

Conference Paper

Development of Language Learning Based on Multimedia Devices for Autistic Student

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Abstract

The purpose of this study to develop a learning device of Indonesian language based on multimedia for autistic students. This research was conducted at SD Islam Alam dan Sains Al- Jannah. The students involved in the research were 20 students. The developed learning device uses the instructional model approach by Dick Carey and Carey (2009). Subjects of the research were 20 students. The developed learning device consists on applications, videos and manual book for both student and teachers. The developed products have been reviewed by a subject matter expert, an instructional design expert, a language expert, a media expert and an information technology expert. A series of formative evaluations through try-out examination has been conducted. The improvement of the learning device has been developed based on the previous formative evaluations. The results of this study shows developed learning device could improve the student learning outcomes effectively. Based on this result, the learning device could be recommended to be used as an alternative learning resource.

Keywords: development of learning devices, autistic student, Indonesian language, multimedia

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1. Introduction

In the Declaration of Human Rights 1948 has guaranteed the basic social rights of every human being to receive educational services. Education as a human right to all society without distinction of origin, religion, gender, color, race, ethnicity, including for students with autism. The right of all children to education also has a strong foundation with UNESCO official statement through the Declaration of Education for all or Education For All (EFA) in Jomtien, Thailand in 1990 [1]. There are opportunities for children with special needs, including students with autism, to access quality education be guaranteed in full.

Students with autism require more specific learning services and tend to the individual. Without discouraging efforts to assist and prepare students with autism in order to

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grow and thrive in a social environment. Autism is one of five types of pervasive developmental disorder called PDD (pervasive developmental disorders), which marked the appearance of abnormalities in the domain of social interaction and communication. Indeed, autism is not an illness, fragility, or emotional disturbance, thus the term “autism” clearly unwise, because they are not suffering. Basically, the same autistic student with other students, would be wise to refer to individual differences, so that with the eyes as it was then in the end, we can see the unique characteristics of each child.

The prevalence of autism is about 1-2 per 1000 people by the number of ASD (Autism Spectrum Disorders) of about 6 per 1000 people by the number of individual males about four times more than women. While the number of people diagnosed with autism has increased dramatically since the 1980s [2].

The increasing number of children with autism has implications for education. Education has a great chance to intervene in their ability to develop optimally. Obstacles often appear on a student with autism is a problem of language. Generally, a student with autism lack even minimal ability to communicate because it has no understanding of the language. Even though language is like a bridge for every student to understand the world around him, including autistic students, especially understanding word by expression or spoken language can be relatively difficult part for autistic students to learn. Most of autistic students can better understand the words addressed to them by looking at them. [2]. In addition, students with autism like doing repetitive activities. So, they are very concerned with regular patterns and routines.

A student with autism in addition to difficulty understanding spoken language, they are also difficult to interpret body language, including the language difficulty understanding facial expressions can influence the behavior of a student with autism. Sometimes they seem anxious, depressed, may be bad, like hurting their self and others. Sometimes they like daydreaming and ignore the people around their, and also busy with themselves. For a student with autism who do not understand the meaning of spoken language and body language, the presence of others can make them confused. Teach the language to children with autism need to use words and phrases that much simpler with additional instructions to explain something, negotiate with the child, or steer, often can help children become confident [3], A student with autism tend to be less like the sudden change, and this can lead to tantrums, they are more like a routine or regular activity patterns and repetitive.

Besides that, student with autism can be served according to their needs, required a variety of innovations. Innovation education is an educational change based on conscious efforts, planned, patterned in education that aims to drive in accordance

with the needs and demands facing his day, in educational innovation of new ideas as a result of rethinking should be able to solve problems that are not solved by ways-traditional way of a commercial nature.

Various efforts are being made to help a student with autism, for example: with a structured learning where learning model is expressed as a way to obtain a great improvement, because the teachers are active and take the initiative to interact and provide guidance, teachers carry out their duties with the smallest so that students easily follow the stages of learning to achieve the expected goals. Also, usually in teaching a student with autism using a lot of media in the form of cards and pictures.

If learning is simply done by explaining just a student with autism tend to be easy to forget. In a student with autism have a more prominent visual capability. In learning more easily remember some object or concept when shown pictures, writings, objects, examples of behavior, events, or abstract concepts. By looking at the pictures, writings, students with autistic student writings will form a clear mental picture and relatively permanent in his memory.

In addition to a variety of learning models that have been mentioned by Reiser and Dempsey [4] stated that the advancement of technology and innovation in general have a direct impact on the area of learning technologies. Learning technologies can bring society to a significant change, the changes are related to the process of modifying human capabilities by offering a learning process in a different way [5]. As for the different learning processes can be tricked by using instructional media according to user needs. Educational technology is able to design, improve and update the situation is really needed by the student. Based on Miarso asserted that the philosophy of educational technology, so that each person can grow as much as possible by way of utilizing all kinds of learning resources are there and need to be developed in such a way to achieve efficiency and harmony with the development of society and the environment [6]. The philosophy of educational technology in line with the philosophy of constructivism, in which the students should form their own knowledge and also actively develop themselves.

Philosophy of technology education, as well as the philosophy of constructivism have significant relevance, with educational efforts to prepare a student with autism become independent beings who together with children in general. Therefore, it takes a multimedia- based learning model that can accommodate those needs. The latest development of instructional media not only non-media but already at the stage of multimedia, interactive multimedia even. Interactive multimedia, allowing most difficult learning concepts displayed visually, can be served at the same time thereby increasing

direct student involvement in the learning process. Multimedia has the advantage of displaying text, sound, graphics, moving images, and do not move, and can motivate early learning for children with autism. Because interactive multimedia to present course material in the form of a game or games. Interactive multimedia can also provide various forms of exercises that are designed in the form of games, and that is enough to attract students to learn, especially when they can practice and try themselves so that they can have the experience succeed or fail in responding to the problem.

From the above description inspire researchers to uncover and solve multimedia learning for students with autism, especially in Indonesian language learning. To the authors propose three fundamental questions in this research: (1) How Indonesian language learning for students with autism who lasted this long? (2) How can fiscal multimedia-based learning models that can accommodate the characteristics and learning styles of students with autism to improve Indonesian language? (3) How to model effective multimedia-based learning to enhance students' language skills and knowledge of autism?

2. Methods and Equipment

This research aims to develop something new that is expected to enhance the language skills of students with autism. The method used in this study with consideration of compatibility with the nature of the research to be carried out is the Research and Development (R & D) [7]. The research combines the right model of development by Dick & Carey, with Borg & Gall while learning to use the multimedia software development by Lee and Owens. Research and Development is the border of qualitative and quantitative approaches, especially to bridge the gap between research and practice of education [8]. Research and Development is used for designing new products and procedures, then apply the research methods for field trials, evaluate and improve our products and procedures to meet the criteria of an effective, qualified and standardized [9]. Utilization research and development in the field of education, it has become a necessity. In the Industry view on research innovation and education: Framework for reform-conference conclusion 'that took place in Brussels May 12, 2009, recommending (R & D) as the preferred way to innovate, because in reality (R & D) has been used globally for innovation [10]. Primarily aimed at developing an effective product for learning purposes, and is an applied research. Characteristics of the model developed in this study did not use the general population, but are limited to digging depth of the phenomenon. Researchers chose individuals in the area concerned [11]. There are 20 students to test

and field test groups, three students to test one to one, and also 16 teachers were willing to participate in this study. As the subjects were students with autism who have barriers in behavior, language and social interaction. Basically, students with autism are visual individuals, which means that they are very interested in objects and images, especially moving images tend to be less like the sudden change, and this can lead to tantrums, more like a routine or regular pattern of activity and over and over reset. They have problems in understanding the concept. Research trial conducted at Islamic elementary school of Al-Jannah science, with affordable whole student population existing autism that is characterized by the type of obstacles that are generally experienced by students with autism in behavior, verbal and non-verbal communication, social interactions.

3. Results

Before producing multimedia products, researchers conducted a study beginning. The results of the initial research showed that the media used by a student with autism are still using conventional media and less stimulating senses a student with autism. Based on the overall process design and development of multimedia-based learning model for students with autism, this study found three important things. First, a student with autism have difficulties in learning both receptive and expressive language so that they have difficulty in Indonesian language learning, but it is a student with autism have the characteristic and the specific characteristics that require specific learning model and can serve their needs in order to develop optimally. Second, the design and development of multimedia-based learning model in language learning using research and development. Researchers in designing and developing multimedia-based learning model for autistic students can follow a few steps or stages (design model) as follows: a) conceptual model adapted from the model 3P (users, processes and products) and integrated with learning theory framework adapted from Reigeluth; b) the procedural model developed using a systems approach, it is assumed the system which processes input of learners who do not have competency becomes the output of the learners who have the competencies expected. Step-by-step procedural model refers to the Dick & Carey model of development in Wisnu research report [12], which consists of four stages, namely: 1) the preliminary study, 2) the stage of identifying, 3) developing stage, and 4) the stage of evaluating and revising. Third, the physical model of multimedia learning for autistic students in the form of applications, videos, teacher guide books. The field trials one to one, small group and field test results show that the product is viable and able to improve the knowledge and language skills of students with autism.

This study managed to create multimedia applications for language learning for students with autism. After conducted various due diligence by experts to examine the feasibility of the model, test one to one, the test group, as well as field tests. Test the feasibility of experts conducted among others by instructional design experts, linguists, and experts in special education, with a special autism, media experts, and information technology experts.

Evaluation or test *One to One* conducted on three students with high ability, medium and low. At this stage, the evaluation is done to get information about the readability of the material, the focus of the material and the attractiveness of the product. Results of repair draft 1 draft 2 generates, as a reference for the validation of one to one. Evaluation stage one to one performed on autistic students in Islamic elementary school of Al-Jannah science integration elementary school, they were drawn randomly. And their also have capabilities of high, medium and low. At this stage, the evaluation is done to get information about the readability of the material, the material focus, feasibility and attractiveness of the product. The steps performed in the evaluation of one to one is as follows: 1) The material samples taken at random; 2) The students were told to look, listen and read the material; 3) The students do the exercise you've finished viewing, listening, and reading material provided. If the student answers the same as what we think it means high legibility, the material has the right and products are very attractive to students.

Test carried out on a group Small groups are carried out on 10 students with autism. Learning is done like real state, but with a fewer number of students. At the trial a small group of students, taken at random. This is done on the effectiveness of multimedia-based learning model for students with autism. Learning is done like real state, but with a fewer number of students. At this stage, the evaluation of the evaluation was the same as one to one, to get information on student feedback about the legibility of the material, the focus of the material and the attractiveness of the product. The difference is the instrument used in the form of an open questionnaire, while the evaluation of one to one used the others questionnaires as well as interviews. Field trials conducted on 20 students. In this final stage, the evaluation conducted to obtain comprehensive information about the quality of learning products. This is done on the effectiveness of multimedia-based learning model for students with autism. Indicators of the visits is student interest and student learning outcomes towards multimedia-based learning model for autistic students.

Here is a product that is the writer's multimedia applications Narrate as follows: Some features of the author created to meet the needs of students with autism, ranging from (1)

The start page for the login name and password 2) Menu, is the main page that contains buttons subjects, summaries, formative tests, the cover (3) The first screen, contains the subject, competency standards, basic competencies and learning objectives (4) the second screen, the video subject (5) the third screen exercises (6). Screen fourth form of exercise is a screen which is further divided into three screens 1,2,3 exercise (7) to display five summaries (8) Screen to six tests formative 9). Based on input from experts evolve by adding multiple screens, such as the use of manual page screen before the menu page, then the first video page of text and narration in one screen is divided into three screens for each subject, repair exercise requires more simplified and additional border to box for my response, adding that early game just one game only be 3 games in a single subject, the addition of an audio feedback each student successfully earn a high score in the game. Use of this application can be installed into a computer or laptop. before running the multimedia applications of learning for autistic students.

Once the application has been made then the authors conducted the first meeting of their lessons in elementary computer lab in Islamic elementary school of Al-Jannah science on April 8th 2018 and to further study conducted in computer labs. Implementation of the trial held for two weeks. Evaluation results of study conducted to determine the level of competence of students after using multimedia-based learning model for students with autism. The completeness of student learning outcomes when getting the average value ≥ 70 based on completeness established minimum values for a student with autism in SD Islam Alam dan Sains Al-Jannah Evaluation interests of students conducted to obtain comprehensive information about the quality of learning products. Instruments used in field trials is a questionnaire about students' responses to the learning model developed products. Questionnaires are presented with a number of statements regarding student responses multimedia-based learning model for students with autism. Assessment questionnaire using statements in accordance with the self, feelings, opinions and carried into action. With a scale of 1 to 4. The student responses to the questionnaire intended to evaluate whether the trial court during the trial, the product can be used in line with expectations, and effectively and efficiently to improve the language skills of students with autism. Overall test results of a range of values of a scale of 1 to 5 obtained in the test group average individual 3,43, 3,39 and 3.42. The small group trial of 3.41, 4.40 and 3.43 as for testing large groups was 3.42, 3, 41, 3.44. Results pre-test and post-test there is a significant increase a number is 28 points means this product can improve the language skills of students with autism on the below:

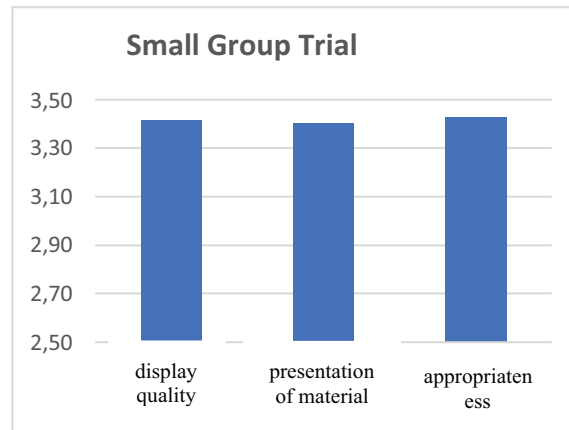


Figure 1: Small Group Trial

This research and development have succeeded in making a multimedia product in the form of the Application of Let's Learn Indonesian Language (Ayo Belajar Bahasa Indonesia: ABBI). The final product that has been made can be seen in the image below:



Figure 2: The main menu screen of the ABBI application for autistic students

Based on Figure 2 shows the product is the last model that was produced after undergoing a systematic repair process a number of times. Changes occur in the appearance of the product as a form of improvement of each evaluation result. After ABBI products have been made then researchers conduct a feasibility test from experts, namely instructional design experts, special education material experts in autism, language experts, multimedia experts, and information technology experts. After the feasibility test from the experts conducted which concluded that this product is suitable for use then researchers conducted a feasibility test on autistic students through one to one

try-out, small group try-out, and field try-out in learning device of Indonesian language based on multimedia for autistic students in SD Islam Alam dan Sains Al-Jannah

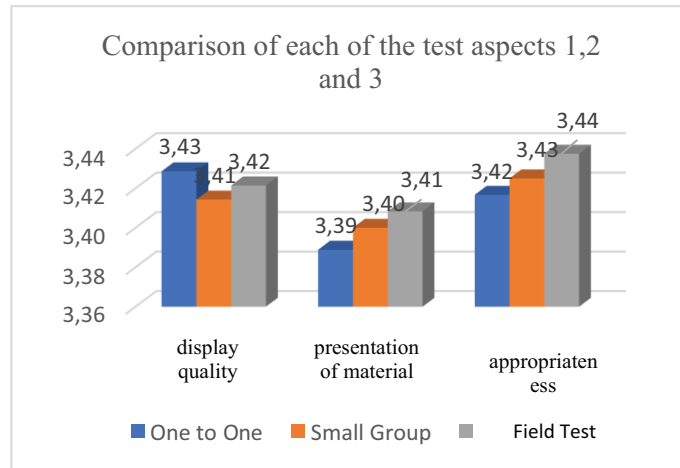


Figure 3: Comparison of each of the Test Aspects 1,2 and 3

Based on looking at Chart 2 data with an average of 3.41 (one to one evaluation reached 3.43; 3.39; and 3.42, then evaluation of small groups of 3.41, 3.40, and 3.43, and field trials or large groups reaching 3.42, 3.41, 3.44) then learning device of Indonesian language based on multimedia through ABBI application products for autistic students who have been developed, have the feasibility to be used. An average score of 3.41 which indicates product worthiness or significance of 85.25% of autistic students is very interested, and this product is worth using. Researchers did the pretest first, the average pretest and posttest result of 20 autistic students of Islamic elementary school of Al-Jannah science was 56.5 and posttest 84.5 on the below:

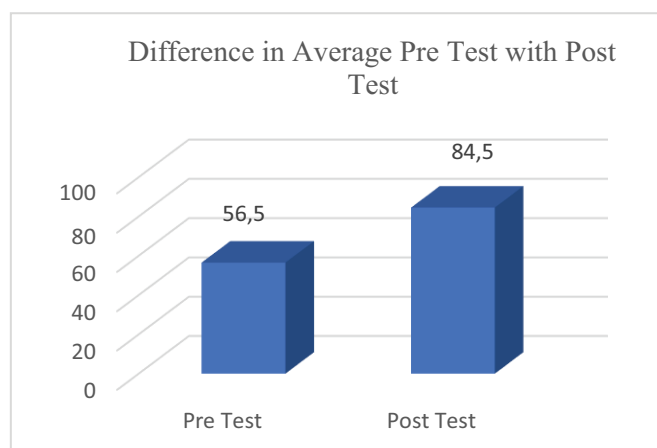


Figure 4: Difference in Average Pre Test with Post Test

The results of the pretest and posttest showed a significant increase reaching 28 points. It means that there was an increase of 49.55% from the results of the pretest

or from the test results before using ABBI (Learning device of Indonesian language based on multimedia for autistic students). Looking at the data it can be concluded that multimedia learning Indonesian language products for autistic students in the form of applications: "Let's Learn Indonesian Language" (ABBI) which has been developed, is proven to improve the learning outcomes of autistic students. This means having effectiveness.

4. Discussion

Students with conditions of Autism Spectrum Disorders (ASD) it can be adapted in a way that allows learning according to the characteristics of students [13]. Meanwhile, in recent years more and more among the researchers concluded that learning through videos have shown its effectiveness for children with autism. For example, research on the students' attention done by Lovaas et.al. in Ozerk, et.al research [14], about the avoidance face to face can be overcome by learning through video as determined by Charlop, Christy, Freeman in Ergenekon, et.al. study [15], about the strong visual stimulation studied by Kinney et.al. in Johnson, et.al research [16]. Through interactive multimedia learning concept that allows most difficult displayed visually, can be served at the same time thereby increasing direct student involvement in the learning process. Vaughan said that multimedia is a combination of text, art, sound, animation and video delivered via computer or electronic equipment and digital. That is used together such elements as images and animations are equipped with sound, video clips and information in text form, it will be able to give a clear meaning to the parents who need it [17]. Multimedia development has a corresponding stage of the Arch C. Luther's view: concept, design, content collecting materials, assembly, testing and distribution [17]. Concept stage is to identify the estimated needs resulting from the stage of observations on the research, multimedia content generated from the manufacturing phase material according to the development of learning, in addition to the analysis of the technology, a wide multimedia, and media used. Design stage is visual design creation screen display, map content, interface, script, or story, storyboards and navigation structure. Multimedia designs required structural mapping or navigation maps (navigation structure or site map) that depicts the relationship between content and helping to organize the content in the message. Furthermore, entered the stage collecting content material, assembly, testing and distribution. Multimedia is composed of four types, namely: (1) Linear, information runs sequentially from frame one frame to another, or from one display to the next screen the user cannot access the desired display or skip to the required view.

(2) Hierarchical, users can navigate with a branching tree structure. The navigation structure is appropriate according to the application for the needs of the organization, (3) Nonlinear, users can navigate freely within the entire display (4) Composite users can make free navigation and also can have a tree structure, but sometimes with branching too complex can be confusing to return to the previous screen [18].

In designing a multimedia application, a navigation map coupled with the storyboard, to help visualize information architecture, generally storyboards created for gave picture every appearance of multimedia to be made. In each view can be given a note or specification before rendering, Hart says that helpful storyboard and can help in terms of (1) presented summary of the story and storyboard creation to explain the adaptation functions and tools that should be used by the team in producing multimedia, (2) Complementing the basis for the development of the ability to realize the style of the artist drawing so fulfill the will of the director (3). Provide a standard text or additional text for the study of art and films, (4) To help the students to create storyboards or preparation techniques in the needs of the future movie. 5) increase the appreciation of the storyboard as a pre-production tools for producers, directors and film-makers. Results of research on interactive multimedia related to the theme of the research authors, among others also performed by Reza (2011), the study concluded that the therapeutic applications of interactive multimedia for children with autism and the methods of Lovaas is effective and can be used as a medium of alternative therapies in the treatment of children with autism. The products of research in the form of an interactive CD with a capacity of 35 MB application of interactive multimedia therapy for children with autism with Lovaas method. This study suggested that treatment with Lovaas method can be applied to interactive multimedia-based therapy [19].

Despite having similarities in the use of interactive multimedia, but the focus of the research problems beyond merely answer the need for behavior modification therapy for children with autism. Meanwhile, research by the author focuses on developing multimedia- based learning model for autistic students improve their language skills based on facts and data most students with autism have problems in language skills, which prevents them from communicating.

5. Conclusion

ABBI applications product as learning device of Indonesian language based on multimedia can be used in class or outside the class, but students with autism should have installed the application. The results of one-to-one, small group trials and field

tests show that this product is feasible and can increase the understanding of autistic students in Indonesian language learning. This is evidenced by the results of tests with an average number of 3.41 (85.25%) recorded there is a difference of 28 points from the pre-test average results (56.5) with the average results of post-test (84, 5). There was an increase of 49.55% compared to the pre-test results. The advantages of the application "Let's Learn Indonesian Language" in addition to being able to present writing, can also display moving objects, animations, interesting images and appropriate themes, combined with an interesting voice, time can be adjusted to students attention span, can be repeated, on average, autistic students repeat two until three times, there are games that are age-appropriate for children to function as rewards. This ABBI application is easy to use for anyone who understands how this application worked, so learning can take place not only at school, but can be at home or anywhere, and assisted by anyone, this application in addition to the PC and laptop can also be used on mobile phones, iPad and tablet. Through a series of formative and summative evaluations, it shows that the product development of multimedia-based Indonesian learning packages for autistic students is feasible, attractive, encouraging, and motivates autistic students to learn so as to be able to improve the language skills and knowledge of autistic students.

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