Pendidik, 2013). So if there is a reasonable view worried toward the program in the completion of academic qualification Bachelor Degree.

BEITP is to provide education programs that are specifically designed for teachers remain in positions that do not have a Bachelor Degree. In particular, efforts are implemented to accelerate the improvement of in-service teacher qualification. Programs offered in education scholars is that this allows the teacher to have a greater opportunity to not interfere with the duties and responsibilities (Permendiknas Nomor 58 Tahun 2008), further program is expected to realize the implementation of the teacher education system that is efficient, effective, and accountable as well as offering access to educational services wider without sacrificing quality. Graduation at BEITP regulated and established by the university in accordance with the regulations organizer/academic guidelines apply. Students who have completed the program are entitled to a Bachelor's Degree and an undergraduate degree from the University of organizers.

Recent developments, pursuant to Presidential Decree No. 8 of 2012 on the National Qualifications Framework Indonesia (Peraturan Presiden No. 8 tahun 2012), Bachelor Degree categorized as a technician or analyst positions (not categorized as an expert) who are at level 6, with a description of qualifications, as follows: 1) Ability to

apply and utilize their specific expertise in the field of science and technology in problem solving and able to adapt to the situation at hand. 2) Mastering the theoretical concept of a particular field of knowledge in general and theoretical concepts in a special section of the in-depth knowledge of the field, and be able to formulate procedural problem solving. 3) Ability to make appropriate decisions based on analysis of information and data, and is able to provide guidance in selecting a range of alternative solutions independently and groups. 4) Responsible for own work and may be held accountable for the achievement of the organization 's work. Noting the provisions of the National Qualifications Framework Indonesian proficiency level, it appears that a scholar actually has a relatively high position in the structure of Indonesian society, seen from the capacity and competence of its science (Akhmadsudrajat, 2012).

In recent years a growing debate related to the presence of the Director General of Higher Education Circular No. 152/E/T/2012 of scientific publications in the Journal of liability as a condition for graduation degree.”A scholar should have the ability to write scientifically, including master manner of writing good science”.

According to Law no. 20, 2003 (Pemerintah RI, Undang-Undang No. 20 Tahun 2003) the curriculum is a set of plans and arrangements regarding the purpose, content, and teaching materials and methods used to guide the organization of learning activities to achieve national education goals. The curriculum of the Bachelor Degree for the same with a Bachelor Degree BEITP regular, and should stick to Competency Standards. The curriculum used in BEITP is applicable curriculum at each high coledge organizers. Competency Standards covering the four core competencies, namely: pedagogical, personal competence, social competence, and professional competence.

Self study material is the substance of learning developed in the form of printed materials, audio, and audio-visual equipment that can be used for student self-learning process. As per the demands of the curriculum, teaching methods should be able to keep the quality achieve the Competency Standards. The learning process in BEITP implemented through the integration of lectures/learning and face-to-face on campus or college-mediated and independent learning activities. In face-to-face activities in the campus system development of teaching materials left entirely to the lecturers at the university course organizers, while the self-directed learning system using the Self-Study

Materials. Self study material designed specifically to be studied independently by students. The form can be printed instructional materials (modules) as the main teaching material and non-print media (media audio/video, computer/internet, radio and television) as a support material or a combination of both.

Learning tools is arranged fixtures learning activities systematically used by the teacher in the learning process. Such as: lesson plan, syllabus, work sheets, and others.”The device is a learning material, tools, media, instructions and guidelines to be used in the learning process”a series of learning tools must be prepared to face a teacher in the classroom, the learning can include: lesson plan, student books, teacher handbooks, student activity sheets, and achievement test (K. Dewi, I. W. Sadia, N. P. Ristiati. 2013).

The process of learning is a form of communication that is the subject of communication between students and educators, between students and faculty”. The communication contained in the transform and the transfer of knowledge, skills or attitudes and values of the communicators (teachers, lecturers) to the communicant (subject learners, students) in accordance with its intended purpose (Yogo Prihatono. 2014). The learning process is a learning activity that is done by integrating the system face to face lectures and/or mediated, and self-learning systems. To-face lectures are scheduled process and the direct interaction between faculty and students in achieving objectives/competencies. Mediated lecture is scheduled interaction process between faculty and students in achieving sublime goal/competency through the use of various types of media and technology. Self-regulated learning is the process of student interaction with learning resources which is done by using self-learning materials, either with or without the assistance tutorial help tutorial. Tutorial assistance is a form of academic study that is directly related to teaching materials, and can be carried out face-to-face or mediated.

Facilities and infrastructure or educational facilities means that everything (tools and goods) that facilitate (provide ease) in organizing educational activities. Educational facilities are all kinds of equipment used educators to facilitate the delivery of the subject matter. When viewed from the point of learners, educational facilities are all kinds of equipment used to facilitate the study subjects/courses. Means functions facilitate delivery/learn the subject matter. Educational facilities is also known appellation education tools (teaching aids), which is all kinds of equipment that is used by the teacher to help

facilitate teaching activities. While educational facilities are all kinds of tools that are not directly used in the educational process. educational facilities are all sorts of equipment, fittings, and objects used by teachers/educators (and learners) to facilitate the provision of education.

Assessment of learning outcomes is giving value to the process and the results of student learning, both in face-to-face lectures and/or mediated and independent learning; Assessment of learning outcomes is conducted on the process and outcomes of student learning, both in face-to-face lectures and/or mediated and independent learning (Kemendiknas, 2011). Learning outcomes assessment carried out in accordance with the provisions applicable in each college, such as: assessment of the course activities, assignments, Mid-Semester Exams, and Final Exams Semester.

To organize BEITP, the providers are required to have qualified faculty as specified in the policy and legislation in force. Lecturer serves as custodian of the course with the basic tasks of teaching and is responsible for the entire implementation of the lecture and tasked to develop learning tools such as course descriptions, syllabi, lecture events unit, preparation of assignments or exam questions, as well as developing teaching materials.

Personnel, program managers are in charge of managing the implementation BEITP. Program managers need to have managerial skills and self-management of learning. The number of personnel tailored to the needs and conditions of the university organizers.

Primary Teacher Educational Program, Satya Wacana Christian University, Salatiga since 2009 has embarked on organizing ICT-based BEITP. Program to improve teachers' academic qualification Bachelor Degree ES through Primary Teacher Educational Program of the program using distance education system known as ICT- Based BEITP. Although a part of the monitoring and evaluation ever conducted by the Ministry of Education, there are still certain blame groups who doubted this program; so far have not done studies that specifically explore the various factors associated with the success of this program. Thus it is necessary to be made studies/study.

Problem Formulation

The problem in this study are:

- 1) What level of performance for BIETP graduated Bachelor Degree?
- 2) What factors that will determine the performance of BEITP graduated Bachelor Degree? Comorbid factors is limited: 1) curriculum, 2) Material Lecture, 3) device classes, 4) teaching learnng process, 5) facilities and infrastructure, 6), assesment, 7) Lecturer Qualifications, and 8) Program Management.

Research Methods

This study was conducted based on the assessment of alumni who had attended BEITP. The data source is 32 graduate alumni of BEITP SWCU graduated. Data were collected through a self-rating scale consisting of 32 items that have been proven valid and reliable; Score validity 0,199 to 0, 827, with a reliability index Cronbach's Alpha = 0.93. Data analysis used descriptive analysis and stepwise multiple regression models with SPSS for windows version 20.

Results

After a descriptive analysis of data collected for each variable are the results as follows.

Table 1 results of a descriptive analysis of all variables studied

Variabel	Mean	Median	Std. Deviation	Minimum	Maximum
1) Curriculum	3,0313	3,0000	,50701	2,50	4,00
2) Course content	2,6563	3,0000	,60158	2,00	4,00
3) Learning tools	3,1875	3,0000	,39656	3,00	4,00
4) Teaching Learng Process	3,0625	3,0455	,26873	2,73	3,64
5) Facilities and Infrastructure	2,9375	3,0000	,56440	1,00	4,00
6) Assesment	2,9438	2,8000	,33014	2,40	3,80
7) Lecturer Qualifications	3,2500	3,0000	,43994	3,00	4,00
8) Program Management	3,0625	3,0000	,56440	2,00	4,00

Variabel	Mean	Median	Std. Deviation	Minimum	Maximum
1) Curriculum	3,0313	3,0000	,50701	2,50	4,00
2) Course content	2,6563	3,0000	,60158	2,00	4,00
3) Learning tools	3,1875	3,0000	,39656	3,00	4,00
4) Teaching Learning Process	3,0625	3,0455	,26873	2,73	3,64
5) Facilities and Infrastructure	2,9375	3,0000	,56440	1,00	4,00
6) Assesment	2,9438	2,8000	,33014	2,40	3,80
7) Lecturer Qualifications	3,2500	3,0000	,43994	3,00	4,00
8) Program Management	3,0625	3,0000	,56440	2,00	4,00
Y) Bachelor Degree	2,9063	3,0000	,81752	2,00	4,00

Based on the analysis presented in Table 1 above, it turns average value variables: Y (bachelor's degree), X₂ (course content), X₅ (facilities and infrastructure), less than the figure the median, this means that the spread of each variable question has a tendency toward higher; While the average value of variables: X₁ (Curriculum), X₃ (learning tools), X₄ (Teaching and Learning), X₆ (Assessment), X₇ (Lecturer Qualifications), X₈ (BEITP management) is larger than the median, this means deployment of each variable in question has a tendency towards lower.

Furthermore, to determine the success of BEITP graduated Bachelor Degree conducted a descriptive analysis of the results are presented in Table 2 below.

Table 2 Distribution of Frequency Variable Bachelor Degree

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 2,00	12	37,5	37,5	37,5
3,00	11	34,4	34,4	71,9
4,00	9	28,1	28,1	100,0
Total	32	100,0	100,0	

The results of the analysis presented in Table 2 above shows that the success rate was BEITP graduated Bachelor Degree at the level of very high (28.10%), high (34.40%), moderate (37.50%). No one was at the level of the low.

After testing for normality and homogeneity met, then performed stepwise multiple regression analysis models the effect of 8 variable X to the performance of BEITP graduated Bachelor Degree (Y), the result is obtained as the following table 3.

Table 3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,785 ^a	,616	,604	,51478
2	,909 ^b	,827	,815	,35207
3	,922 ^c	,850	,833	,33364

a. Predictors: (Constant), course of the content

b. Predictors: (Constant), course of the content, Lecturer Qualifications

c. Predictors: (Constant), course of the content, Lecturer Qualifications, Learning tools

Based on the results of the analysis as presented in Table 3 above, obtained a summary of that course content (X_2) be the determinant of the performance of ICT - based BEITP graduated Bachelor Degree (Y) of 60.40% (Model 1), which when followed by the qualification of lecturers (X_7), its effect on the performance of ICT - based BEITP graduated Bachelor Degree (Y) amounted to 81.50% (model 2), especially in addition to course content (X_2) and the qualification of lecturers (X_7), followed by the learning tools (X_3), the influence the third variable to the performance of the Primary Teacher Educational Program held a distance learning program graduated Bachelor Degree (Y) increased to 83.30% (model 3); This means that only less than 13% are influenced by the other variables that are not observed in this model. Other variables, namely: Curriculum (X_1), teaching and learning process (X_4), facilities and infrastructure (X_5), Assessment (X_6) and business programs (X_8) supported the data does not affect the performance of conducting Distance learning BEITP graduated Bachelor Degree (Y).

Furthermore, to determine whether the findings of the above three models significantly, can be examined in Table 4 the results of the ANOVA analysis as below.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12,769	1	12,769	48,185	,000 ^a
	Residual	7,950	30	,265		
	Total	20,719	31			
2	Regression	17,124	2	8,562	69,074	,000 ^b
	Residual	3,595	29	,124		
	Total	20,719	31			

3	Regression	17,602	3	5,867	52,709	,000 ^c
	Residual	3,117	28	,111		
	Total	20,719	31			
a. Predictors: (Constant), course of the content b. Predictors: (Constant), course of the content, Lecturer Qualifications c. Predictors: (Constant), course of the content, Lecturer Qualifications, Learning tools d. Dependent Variable: Bachelor Degree						

Based on the results of stepwise multiple regression analysis models as presented in Table 4 above, obtained $F = 48.185$ with a significance level of 0.00 (Model 1), $F = 69.074$ with a significance level of 0.00 (model 2), and $F = 52.709$ with a significance level of 0.00 (Model 3); This means that the three variables in: Model 1 course content (X_2), and model 2 plus qualified lecturers (X_7), and model 3 along with the Learning tools (X_3) become determinants of the performance of ICT - based BEITP graduated Bachelor Degree (Y) is supported by data to meet the level of significance.

To build influential model of equation 3 variables: course content (X_2), lecturer qualification (X_7), and the lectures (X_3) on the success of ICT - based BEITP graduated Bachelor Degree, performed by observing the Beta coefficient (B), both standard and non-, can be collated by utilizing the results of such analysis in Table 5 below.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,072	,418		,173	,864
	course content	1,067	,154	,785	6,942	,000
2	(Constant)	-2,278	,489		-4,659	,000
	course content	,845	,112	,622	7,576	,000
	qualified lecturers	,904	,153	,487	5,928	,000
3	(Constant)	-1,680	,546		-3,079	,005
	course content	,917	,111	,675	8,242	,000
	qualified lecturers	1,026	,156	,552	6,574	,000
	Learning tools	-,371	,179	-,180	-2,072	,048
a. Dependent Variable: Bachelor Degree						

Based on the results of the analysis as presented above, it turns out BEITP-ICT based success in graduating Bachelor Degree (Y) is not affected by: Curriculum (X_1), the teaching and learning process (X_4), facilities and infrastructure (X_5), Assessment (X_6) and program management (X_8) but is determined by the variation of ICT-based course content, qualified lecturers and learning tools used in distance learning.

Discussion

Performance BEITP - ICT based graduated bachelor degree in quite exhilarating it, how not, the results are at the level of the analysis showed a very high (28.10%), high (34.40%), moderate (37.50%). No one was at the level of the low. The high success supported by three factors, namely: the course content, lecture qualifications, and learning tools. The third variable influence of 83.30%.

Interaction and communication in the process of ICT - based learning BEITP involve factors faculty, students, and learning materials. The development of information and communication technologies, especially the development of a computer with internet technology, the current rapid, effect on the development of the concept of distance learning. Internet is becoming a very appropriate medium in distance learning because it can penetrate the boundaries of time and place, or can be accessed anytime, anywhere, multiuser and provide ease. A variety of learning materials and information in printed form, books, CD - ROM, or video can be accessed directly by students. Material can be accessed without being limited distance, space, and time, it could be anywhere and anytime.

Utilization of technology in distance learning system raises an electronic-based learning as a result of technology. One application is the technology of information and communication technology. Information technology-based learning and communication further by Munir, (2006) has changed the system of conventional or traditional learning patterns into patterns of media, including computers with internet media that gave rise to e-learning. In this pattern of media learning, students can choose their own learning materials based on their interests, so that learning becomes fun, not boring, full of motivation, enthusiasm, and so attract attention.

Based on learning information and communication technology will be effective if the teacher's role as a facilitator in the learning process is learning or for students to easily learn not only as a conduit of information. Lecturers are not the only source of information conveyed. Lecturers not only teach knowledge transfer, but also be able to learn from the students. Lecturers not instructors who give orders or direct students, but learning partner to enable the student does not hesitate to argue, ask questions, or exchange ideas with a lecturer. The learning process by utilizing information and communication technology is to facilitate the guidance of a faculty lecture effectively. Lecturers provide maximum opportunity and create the conditions for students to develop their own ways of learning according to the characteristics, needs, talents, or interests. Lecturer's role as a programmer, which is always creative and innovative produce a range of innovative work in the form of programs or hardware/software to be used for student learning.

The role of the student in learning not only the passive object that receives information from the professors, but more active, creative, and participatory in the learning process. Students are not only given the facts or revealing back information it receives from professors, but able to produce or find a variety of information or knowledge. Learning activities do students not only individuals, but also learning cooperatively in groups with other students. So natural that the quality of lecturers who can meet the demands as above, so the determinant of the success of distance learning programs. Lecturer in human resources is a college that has a central role in all activities and strategic in college (Direktorat Pendidik dan Tenaga Kependidikan Direktorat Jenderal Pendidikan Tinggi Kementerian Pendidikan Nasional, 2011). So natural that qualified lecturers to be one of the critical success BEITP. What more devices with sufficient learning in distance learning system is.

End Note

Performance BEITP-ICT based in undergraduate pass bachelor degree are at high level. The high performance is determined by three factors, namely: the course content, lecturer's qualifications, and learning tools; this gives the effect of a variable 60.40% - 83.30%. 5 other variables, namely: curriculum, teaching and learning, facilities and infrastructure, assessment and program managers do not influence the success of BEITP-

ICT based program in bachelor degree graduated, therefore, the development of distance learning institutions should focus on the lecturer, course content and learning tools.

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DEVELOPING LEARNING TOOLS OF A GAME-BASED LEARNING THROUGH REALISTIC MATHEMATICS EDUCATION (RME) FOR TEACHING AND LEARNING BASED ON CURRICULUM 2013

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Abstract

This study aims at developing learning tools of a game-based learning through Realistic Mathematics Education (RME) approach including syllabus, lesson plan, game-based learning media, students' worksheets and assesment, and determining the effectiveness of the implementation of learning mathematics using game-based learning through RME and the learning tools on the topic of Numbers at junior high school. This research is a Research and Development (R&D) research. The research and development method carried out in this research referring to the steps of research developed by Borg and Gall. The results and discussion indicate that the games-based learning through RME approach in learning mathematics at the junior high school produced in accordance with the determined criteria/valid. The results of field test show that the average of students' test results and the average of students' problem solving skill are increase.

Keywords: *Developing, RME, Games*

Introduction

The challenge of curriculum 2013 is that every subject has to contribute to students' characters building, attitudes, skills, and knowledge. Furthermore, it has been explained that the depth of subjects matter taught in school has to be in line with the demand of international standard which is at the level of reasoning. Therefore, students are able to reach the higher level than the results of PISA 2009 and TIMMS 2011. Referring to the framework of 21th century competencies (Nuh, 2013), then the learning has to be able to create learning exercises that allows students to collaborate, to learn things relevant to the world contexts, so that the learning process should be able to create learners that are innovative and creative. In addition (Nuh, 2013) stated that the ability of innovative, creative, and intelligent can be obtained by observing, questioning, and experimenting.

This innovative way could be using an appropriate learning approach and creating a conducive environment to learn. Many learning approaches which has been developed as a step to create a conducive environment to the learning process are expected to increase

students' achievement. One of the learning approach is Realistic Mathematics Education (RME), which is a mathematical learning that emphasizes problem solving informally before using a formal way. This informal way could be games, song, or anything that closed to students. RME is started from informal problems which are then directed towards the formal. Kamii (Turmudi, 2002) suggested that the games are used as a form of approach in the study of mathematics. In learning mathematics, Ernest (1986b) explained that (1) games are able to provide reinforcement and train their skill, (2) games can motivate, (3) games assist the acquisition and development of mathematics concepts, and (4) through games, students can develop strategies to solve problems.

Based on the descriptions, it is necessary to develop learning tools which can accommodate the situation and condition of students. Therefore, a conducive and fun learning environment can be created.

Research Methods

A. Research Approach

This research is a *Research and Development* (R&D) research. The steps conducted refer to the steps of R&D developed by Borg and Gall. Therefore, the research method (restricted to limited trial) is presented in Figure 1.

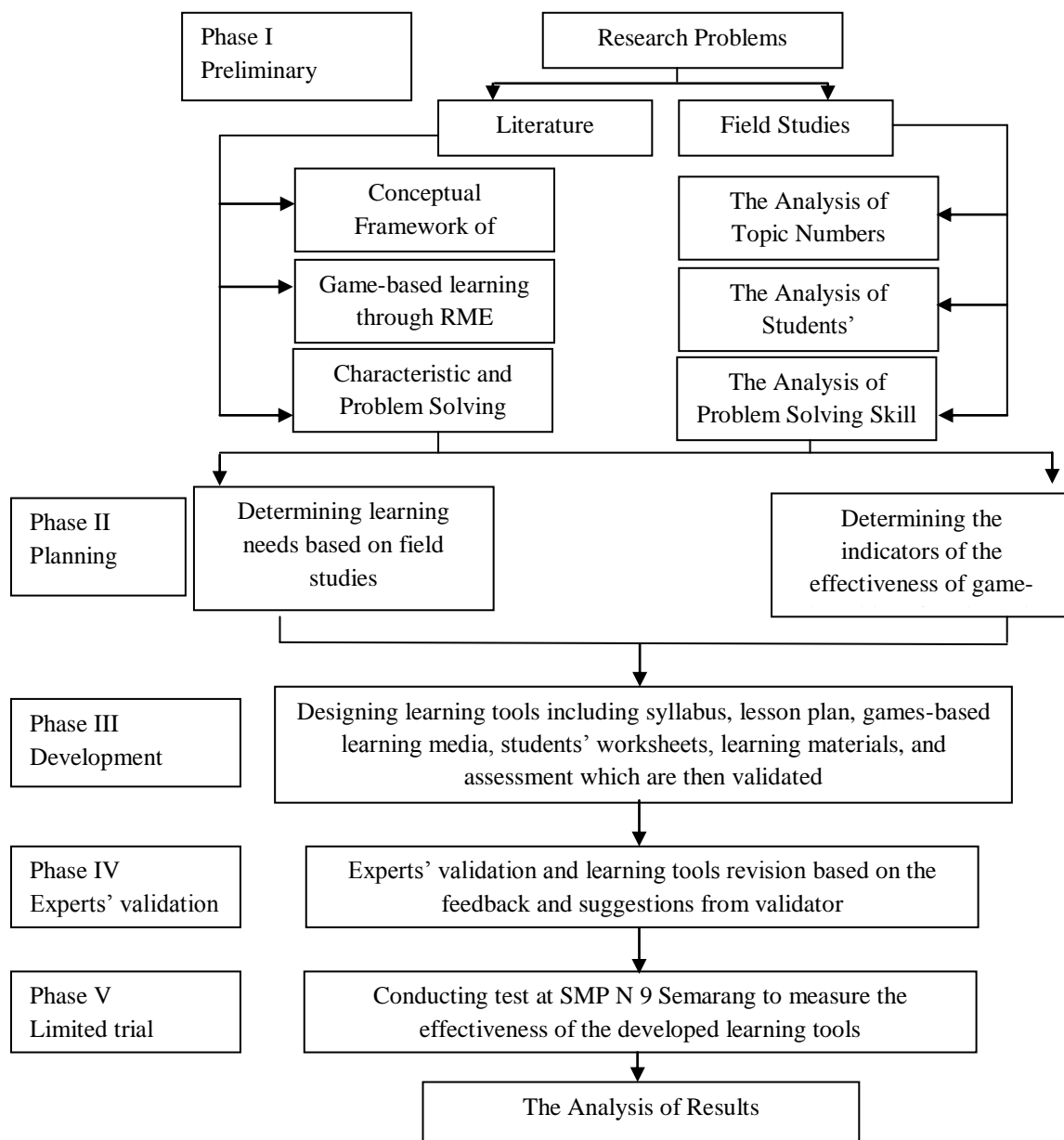


Figure 1. Research Method

B. Procedures of Data Collection

The instruments developed in this study is based on the needs of the study. The procedures of data collection in this study are presented in the following table.

Table 1. The procedures of Data Collection

Aspects	Indicators of success	Data resources	Instruments	Time
Learning tools of games-based learning through RME	Learning tools and teaching materials fit for use	The results of Focus Group Discussion (FDG) and experts' validation	The draft for FDG and validation sheets for syllabus, lesson plan, students' worksheets, media, learning materials, and assesment. The data is statements of experts on the aspects of learning tools	Early development tools, before the limited trial
Teaching and learning process	Teachers' ability to manage learning	Teachers' activities in teaching and learning process	Observation sheet and video recording	The process of limited trial
	Students' activities are increased	Students' activities in teaching and learning activities	Students' portfolio, observation sheet of the learning activities, and video recording	The process of limited trial
The effectiveness of games-based learning through RME	<ul style="list-style-type: none"> - Individual mastery (at least 75) and at least 85% of the number of students - Students' learning outcomes are better - An increase in learning outcomes through Gain test 	Students' scores	Achievement test instrument	Learning evaluation and analyzed before and after learning process

C. Data Analysis

Methods of data analysis is conducted by using triangulation mixed-method design, which is simultaneously analyze data from quantitative and qualitative data, as well as the combined data. Moreover, the results of the analysis are used to understand the research problems. The rationale of this data analysis design is a shortage of one type of data will be supplemented by other types of data. The quantitative data provides a way to generalize while qualitative data provides information about the context and setting.

The quantitative test is conducted statistically to evaluate the response of students and teachers during the learning process of games-based through RME, determining the effectiveness of the implementation of game-based learning through RME, and improving students' learning outcomes after receiving the application of game-based learning through RME. While the qualitative descriptive analysis performed on the data from validation sheet, observation sheet to the stages of the implementation of games-based learning through RME. In addition, qualitative analysis will also be used to describe the students' ability to solve problems during the learning using games-based learning through RME.

Results and Discussion

A. Observation of Learning Process

1. The effectiveness of Learning

The effectiveness of learning shows that the effectiveness is 92,3%. It showed that the learning has been done very well. The effectiveness of this learning is influenced by several factors such as communication and perception within the framework of research between the researchers and the teacher as the model conducting the learning.

2. Teachers' Observation

The observation of the teacher in the learning of the topic of Numbers using games-based learning through RME in the learning of mathematics at the junior high school indicates that during the learning activities value (which is taken from the value on the last observation because it indicates an increase), showed that the percentage of the value is 92.5. This shows that the teacher gives excellent response to the learning mathematics using games-based learning through RME.

3. Students' Observation

The observation of students' responses in the learning of Numbers using games-based learning through RME at junior high school level indicates that the students' activities during the four meetings showed an average of 87.5%. This shows that the students gave an excellent responses to the activities designed by the researchers and implemented by the teacher.

B. Results of Field Test

1. Hypothesis Results of Completeness Results.

A learning is said to be complete if it is qualified mastery learning, which means the average scores of students' learning results is at least 75.

Table 4.1 Output (Statistic Group) of Students Learning Results

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Nilai	32	95.72	5.531	.978

Table 4.2 The Analysis of Students' Mastery

One-Sample Test						
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Scores	21.189	31	.000	20.719	18.72	22.71

Based on the probability, if $\text{Sig} < 0,05$ then H_0 is rejected. In other words, students master the learning or the learning results are complete. Moreover, the Proportion Test is used to determine the proportion of the data of students learning results of the experiment class whether results are classically master with the proportion of students who are master about 85%. For the hypothesis test, it is conducted by using proportion test.

$$Z = \frac{X - np_0}{\sqrt{np_0(1-p_0)}} = \frac{32 - 32 \cdot 0,85}{\sqrt{32 \cdot 0,85(1-0,85)}} = 2,376$$

It is obtained the $Z_{\text{value}} = 2,376$ with $Z_{\text{table}} = 1,65$. Therefore, it indicates that H_0 is received where $Z_{\text{value}} > Z_{\text{table}}$ which means that the results of the students have been reached mastery learning at least as much as 85% from the total number of students (the amount of students who are mastering is 100%).

2. Comparative Results of Learning Results

The hypothesis test used in this analysis is the average difference test, the test of the right side of the t-test formula. The test is then used to determine the effectiveness of learning.

Table 4.3 The Results of Comparative Tests of Learning Outcomes

Paired Samples Correlations									
		N	Correlation	Sig.					
Pair 1	Nilai1 & Nilai2	32	-.015	.935					

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Nilai1 - Nilai2	32.281	18.191	3.216	25.723	38.840	10.038	31	.000

Consider the table 4.3, it is obtained that $t_{value} = 10,038 > t_{table} = 1,645$ so that H_0 is rejected. This shows that the average of the post-test results/outcomes of students competence test is better than the pretest. The average of control class and experiment class can be described in Table 4.4 below.

Table 4.4 The Difference of Control Class and Experiment Class

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Nilai1	95.72	32	5.531	.978
	Nilai2	63.44	32	17.248	3.049

From Table 4.4, it can be explained that the average of post-test scores is 95.72 and the average of pretest scores is 63.44. Then, the average of the post-test scores is greater than the average of the post-test scores.

C. Discussion

The developed learning tool consists of syllabus, lesson plans, games-based students' worksheets, teachers' observation sheets, students' observation sheets, and test results of students' learning. Furthermore, the learning tool is validated by experts, in order to obtain a learning tool in accordance with the determined criteria/valid. Then, it can be obtained a valid mathematics learning tool using games-based learning through RME. Vygotsky (in Slavin, 1994: 49), emphasizes the sociocultural nature of learning, that students learn through interaction with adults and peers. This Vygotsky's theory is in line with the main components in the context, which are learning society, interaction between one student and other students, as well as between students and

mentors (teachers). In addition, the discovery strategy (inquiry), the teachers' assistances are only limited on questioning students in the beginning of solving contextual problems given by teachers until students understand the intent of the given problems.

The emphasizes is that the implementation of learning through contextual approach should consider the characteristics and the learning style, which means that learning should involve students' mental processes, fun, encourage students' activities, give students the opportunity to construct their learning experiences so that learning becomes meaningful. In this case, the role of teachers is as facilitators in learning which the estuary towards the creation of an effective learning environment. This theory is used as a based or direction in the process of learning or teaching mathematics in this study.

The effectiveness of learning based on the findings at SMP Negeri 9 Semarang show that students and teachers responded well to the learning mathematics using games-based through RME. The grouping of students with high, moderate, and low level of ability allows students to interact and discuss well. They can perform the task well and the competition also occurs between members of the group. The positive attitude of the students after learning mathematics using games-based learning through RME is supported by a number of factors which can be described as follows.

1. The learning atmosphere is not tense/awkward and students were able to play around and be creative.
2. The game used has been able to attract the attention of students because it is completed with an attractive appearance and questions for students' understanding.
3. The students feel that they get a new learning experience and quite different from their previous learning experiences. siswa merasa memperoleh pengalaman belajar yang baru dan cukup berbeda dengan pengalaman belajar sebelumnya.

Then, the mathematics teachers at SMP Negeri 9 Semarang have good responses in the subject of mathematics using games-based learning through RME. Several things that can be seen as contributing factors for the positive responses are the

willingness of teachers to enhance students' creativity in mathematics through a variation of learning. furthermore, the results showed that:

1. The mathematics learning using games-based learning through RME is conducted well.
2. The students gave positive responses to the activities of learning mathematics using games-based learning through RME.
3. The teacher gave a good response to the mathematics learning using games-based learning through RME

In addition, from the learning using games-based learning through RME, it was obtained that the students' average score is 95.71; the classical completeness became 100% (the minimum is 85%). The results in this study showed that the average of students' ability to understand the problems is 5.00; the average of students' ability in problem-solving plan is 4.76; the average of students ability to carry out the problem solving plan is 4.67; the average of students ability in problem solving rechecking results is 4.67. The results of the analysis of this study showed that the average of students' problem solving ability is still at a very good level.

Conclusion and Suggestions

A. Conclusion

Based on the results of developing learning tools and the results of this study described in chapter IV, then the conclusion can be described as follows.

1. The learning tools developed consist of syllabus, lesson plan, games-based students' worksheets, teacher observation sheet, students' observation sheet, and test results of students' learning. Furthermore, experts validate the learning tools in order to obtain valid learning tools.
2. The learning implementation is effective which is characterized by: a) the average of students' outcomes individually are greater than KKM = 75, and classically more than 85% of students scored 75.

B. Suggestions

Based on the conclusions set out above, the researchers expect:

1. In the use and the implementation of a strategy, it has to consider towards the achievement of indicators and learning objectives. The implementation of learning must be based on a right strategy, so that the implementation of learning can be done well. If the strategy has been appropriate, a teacher can add appropriate learning media, such as games, which can really help students to learn.
2. By using a valid learning material, it will produce a tool system, which can be an alternative in the implementation of learning. Hence, a good learning tool is a tool, which has to be consulted with experts in the field to produce a tool that is in accordance with the criteria. Afterwards, it can be implemented in learning activities.

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**PREPARATION OF COMPUTER ANIMATION MODEL FOR
LEARNING ELECTRICAL MAGNETIC II PHYSICAL EDUCATION
PROGRAM STUDENTS SEMESTER IV TEACHER TRAINING AND
EDUCATION FACULTY SARJANAWIYATA TAMANSISWA
UNIVERSITY 2014**

Sunarto

Abstract

The experiment was conducted with the purpose : (1) to obtain the product models of learning computer animation physics electricity magnetism two physical education programs for students of fourth semester, and (2) to determine the effectiveness of learning outcomes using computer models animation the magnetic power of two courses in four semesters students Education Program Physics FKIP-UST Yogyakarta. This research is about the development of computer animation models in order to determine the effectiveness of teaching and learning magnets electric two physical education programs to students. The location of this research is in the Physical Education Program Guidance and Counseling-UST Yogyakarta. The subject of research is the development of developing the model and the effectiveness of learning computer animation magnetic power of two in a four-semester students in 2014 a number of 30 students. Data collection techniques in this study uses observation sheet instruments Likert scale models and objective multiple choice test. Data analysis techniques are quantitative and qualitative assessment to determine the product descriptive computer animation models to study the effectiveness of learning outcomes and the two magnet power on students. The results of this study are: (1) the product obtained by the learning model of computer animation with a score of two electric magnets valuation predicate 82.76 enter good ranking, and (2) a score of effectiveness of learning outcomes assessment in groups using a computer animation model is 84.33 ranked the predicate very effective. The conclusion is obtained by the product of computer animated models of learning with both predicate ranking, and student learning outcomes and the effectiveness of using a computer animation model makes a predicate ranked excellent or very effective.

Keywords: *Modeling, Animation, Computer, Learning, Electricity, Magnetism.*

Introduction

Determine the learning model is very successful in understanding the substance of the material students learning related symptoms and the fact that occur in natural phenomena, especially the electric field generated by an electric current, the Lorentz force, Lenz's law and Faraday's law of motion electric force (emf) induced in a circular wire. Model of computer animation students can observe the process visualization physics events. So the students are expected to be effective in remembering (*niteni*), understanding (*ngerteni*), repeat (*neroke*) to practice what has been seen or understood and add (*nambah*) the analysis so as to provide additional concepts or principles important in the laws of physics and its application in the circumstances day-to-day practical and theoretical. In the teachings of Dewantara Kihadjar no concept of education in learning, namely : (1) Tri N: *neteni, neroke dan nambahi*, (2) Tri Nga: *ngerti, ngrasa dan nglakoni*, dan Trilogi Kepemimpinan: *Ing Ngarsa sung tulada, Ing madya mangun karsa, Tut wuri hadayani*.

Learning about the magnetic power of two particular students in understanding the magnetic field induced by Oersted, the Lorentz force, Lenz's law and Faraday's law brought about by electrical experience kusulitan as abstract but real. In order for the occurrence of events of symptoms is not an abstract power magnet for students, then be required visualization models with computer animation that can be observed. So it needs preparation in computer animation models to study with the title.

Problem Formulation. (1) How to create a model for teaching computer animation of two electric magnets? (2) How can the effectiveness of learning using computer animation model on two electric magnets?

Research Objectives. (1) Provided a model for teaching computer animation magnetic electric two visualization the students about the process of how the magnetic field induced by Oersted, the Lorentz force, Lenz's law and Faraday's law; (2) Determine the effectiveness of student learning outcomes using the model of computer animation on the magnetic power of two on the substance

of the material according to Oersted magnetic field induction, Lorentz force, Lenz's law and Faraday's law.

Benefit Research. (1) Students : petrified physics education students in understanding the principles, concepts and laws of electricity with magnetism are two models of learning using computer animation, and add to the understanding can mimic in computer animation to create a model that is better for learning; and create on and berinovatif practice in selecting and making instructional media, so that effective learning outcomes. (2) Lecturer: (a) improve the ability to manage self-motivated learning lectures using commuter animation models for learning, and (b) develop a model in learning computer animation to improve the quality of competence profesional. And (3) University: provide feedback in order to arrange repairs learning media with computer animation models in graduate higher education institutions , and can improve the effectiveness of learning.

Literature

Computer Animation Model. (1) The model describes the phenomenon of a technique and the process of giving an object or an activity (McLeod , Jr. , 1996; Afrizal Mayub 2005: 76). The model can be interpreted as a form, a prototype of an object or concept , with the object or purpose of the concept will be more easily analyzed , interpreted and understood. (2) Animation is (a) an animation techniques and provide standard process that looks at the movement of the object dies , and (b) is granting motion animation to inanimate objects (stationary) by making a series of drawings of inanimate objects (still) is in the interval the minimum (Soengeng , 1993; Afrizal Mayub , 2005: 76). (3) Animation is made by forming a series of frames that contains the graph in the timeline (Wijaya , D , 2002; Afrizal Mayub 2005: 76). So the animation model is defined as a way to "live " objects or abstract concepts or die so easily understood. Animation made from images that are passed through the scanner , an image of a hand or an application program to draw like Corel Draw , Free Hand , Adobe Illustrator or (Afrizal Mayub 2005: 76).

Basis of Computer Animation. Using Macromedia Flash MX facility is a professional standard that is used to create animations on the web (Zeembry , 2001; Afrizal Mayub , 2005: 29). Flash started as an animation software to create cells called Future Splash . Preparation of computer animation model in this study uses the learning in the animation tool called manually , it can be done in a way , the frame - by- freme animation and tweened animation . Frame - by- freme animation using a different image in each frame while tweened animation to ondengan Flash will work on the animation frame-by - frame between the start position and end position (between frames) . Enough to create a simple animation using layers , stage , scema , timeline , toolbox , tools , and others as well as refer Afrizal Mayub (2004 : 29-38) - other judgments .

Learning effectiveness . According to Indonesian General Dictionary effectiveness is defined : (1) has effect , influence , or result , and (2) provide satisfactory results. Effectiveness means the nature or the circumstances in order to effect or result (Badudu JS , 1974: 371) . Effectiveness is an effective derivation of the word in English effective defined simply " coming into use" (Oxford Learner 's Pocket Dictionary , 2003: 138) . Effectiveness in Eksiklopedi Administration is as follows : " a condition which implies the occurrence of the desired effect or result . If someone is doing something purposeful act , which is desired , then the person is said to be effective if it pleases consequences of it . " (The Liang Gie , 1989: 108) . According to Steers (1985 : 176) , that : " an organization that is truly effective is the one who is able to create a working atmosphere where workers not only carry out work that has been charged , but also makes the atmosphere so that the workers take more responsibility , act creative in order to improve efficiency in order to achieve the goal . " Criterion for Learning Effectiveness . According Hergenhahn & Matthew H Olson (208 : 2) learning is measured by the change in behavior . After making the learning process will be able to do something that they could not do before they make the process of learning . Learning will be effective if it involves physical activity and mental subjects students in the learning process . Activity will increase the

mastery of cognitive , affective and psychomotor , giving rise to a change in behavior of the subject students .

Matter Physics and Computer Animation Model . Is (1) Law magnitude induced Oersted field around current listrik mathematical formulation is shown with mathematical equations , namely : $\mathbf{B} = \frac{\mu_0 I}{2\pi a}$, (2) the Lorentz force around the magnitude of electrical current carrying straight wire shown with mathematical equations , namely : $\mathbf{F} = \frac{\mu_0 I^2}{2\pi a}$, Lenz 's Law and Faraday's Law in the form of a circular wire coil magnitude of the electromotive force (emf) is shown by mathematical induction , namely : $\varepsilon = - \varepsilon_{\max} \sin \omega t$, and (4) evaluation instrument form of objective test questionnaire item number forty . Preparation of computer animated models of learning refers to the steps Aburizal Yacub (2005 : 89-90) in developing models using computer animation to be done to provide modules that will be used , are : the main module , presentation materials , animated demos , and animations analysis . This module contains the necessary information and a button , including : title , button to select the next module by entering the inputs in the space provided so that no user interactivity with free , unlimited and button to return

Computer -Based Media . Computer -based media text changable according to Azhar (2011 : 99-100) consists of : computer not monitor page , but the delivery of dynamic moving slowly changing ; screen should not be too dense for some tanyangan into , or start with a simple and slowly , and add up to the desired complex stage ; choose the normal type , not ornate , using capital and lowercase letters , do not use all capital letters ; use between seven to ten words per line because it is easier to read short sentences rather than long sentences ; do not chop off the end of the line said , do not start a paragraph on the last line in the display screen, does not end the paragraph on the first line of the display screen, stretched sentence on the left, but on the right it's better not to be straight because it is easier to read ; distance of the two spaces is recommended for better readability ; choose a particular case characters for the title and key words , for example : bold , underline , italic ; given text box when the text was to be together

with a graph or other visual representation on the same display screen ; and consistent with the style and format selected .

Relevant Research . Supports models with computer animation , among others : Mayub A (1998) research on structured tasks and with computer simulations as an effort to improve learning outcomes in basic physics courses agronomy , research by Sri Waluyati (1997) , about the effectiveness of the package vedio to teach electronics skills , Suharyanto (1998) development research on computer-assisted teaching model physics . Based on the results of the above studies that learning to use a computer simulation , electronics with computer skills , and learning model development model can improve the effectiveness of learning . So thus this research has received support to conduct computer modeling animation can improve the effectiveness of learning outcomes electric magnet on physics education students .

Framework . The process of magnetic power is abstract but real , then compiled a computer animation model that can show vesualisai process , symptoms , events , and in fact can be observed by the student and the feasibility of this model should be tested . Students using computers anomasi vesualisai models is helping students to *neteni* , *neroke* , and *nambahi* . Students there learn the ease of an electric magnet using a computer animation model , then the results would be so more effective learning . So the logic of thinking is a product of learning models for computer animations that have been tested electrical magnets can feasibility produce effective and highly effective learning in students .

Research Methodology

Research Methods. This research uses an experimental approach or the development of computer animation models for learning two electric magnets on physics education students four semesters. Reference research in computer animation to create a model for learning the electric magnet on students physical education program , was according to Borg and Gall (1983: 784-785) there are ten (10) steps: (1) gathering information (research and information), (2) planning, (3) product planning, (4) pre-testing models, (5) revise the product (main product

revision), (6) to test the product on the field (playing field testing), (7) stages product revision operations (operational field testing), (8) product revision phase field operations (operational field testing), (9) stages of revision of the final product (the final product revision), and (10) the deployment and execution stages (disimination and implementation). Based on the reference model development according to Borg and Gall mentioned above there are ten steps. Step this computer animation modeling done adaptation, namely: (1) develop learning worksheet students (LKPM), (2) develop LKPM be animated using computer models using Macromedia Flash MX, (3) obtained a model of learning computer animation Electricity Magnetism II , (4) to assess the feasibility of the model tests performed by the user (student of physics education four semesters) and the expert or experts progremmer animated model of learning physics electricity magnetism, (5) use the product for a computer animated models of learning physics electricity magnetism, (6) assessment physics on student learning outcomes using the model of the computer animation, and (7) the product obtained by computer animation models for learning physics and the effectiveness of student learning outcomes.

Develop program and called program. Step-by-step animated model file called Oersted, Lorenz animated models, animated models Lentz and Faraday, and animated models of evaluation, are : (1) call the Oersted animation files that are in folders flv. on (press) {unload Movie ("materi_mc"); load Movie ("flv/oursted.swf", "materi_mc"); materi_mc._xscale = 100; materi_mc._yscale = 100; materi_mc._x = 260; materi_mc._y = 160; title_txt = "Animation Oursted"; video_mc._visible = false;}, (2) call the animation files that are on the menu Lorentz flv folder. on (press) {unload Movie ("materi_mc"); load Movie ("lorent.swf menu", "materi_mc"); materi_mc._xscale = 100; materi_mc._yscale = 100; materi_mc._x = 280; materi_mc._y = 160; title_txt = "Lorentz force"; video_mc._visible = false;}, (3) calling the animation files Lentz and Faraday's law which are in flv folder. on (press) {appear; unoad Movie ("materi_mc"); loadMovie ("flv/lens1.swf law", materi_mc); materi_mc._xscale = 100; materi_mc._yscale = 100; materi_mc._x = 260; materi_mc._y = 160; title_txt =

```
"LENT Law and Legal FARADAY"; video_mc._visible = false;} Scripts to exit the application on (release) {fscommand ("quit" , " true");, And (4) evaluation Scripts to call on (press) {video_mc._visible = false; go to And Stop (1); title_txt = "Evaluation"; load Movie ("flv/info_evaluasi.swf", "materi_mc"); materi_mc._xscale = 110; materi_mc._yscale = 110; materi_mc._x = 300; materi_mc._y = 175;}
```

Research Subjects and Location . The subject of the research is the implementation of two magnetic power of learning on all four semesters students Education Physics Program totaling 30 people . Location of research in Physics Education Program Teacher Training and Education Faculty of the University of Sarjanawiyata Tamansiswa Yogyakarta for four months or 16 weeks .

Preparation Instruments . Stages are : (1) develop indicators Instruments grating observation sheet Likert scale assessment , and objective tests , (2) develop instruments observation sheet in the form of a Likert scale assessment , and test ojektif a questionnaire , and (3) test the validity and reliability of objective tests refers to the results of the test indicated a significant difference before and after the study is done using a model of the learning process of computer animation learning physics .

Instrument Validity and Reliability . The validity of the instrument used to determine the construct validity (construct validity) . Proving the validity of this is done by arranging the instruments based on the lattice indicators , further testing and the results of the test instrument to the extent the item - item test includes the entire contents of region to be measured (Saiffudi Anwar , 1996: 175) . Content validity testing using rational analysis . One of the practical way is with see if the contents of the grain has been in accordance with the lattice indicators that have been written . The test result obtained results valitas coefficient exceeds 0.3 then said satisfy (Saiffudi Anwar , 1996: 179) . Instrument reliability test aims to determine the extent to which the results of a measurement can be trusted (Saiffudi Anwar , 1996: 180) . The trial results instrument reliability coefficient of at least 0.7 , then the test results the instrument

meets the requirements of reliability according to Kaplan and Sacczo, (Mawardi Lubis 2011 : 65) .

Data Collection . Using instruments : (1) the observation sheet with a Likert scale , product assessment models for computer animation and (2) objective test (questionnaire) for the assessment of student learning outcomes with multiple choice . Data respondents sources : (1) a model student users , experts and specialists or progremmer animated model of learning physics , and (2) a physical education student of 30 people .

Data Analysis . Analysis of the data in this study was descriptive quantitative and qualitative assessment to determine the product yield and effectiveness of computer animated models of learning with the criteria according Sukardjo , et al (2006 : 75) , is : very good score of $k > 83.99$; Both scores k ($67.66 < k \leq 83.99$) ; Quite scores ($52.01 < k \leq 67.66$) ; Less scores ($36.01 < k \leq 52.01$) ; and very less score $\leq k 36.01$.Research Procedures . Are : (1) develop a model using computer animation and LKPM module , (2) to evaluate the feasibility of the model animation and LKPM modules on each title by respondent students , professors and experts of computer animation program , (3) make revisions or improvements at any LKPM animation models and modules based on the results of a feasibility evaluation and or suggestions by the respondents , (4) using models and computer animation LKPM modules for electrical magnets on student learning in groups , (5) data collection by performing tests on student learning before and after learning and score data obtained , (6) data processing students' test scores in quantitative and qualitative descriptive, (7) determine the assessment on the model of computer animation and learning effectiveness descriptive based on quantitative and qualitative criteria ; (8) the product obtained to computer animated models of magnetic and electric learning effectiveness and learning outcomes (9) prepare research reports . And a study by developing models using computer animation and physics education for students learning the four semesters in the course of two magnetic power take six months.

Results And Discussion

Research . (1) obtained a model of learning computer animation magnetic electric two of : (a) Oersted , (b) the Lorentz force , and (c) Lenz's law and Faraday . Details of assessment models pembelajaran computer animation physics electricity magnetism two , consists of three components , namely : (1) the model can score 19.68, (2) computer -based animation with a score of 45 , 94 , (3) the principles of physics 17 , 94 and the total score was 82.76 .

Discussion . The results of the first assessment entrance test predicate is very less and the second test went very well predicate . Based on the results of the second test with an average score of 84.33 with an excellent title if embraced complete learning there is no remedial learning means learning process is very effective . This means that the study supported the theory , relevant research , and the development of research methodology learning computer animation model electric magnet models obtained good results and are very effective in student learning outcomes .

Conclusions and Recommendations

Conclusions . (a) the product obtained animasi model of computer learning courses Electricity Magnetism 2 Physical Education Program for students 4th semester with good predicate entry assessment results , and (b) the results obtained in the course learning Electric Magnet 2 on Physics Education Program students education students four semester using computer animation model makes a predicate very good or very effective .

Advice . (a) the product of the preparation of computer-animated models for learning in students of Physical Education four semester with a good rating assessment result entry , it is expected to do more improvements in terms of modeling and animation and more to be tested. And (b) the results of assessment of learning using computer animation model makes a predicate on a very good student so efektif . In order to be sustained achievements that have been obtained , then the model can be developed for the computer animation in the effective use of computers for learning .

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**IMPROVEMENT ACTIVITIES AND STUDENT LEARNING
OUTCOMES IN READING COMPREHENSION THROUGH
COOPERATIVE LEARNING
TYPE TEAMS-GAMES-TOURNAMENT (TGT) FIFTH GRADE CLASS
ELEMENTARY SCHOOL 8 SOUTH METRO**

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Abstract

This research is motivated by the low activities and student learning outcomes in teaching reading comprehension is lesson. The purpose of this action research to improve the activity and student learning outcomes in reading comprehension through cooperative learning type teams-games-tournament (TGT) in fifth grade class Elementary School 8 South Metro academic year 2011/2012. This study is a Classroom Action Research (CAR). CAR consists of a series of four activities carried out in the cycle, namely: (1) planning, (2) implementation, (3) observation, and (4) reflection. The data were taken by using observation, test, and documentation. The data analysis of this research is descriptive qualitative and quantitative of the learning process of students from the first cycle to the second cycle. The results of the reading comprehension is lesson in fifth grade class students of Elementary School 8 South Metro through the TGT cooperative learning from cycle to cycle is increase. Student activity in the first cycle obtained 65.90%, in the second cycle it obtained 78.40% or 12.50% increased. Student learning outcomes in the first cycle is 68.33, the second cycle increased 5.21 to 73.54. Based on the findings, reading comprehension activities through cooperative learning tipe TGT is able to improve student learning outcomes. Researcher recommend to teachers to implement cooperative learning TGT as an alternative learning method to teach Indonesian as well as other subjects.

Keywords: *Activities, Learning Outcomes, Reading Comprehension, Teams-Games-Tournament (TGT)*

Introduction

In the *Kurikulum Tingkat Satuan Pendidikan (KTSP) 2006* the Indonesian language lesson in primary schools carried out in the framework that consist of four aspects of the formation and development of basic language skills include; listening, speaking, reading, and writing. The four skills are basically a unity, a single chess (Dawson in Tarigan, 2008: 1). Called single chess, because every skill has a close relationship with one another. In the learning process, four

aspects should be presented in a balanced manner. This opinion accordance with the opinion Resmini (2006: 31) that the four aspects should receive equal portions.

Learn to read in elementary school consists of two parts, namely (a) reading beginning in grade 1, 2, and 3 (b) Further reading from grade 4 to grade 6 reading skills with the previous implemented through technical reading or reading aloud so that the student is able to recognize letters, syllables, words, and sentences. While further reading skills is implemented through silent reading or reading comprehension.

On the pre-survey in elementary school 8 South Metro, Indonesian lesson has some problems they are low activities of student learning and outcomes on learning to read the text. The low activities of student learning is characterized as: (1) students pay less attention to the teacher explanation about the material; (2) student is chatting one another during the lesson; (3) the student did not dare to ask or answer of questions; and (4) students have difficulties is doing their task from the teacher. In addition, in language lesson is less attractive to the student caused by teacher's method monotonous learning, less innovative, and less fun. Furthermore, based on empirical data, student learning outcomes in the process of reading comprehension of 33 students only 13 students or (39.4%) who reached the standard criteria for graduation.

Researchers collaborate with teachers to make improvements in Indonesian language lesson specifically on the aspects of reading comprehension through action research. Some learning model that emphasizes active student activity, innovative, and fun in an elementary school is cooperative learning. It is accordance to Parendrarti opinion (2009: 3), one model of learning that involves the participation of all students is cooperative learning. The implementation of cooperative learning by placing students to work in a small groups to help each other in learning the subject matter. The expectation's that cooperative learning is

able helps students to acquire knowledge and to cover gaps in the understanding of each.

Cooperative learning has many types, including the Teams-Games-Tournament (TGT). According to Suwarjo (2008: 114) TGT type of cooperative learning will lead to pleasure. Friends help each of team members to prepare the game by explaining the problem. The team that has the highest score will get a certificate from the other team. Furthermore, TGT of cooperative learning has the following advantages; (1) students are trained specific skills to help his fellow works just as well; (2) there is little recognition or reward to be given to groups that perform well; (3) improve student achievement through the opportunity to work together in a small group games (Diyanto, 2006: 3).

As for the purpose of research actions on elementary education 8 South Metro is to enhance learning activities and student learning outcomes in reading comprehension through of cooperative learning type TGT in Elementary School 8 in South Metro.

In the process of learning activities of students and teachers play an important role in order to create an active and fun learning environment. For example, the activity of the students in reading the book, asking the teacher, doing chores, and answering questions. According to Kunandar (2010: 277), the involvement of student in learning activities in the form of attitudes, thoughts, and activities support the success of the learning process and beneficial. Subsequent, Dimiyati and Mudjiono (2002: 20) state that the result of learning is a learning process peak. The results of the study mainly due to teacher evaluations. The results of the evaluation of teachers are designed to know the changes in the level of mental development of the students to be better than before. Student learning activities are very influential on student learning outcomes in language lesson.

According to Resmini (2006: 94) learning to read should have a clear objectives. Those goals are: 1) enjoy the beauty contained in the readings; 2) read aloud provides the opportunity for students to enjoy reading; 3) the use of certain

strategies for reading comprehension; 4) explore savings knowledge or schemata of students about a topic; 5) connect new knowledge with students schemata; 6) search for information for a report to be presented orally and in writing; 7) strengthening and rejection of the predictions made by the student before committing to read; 8) provides the opportunity for students to do experiments to examine something described in a passage; 9) study the structure of the reading; and 10) answer the questions specifically developed by teachers or deliberately by the author readings.

The purpose of reading is to get information from the text in accordance with the purpose of each reader. Related to reading comprehension, the purpose of reading is very important and will affect the reader so that the readers understand content of reading. According to Resmini (2006: 45) the factors that affect reading comprehension, is the ability to parse the message (decoding), vocabulary knowledge, knowledge of the concepts, and cognitive development.

Learning reading comprehension according to Mulyati (2006: 2.12) can be implemented through activities in the classroom to read as follows: 1) search for a topic sentence, students were asked to read a paragraph in the text, then look for the topic sentence contained in it, 2) retelling, students read a passage of text to find keywords, answering questions, preparing or systematically summarize and retell it to the front of the class, 3) paraphrase, students read poetry given by the teacher and search for the meaning contained in, then recounted the words to be said their own, 4) continuing the story, the teacher gives a piece of paper which contains of story, but there are parts of the story that are removed or commonly called text hiatus, and 5) practice guidance, students are given a book in which there are indications of how to make something or do something in front of the class.

According to Suwarjo (2008: 98) learning model consists of a variety of learning strategies, such as modeling strategy, discovery learning, cooperative learning, sinektik learning, inquiry model, play a role, and so on. Cooperative

learning emphasized on student cooperation in learning and responsible for his teammates. This is in accordance opinion of Slavin (2010: 10) that all cooperative learning methods contribute ideas that students who work together in learning and responsible for his teammates to make themselves learn equally well.

Typology of cooperative learning have various differences, but can be categorized by Slavin (2010: 26) six characteristics of the principle, namely: 1) the purpose of the group, 2) individual responsibility, 3) chance of success together, 4) team competition, 5) spesiasilasi task, and 6) adaptation to the needs of the group. Then added by Davidson and Kroll (in Asthma, 2006: 11) that is cooperative learning activities that take place in the learning environment of students in small groups to share ideas and work collaboratively to solve the problems that exist in their assignments. Subsequent the of cooperative learning TGT consists of five phases or components, namely:

1. The presentation of the class, the teacher focused a presenting the material in class.
2. Learning in groups (teams), students are divided based on academic achievement, gender, race and ethnicity.
3. Games, teachers design the questions that are relevant to the learning material in the classroom.
4. The game in tournament, students are compete in the tournament table that has been designed by the teacher.
5. The group awards (team recognition), the teacher gives the award to a group has the highest points during the tournament (Slavin, 2010: 166).

The implementation of cooperative learning in reading comprehension through the TGT implemented in the fifth grade class 8 Elementary School South Metro, namely: 1) **presentation**, teachers present the objectives of learning and reading comprehension through reading texts, 2) **group study**, students are divided into groups and jointly do their tasks contained in the Student Worksheet. Representative groups collect their work in completing the worksheet and submit

to the teacher, 3) **games tournament**, teacher divides the students to compete in the tournament table. Students representing each group, competing with other groups trying to answer the question. Scores gathered by the members of the group determines the final score, 4) **awarding**, the teacher gives the award to the group that received the highest score as the winner of the tournament consist of a super team, a very good team, a good team, and the less team, and 5) **reading comprehension test**, teacher gives the evaluation of learning outcomes through formative tests about stuffing hiatus and multiple choice to the students at the end of the implementation cycle.

Research Method

The approach used in this study is a qualitative approach, while the selected type of research is Classroom Action Research (CAR). The aim of this research as a process of continuous improvement or repeated measures (cycle), so that from the first cycle, the second and so on in order to obtain better results. According to Arikunto (2007: 74) the classroom action research consists of a series of four activities performed in repeated cycles. The four main activities that exist in every cycle, namely: (1) planning, (2) implementation, (3) observation, and (4) reflection.

The subjects were students and teachers in the fifth grade class of 8 Elementary School South Metro academic year 2011/2012. The total number of fifth grade students there is 33 students consisting of 17 male students and 16 female students. The research activities carried out in the second semester for four months from July to In October 2011.

The data in this study is qualitative and quantitative data. Sources of qualitative data in the form of student activities, teacher performance and student outcomes tournament. Quantitative data is the result of the test at the end of the cycle. There was also a collection through the research process class act. The data collection instruments used are: (1) student observation sheet, (2) the performance

of the teacher observation sheet, (3) copies of the results of the implementation of tournament games, (4) achievement test, and (5) documentation.

The data analysis technique is classified into two types, namely in the form of qualitative data, observation of student learning activities, teacher performance, and the results of the tournament is done by providing a checklist and enteris into the tabulation of the data, then convering the data into the established criteria. Quantitative data obtained from the post test students, stuffing the hiatus (closed procedure) and multiple choice (multiple choice) and then count the number of students who obtained scores divided by the maximum score of correct answers.

Subsequent the value of student learning outcomes obtained were compared with mastery learning criteria. Whatever the research defined the indicators of success, if the percentage of students' learning activity increased to good category, and learning outcomes of reading comprehension has increased $\geq 75\%$ of students have been thoroughly studied in each cycle (Depdiknas, 2008: 5).

Research Findings and Discussions

Based on the results of the implementation of the research on teaching reading comprehension through of cooperative learning TGT in in the fifth grade class of 8 Elementary School in South Metro performed qualitative data from student activities, teacher performance, student learning outcomes, and the results of the tournament games. Activities of students in the learning process in reading comprehension through TGT held well for 2 cycles. The Increase student activity in reading comprehension lesson through of cooperative learning TGT is submitted from the opinions to other students or teachers, the activities include the games, work on the problems of the tournament, doing worksheets in groups and reading textbooks. In the first cycle the average student activity increased by 65.90% in the second cycle becomes 78.40%. The Increase of activity of the students from the first cycle to the second cycle of 12.50%. Results of student activity in the second cycle is 78.40% a good category.

Subsequent observations of teacher performance during the reading comprehension lesson through cooperative learning TGT type already performs well. Percentage of teacher performance in the first cycle is 68.33% and the increase to 78.33% in the second cycle. The increase in the percentage of teachers' performance during the execution of reading comprehension lesson through TGT is 10%. Subsequent the percentage of teachers' performance in the second cycle reached 78.33% with the category of good. The results of the implementation of the tournament games on the process of learning to read in the first cycle the average number of group was 313.5 points, while in the second cycle is 317.5. Improved results tournament games are implemented as a whole group at each cycle by 4 points.

The results of the test in reading comprehension obtained an average score of student learning outcomes in the first cycle of 68.33 and the second cycle reached up to 73.54. Average increase of student learning outcomes in the first to the second cycles of 5.21. mastery in the first cycle of students who pass the study is 23 students (69.69%) and increase to to 26 students (78.78%) student learning outcomes completeness cycle in the first to the second cycle is (9.18%). Mastery learning of students in the second cycle reached 78.78% with high success criteria

Discussions

Reading comprehension lesson through cooperative learning type TGT more emphasized on students learning activities. Students are required to be directly involved both in attitude, attention, thought, and other learning activities. Student activities in learning are more visible, for example: (1) students pay attention to the teacher's explanation, (2) the attitude and cooperation in the study group, (3) sharing the knowledge gained, (4) testing the cognitive abilities of the current tournament games, and (5) to answer questions on the formative tests. According to Kunandar (2010: 277) that the learning activity is the involvement of students in the form of attitudes, thoughts, and activities in the learning activities to support the success of the learning process and benefit from such activities.

TGT of cooperative learning has very compatible with constructivism learning theory for teachers to be implemented in the classroom, because the teacher acts as a facilitator and motivator to help students actively participate in learning. The principles of constructivism are; (1) knowledge is actively constructed by the student, (2) the pressure in the process lies in the students' learning, (3) teaching is to help students, (4) the pressure in the process of learning more on the process rather than the result, (5) the curriculum emphasized on the participation students, and (6) the teacher as a facilitator (Suparno in Trianto, 2010: 75).

Furthermore TGT of cooperative learning in reading comprehension learning can improve learning outcomes for research in the first and second cycle. In the first cycle the average reading comprehension student learning outcomes is 68.33 and the second cycle reached up to 73.54. Average increase of student learning outcomes in the first and second cycles is 5.21. The Increase of student learning outcomes can be influenced from the learning activities of students in lesson through cooperative learning type TGT, such as reading activities, listening to the teacher's explanation, discussion groups, working on worksheets, answering questions tournament games. Accordance to the opinion of Slavin (2010: 10) that all of cooperative learning methods contribute ideas that students who work together in learning and responsible for his teammates were able to make themselves learn equally well.

Conslusions's Suggestions

Based on the results TGT of cooperative learning in Indonesian language lesson aspects of reading comprehension in elementary school 8 South Metro and the discussion that has been described, it can be concluded: (1) TGT can enhance students' learning activities, such as reading a text, listening to the teacher's explanation, discussion in groups study, doing worksheets, answering questions on the games, and answering the test. Average increase student activities on the reading comprehension lesson through of TGT in the first cycle reached up to

65.90% and the second cycle increased to 78.40%, (2) TGT also able to improve the mastery of students learning. This is proven by the test results of students' learning during first and second cycle has increased the average score in the first cycle reached up to 68.33 and 73.54 in the second cycle. Furthermore, to the thoroughness of student learning outcomes also increased in the first cycle from 23 students (69.69%) to 26 students (78.78%) in the second cycle.

Based on the research that has been conducted, researchers have several suggestions as follows: (1) for primary school teachers, TGT can be used as an alternative learning method which is suitable to cope the low activities, of the students in the classroom, 3) school can be a place for the dissemination or spread, so that classes can implement TGT, and (3) for further research, TGT should focus on the study material, planned distribution of study groups, activity games in the tournament, awards, and evaluation of learning and the right time management.

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PSYCHOLOGICAL FACTOR AFFECTING ENGLISH SPEAKING PERFORMANCE FOR THE ENGLISH LEARNERS IN INDONESIA

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Abstract

In every learning situation or environment, human psychology plays a significant role. English speaking is a language skill that is highly affected by human psychology. The aim of this study was to find out the psychological factor that affects most of the Indonesians' English speaking performance in order to propose some solutions to overcome the problem. This study used a descriptive qualitative research methodology to collect the data. The Indonesians who learnt English for their undergraduate program had been the population of this study. The researcher also purposefully selected some Applied Linguistics master program students in English education at YSU to act as research samples. So, after having analyzed the collected data from those participants by using some observations tools to find out the barriers students face in English speaking performance, it was clear that most of those students's desire is to speak English as well as they speak their first language. Unfortunately, most of them showed increased levels of anxieties. Although most of the students think that they have a good level of vocabulary or grammar, they also keep on feeling insecure while speaking. Most of the barriers were: being worried of making mistakes, feeling shy, and feeling frustrated while performing in English speaking. Finally, the researcher has proposed some solutions that are expected to be significant remedies to overcome the problems mentioned above.

Keywords: *English as Foreign Language in Indonesia, English Speaking difficulties, and Psychological Factor.*

Introduction

In this era of globalization, knowledge of a foreign language serves students well in the interconnected world, it opens the door to job opportunities in the global economy and makes more media accessible, enriching public discussion of current issues. At present, the language that dominates internationally is certainly English. Kachru and Smith (2008: 201) agreed that: "In the era of globalization and rapid diffusion of knowledge, all the nations are aware

of the need to prepare their citizens to perform in ways that would ensure their prosperity and eminence in the world. In order to be competitive, they have to be able to function well in multinational industrial enterprises, international trade, diplomacy, and scientific technological areas of expertise. They have to be innovative and contribute to the knowledge-based of the world. In order to achieve these goals, they need to be able to utilize the most widely used medium, English.”

The most influential model of the spread of English is Braj Kachru's model of World Englishes. In this model, the diffusion of English is captured in terms of three Concentric Circles of the language: The Inner Circle, the Outer Circle, and the Expanding Circle. The Inner Circle represents countries such as the United Kingdom, the United States, Australia, New Zealand, where English is widely used as a first language; the Outer Circle represents countries such as India, Nigeria, Bangladesh, Singapura, Malaysia, where English is institutionalized; and the Expanding Circle represents countries where English plays no historical or governmental role, but where it is nevertheless widely used as a medium of international communication. This includes much of the rest of the world's population, most of European, Asian or African countries such as Mali, Egypt, China, Russia, Japan, Korea, and Indonesia.

In Indonesia, English is considered as the primary foreign language which is considered more important than other foreign languages. This point is well clarified by Lauder (2008: 9-20), he explains that: “The expanding or extending circle refers to nations which recognize the importance of English as an international language, but which were not colonized by the countries of inner circle, and which have not given English any special official status. In these countries, English is taught as a foreign language. Indonesia belongs to this group.” According to Junaidi Mistar by Braine (2005: 71), to equip Indonesians with an ability to communicate at the international level, English is the first foreign language officially taught to students from junior secondary school. So,

English language cannot be separated from Indonesian educational system and Indonesian students daily life.

Many students in Indonesia learn English for various purposes such to become tourist guides, to be able to speak in international level, to get better jobs, and so on. So, English has become part of students' everyday activities in Indonesia; most of them feel very proud once they are able to speak the language well. Unfortunately, most of those students always show increased levels of anxieties when it comes to use the target language for the oral communicative purposes. Those levels can appear due to the factors as being called by the teacher to present something in front of the class or to respond orally to some questions.

One of the productive skills of English teaching and learning is speaking. Speaking is so intertwined with daily interactions that it is not easy to give a unique and concise definition to it. Therefore, different experts have defined speaking in a various way, among which the researcher is going to cite as follows:

According to McKay (2008: 179):

In language use situations, when people speak, it is not the case that they simply open their mouths and speak the words and sentences. When people speak, they are doing so in a cultural context, they are speaking to another person or persons (perhaps friends, a teacher or a tester) who bring with them a relative degree of status and power and they are doing so in order to meet the purpose required of the interaction, which may be a conversation, or a task that needs completing.

Learning a foreign language is not as the same as acquiring a first language, especially while we have to use for communicative purposes. To some EFL students, speaking English fluently, accurately, and appropriately is just like eating food with the nose, just not to say it is impossible to do so. What makes English speaking practices so difficult among those EFL students who had learned English for many years? Many studies have shown that many factors such as

sociological, linguistic, psychological, economical factors may negatively influence students speaking practices and make English speaking performance difficult. Nevertheless, this study just focused to investigate the psychological factor that greatly affects English speaking performance of Expanding circle students.

Nowadays, one of the big problems that affect EFL students' English speaking practices is without any doubt psychological barrier. Why does the researcher focus on psychology? Because he believes that psychology is the number one key to success for most EFL students in their English speaking performance. Most of the EFL students who learned English for many years, most of them have difficulties to use the language to speak, whereas when we analyze, we come to know that most of them have good level in vocabulary or in grammar. Therefore, it is not only the lack of grammar or vocabulary, but it is also a question of psychology, your believe, your confidence, your strong feelings in yourself. Most of those EFL students have weak motivation; they never develop confidence in themselves. They are always afraid of making mistakes, some are shy, some hesitate just because they feel insecure while using the target language to communicate. To overcome those fears, those anxieties, they need to stop thinking lot about mistakes; they need to stop underestimating themselves.

Methods

The purpose of this section is to describe in detail the research process undertaken by the researcher in order to address the objectives of the study. It includes a description of the methods used for gathering and analyzing data and attempts to justify why these particular methods were chosen and the benefits of doing so.

a. Participants

According to Creswell (2012: 206), in qualitative inquiry, the intent is not to generalize to a population, but to develop an indepth exploration of a central

phenomenon. Thus, to best understand this phenomenon, the qualitative researcher purposefully or intentionally selects individuals and sites.”

Based on Creswell’s point above, the researcher purposefully selected 20 Master degree Applied Linguistics students of English Education at Yogyakarta State University to act as his research samples. They are from different regions of Indonesia and they have learned English for their undergraduate program at different Universities of their respective region. They have been observed during their presentations, their discussions, and their interactions with other people outside the classroom while using English to communicate. 10 of those students have been interviewed about the psychological barriers related to their English speaking performance.

b. Instruments

According to McNiff (1988: 76), there are various traditional methods in data collection procedure like personal field notes, audio tape recording, diaries, interviews and discussion, videotaped recording, questionnaires, documentary evidence, slide/ tape photography.

In order to gather large data from those participants, the researcher first observed them at any time they used English to present about something, to discuss about some topics, and to interact with other people outside the classroom. Creswell (2012: 213) defines observation as the process of gathering open-ended, firsthand information by observing people and places at a research site. Then, a great number of data have been gathered by taking notes from the observation. The second instrument that enabled the researcher to collect other amount of data has been the interview. The observation alone seems to be not sufficient to validate the data, that is why it has also been the duty of the researcher to interview some of his participants in order to compare or to cross-check the different sources. So, 10 students have been interviewed. The interviews were unstructured interviews, and all started by asking them if they enjoyed learning

English and by asking them what according to them were the difficulties mostly faced while learning English related to English speaking performance.

c. Data Analysis

The interactive analysis technique developed by Miles and Huberman as cited by Keith (2009: 174) has been implemented to analyze the data. The interactive analysis consists of three interrelated components namely reduction of data, display of data, and conclusion. Data reduction has been done by selecting, determining the focus, simplifying, summarizing and modifying the form of raw data from the field notes or transcriptions. This is the steps that the researcher dealt with sharpening, separating, and finally to limit data to those that were related to the psychological barriers in English speaking performance. After having reduced the data, the researcher has also arranged and organized them, this is called data displays. The reasons for reducing and displaying data are to assist in drawing conclusions. Finally some conclusions have been drawn that can be presented in the next section or results.

Finding and Discussion

The observations showed that students' main psychological barrier was lack of confidence, and students being interviewed confirmed it themselves to be one of the main barriers they face. Since they don't feel able to speak English in a natural way, and since they are always thinking about how to pronounce correctly a word or how to use the correct grammar structures, they said that it is difficult to feel confident. The second, and somehow connected, is making mistakes, because most of them think that people may laugh at them if they mispronounce some words as in Indonesia is referred to "Takut salah"; then they prefer not to interact in English until they know for sure that they are not making any mistake, whereas even if practice cannot make perfect, at least it can make you speak fluently.

Another conception is that students think that language is complicated and difficult, so they already put a barrier since they don't make any effort and they

tell themselves that they do not have the ability to learn that language. All that formerly mentioned are widely observable on English learners in Indonesia, and teachers should encourage students to overcome this barrier, since they understand that in any learning process making mistakes is unavoidable, and people always learn from their mistakes. In addition, some students' perception of the language can be negative and appears as a barrier too, for example many students expressed that speaking English outside the classroom is a style of people who just like to "show-off", since using English makes students feel uncomfortable while speaking or interacting with each other. To sum up, most of those English learners always complain about problems such as: being anxious, being nervous, being worried of making mistakes, feeling shy, and feeling frustrated while performing in English speaking.

Conclusion and Suggestion

The researcher has concluded this study as follow:

- 1) After having analyzed the data gathered from observations and interviews, the results first showed that those students who had learned English for many years are still confronting some barriers in their English speaking performance, that came to prove the researcher's assumption in the first place.
- 2) The results showed that one of the main barriers they face is the psychological barrier. Most of the problems they were complaining were: being anxious, being nervous, being worried of making mistakes, feeling shy, and feeling frustrated while performing in English speaking. The researcher then believed that those problems mentioned above indicate nothing but the psychological factor.

Finally, we suggested that in order to be confident, those students should stop thinking about the language as difficult to learn, they should stop thinking much about what others think about their performance in English speaking, they should practice the language as much as they can, without thinking about

mistakes. No one is perfect, perfection is impossible and they should think that mistake is not bad or negative thing. In fact, as we have already mentioned above, people learn from their mistakes. That is why we ended this section with a point cited by Sousa (2001: 59). He said: “People learn from their mistakes, so they should think of them as useful and positive.”

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