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The Problem Based Learning in Enhancing Students' Critical Thinking for Reading Skills in English Teaching at Vocational School

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ABSTRACT

The purpose of this research explained how Problem Based Learning (PBL) designed in teaching and learning English for Vocational School students in Indonesia. A PBL was used for overcoming critical thinking skill in teaching English at vocational school. The sample consisted of tenth grade of vocational school students who were recruited purposively. The research methodology used qualitative and qualitative method. Interview was used to get data about instructional and students' needs. Questionnaire was used to obtain expert validation during teaching and learning process, and a test was used to obtain the effectiveness. The results of expert validation showed that the design of this learning strategy was good and can be used in learning English. It was effective in English as Foreign Language teaching strategy for vocational school in Blega of Bangkalan. Thus, it could be implemented in the teaching and learning English for vocational school students in enhancing students' critical thinking.

INTRODUCTION

Nowadays, Indonesian vocational schools need to prepare the twenty-first century skill and career for contributing in the global society and work. The 21st century demands a new response to become productive contributors to society where we must quickly master the learning innovations, technology, and career skills needed for work and life (Griffin & Care, 2015; Kumar & Refaei, 2017). It means that teachers should be innovative in preparing students for the need of 21st century skills demand. Schools play a role and are responsible for realizing the quality of education to produce vocational school graduates based upon the demands of the twenty-first century. Ten countries in the Asia-Pacific region has been participate in the research approaches transversal competencies core skills (Grii & Care, 2018). Therefore, Indonesia as the development country already participated in contributing such competencies that one of them is the critical thinking.

In fact, the learning process mostly does not provide opportunities for students to think critically in some school in Indonesia (Mursyidah et al., 2019; Nurisya & Corebima, 2017; Rohim, 2014). It concerns to solve such problem in learning process. In addition, ability of vocational students to communicate effectively in English is still low. This problem mostly caused by lack of analysis from students, thus it merely depends on memorizing vocabulary and grammar. Thus, some empirical research already suggest that using Problem-Based Learning (PBL) can an effective solution for it (Kassem, 2018; Rohim, 2014; Savery, 2018). However, there are still lack of evidence in its usage and implementation in Indonesian Vocational Schools.

While English is one of important skill in Indonesia vocational school (Mahbub, 2019), it still having some troubles in its teaching process (Ekawati, 2019; Iskandar, 2015). Therefore, the development of student-centered learning strategies is needed. This learning strategy aims to overcome the problem of learning in Indonesian vocational schools that emphasizes students' critical thinking skills. PBL should become alternative model of learning in vocational schools, since some research already claimed that the model is effective in the use and output produced (Kassem, 2018; Monterrat et al., 2014; Savery, 2018; Safaruddin et al., 2020).

It is important for students to solve real-life problems collaboratively to enhance their learning outcome using model (Lathram et al., 2016). PBL as involving students towards problems through practice. It means that teaching PBL has more practice and students centred learning. In another part, it is stated that PBL is a learning model where of "learning to learn". Students collaborate to find solutions to life problems. Students are able to formulate, analyse, and solve problems (Mustaji, 2017). It can be concluded that PBL is a student-centred learning model in teaching. It involves real-life problems to solve collaboratively. It constructs students' knowledge to analyse, evaluate, and create problem solving. Cognitivism and constructivism as a foundation for Problem Based Learning models. Barrow's taxonomy, there are 6 PBL representative models, identified as follows; pure PBL, hybrid PBL, anchored instruction, project-based learning, case-based learning, and instruction with problem solving activities (Arends, 2015). Based on those PBL model, the main concern of this research is Hybrid PBL. The teacher still needs his role in helping students to solve problems. The role of the teacher is as scaffolding against the powerlessness of students in determining the right approach, strategy, or technique in problem solving. This Hybrid PBL can lead students to make their own decisions. Even the problem structuring uses problems that are not structured (ill-structured). With the presence of ill-structured problems, students are able to solve and conclude reasoning. With the ability to solve problems and reasoning, it makes students able to think critically.

On the other hand, PBL in English teaching, especially for vocational school should increase students' skills to think critically. Some empirical research in Indonesia, already tried to implement PBL in increasing critical thinking capability, however, most of the doing it in elementary school and higher education (Hakim et al., 2018; Nurhayati et al., 2019; F. N. Sari et al., 2018; L. K. Sari et al., 2017). Thus, it should be proven in vocational school which has different characteristic in Indonesia.

This bring another thought that PBL in increasing critical thinking for enhancing English teaching process, especially in vocational school. On the other hand, English study was conducted to explain how is PBL designed for EFL teaching strategy? How is the impact for students critical thinking?

RESEARCH METHOD

The Aim of Research

The aim of this research explained how Problem Based Learning designed to vocational school students (class of 10) regarding critical thinking in English lesson, and the impact for students' critical thinking.

Research Methodology

The research methodology was qualitative. The interview was used to get data about instructional and students' needs. The questionnaire was used to obtain expert validation of the instructional strategy and the observation of teaching strategy during teaching and learning process.

Participants

The subjects were 31 students of Accounting program at Vocational School in Blega of Bangkalan in Indonesia. They are new generation of English learners who come from rural areas and have different educational backgrounds.

Problem Based Learning (PBL)

PBL is a model that teaches students to solve real-life problems by collaborating in their implementation (Arends, 2015). Real life problems are needed to foster students' problem solving abilities. The students are given the opportunity to become problem solvers that are unstructured, complex, and diverse in real life (Mayer, 2012). The reason for the inability of students to solve problems outside the classroom because the problems presented are not appropriate to the real life contexts. In contrast, students learn primarily to solve well-structured problems in subject matter (Lee & Blanchard, 2019). It always occurs in some classes of vocational school in my city. Instead, problem solving is the most important cognitive process (Mayer, 2012). Cognitive processes in problem solving are directed at solving a problem. Problem solving includes higher order thinking skills (Jamhari et al., 2018). To solve problems, students need to think critically, be scientifically, and formulate coherent evidence-based arguments. Evidence-based arguments are arguments where conclusions are reasonable given assumptions, and assumptions must be clear or supported by evidence.

Critical Thinking

Critical thinking is appropriate use of reflective skepticism of problem with some consideration (Vaseghi, 2012). This thinking skill is highly needed in 21st century education. It is clearly stated that critical thinking is an important component of the quality of 21st century education programs, especially in Indonesia (Ariyana et al., 2018; Toheri et al., 2019). Critical thinking involves identifying and analysing information sources. Credible information relates to prior knowledge. Then a conclusion is made. Critical thinking skills are obtained from the process of solving problems and working together. It was also explained that critical thinking skills were identifying and analysing information. Thinking of connecting early knowledge and making conclusions.

Critical thinking skill is obtained from the process of solving problems and working together. Today students need to know about the problem solving as a basic skill. The problem solving is recognizing as an important life skill (Karatas & Baki, 2013). It is also explained that critical thinking skills were identifying and analysing information. Thinking of connecting prior knowledge and making decisions (problem solving) (Hmelo-Silver et al., 2018). Encompasses approaches to learning and instruction that situate learning in problem-solving contexts with a focus on PBL and Productive Failure. From the above review, it is important for students in Indonesian vocational schools to be equipped with 21st century skills; critical thinking. Through problem

solving, the students learn to think critically in English class (Qizi, 2019; Vaseghi, 2012). Critical thinking is the ability of one's reflective thinking in acting through the process of identifying, analysing, interpreting, and evaluating what will be done before making decisions and conclusions in overcoming problems by using several methods of active learning in the classroom (Mulnix, 2012). Table 1 shows some indicators used as tools evaluation of students' critical thinking skills in this research.

Table 1. Indicators of critical thinking.

Indicator	Instructional Objectives
Focus	Students are able to identify problems.
Reason	Students are able to produce reason and argument.
Inference	Students are able to make decision.
Clarity	Students are able to clarify the supporting arguments.
Overview	Students are able to evaluate the problem solving.

Source: Adopted from (Fisher, 2011)

RESULTS AND DISCUSSION

How is Problem Based Learning Designed to Vocational School?

This learning design has gone through the stages of validity testing. The validity test used expert validation (expert justice). There are two validators, a learning technology expert and an English learning expert. The purpose tested the validity therefore the learning design developed is valid and it has expert advice and recommendations. The results of expert validation showed that the design of this learning strategy is good that can be used in learning English.

The main principle of this learning design is as scaffolding in reading lessons. The Problem Based Learning (PBL) is designed with integrating the IDEAL Problem-Solving approach. PBL syntax was adopted from Arends (2015) which are: 1) orientate, 2) organize study, 3) assist investigation, 4) present artifacts and exhibits, and 5) analyse and evaluate (Arends, 2015). While IDEAL steps are as a scaffolding for students in problem solving. The scaffolding is assisted in the second syntax of PBL. The scaffolding was given for any reasons. With the guidance and support of an expert, children can perform tasks that are slightly outside of their own independent knowledge and abilities. The quantity and quality of scaffolding in learning must be adjusted to students' self-regulated skills and student development needs through a combination of scaffolding from teachers and peers (Fazriyah et al., 2018; Watson & Watson, 2016). Provision of scaffolding continues until students are truly able to achieve their learning goals. Instruction (guidance) must be given to reach a new point of achievement when students have difficulties in learning achievement (Reigeluth et al., 2017). Therefore, this learning design is very useful as scaffolding for students in overcoming the problem of learning English especially reading. Here, syntax for PBL in English lesson that must be carried out by the teacher and students are as follows.

Problem orientation (Pre-reading activity)

The teacher guides the students to activate prior knowledge to help understand reading (Anderson & Pearson, 2016). In this phase, the teacher facilitates students in understanding the concept of a reading. The teacher provides a stimulus for students to

respond. The teacher presents a reading text. In addition, this stage invites students to activate their prior knowledge to help understand reading. From initial knowledge, students identify and recognize the meaning of words, sentences, and text structure. Pourhosein Gilakjani & Sabouri (2016) claims readers activate their background knowledge and apply it to help them understand what they are reading. Activating prior knowledge means activating cognitive structures related to topics and tasks that must be learned and completed. The principle of activation comes from the view of cognitive information processing learning in which relevant mental structures must be prepared to receive new information and experiences (Reigeluth et al., 2016).

In this phase, the learning focuses on extracting students' initial knowledge to be connected to new knowledge. This knowledge consists of individuals' experiences in understanding their concepts of how the written text works, which involves the recognition of words, the meaning of words, and how the text is formed.

Organizing students for problem solving (Whilst-reading activity)

The importance of skills in problem identification refers to the opinion of Driscoll & Carliner (2005) that the more thoroughly the problem is identified, the more likely a solution is found. Furthermore, problem solving implies two things namely first, that an effort must be made to define the problem and, second, that the solution is intended to overcome the problem identified. The students can solve problems after getting the right help from an adult or a friend (Karatas & Baki, 2013). Therefore, the teacher provides IDEAL problem solving.

In this phase, the provision of scaffolding is needed for students who experience problems in reading comprehension. According to (Reigeluth et al., 2017), scaffolding takes the form of main questions, or information, or clues, or explanations (develops understanding). (Watson & Watson, 2016) adds that the quantity and quality of scaffolding in learning must be adjusted to the students 'self-regulated skills and students' developmental needs through a combination of scaffolding from teachers and peers. Therefore, learning must be self-initiated and self-regulated, motivated by one's natural desire to learn the things needed to maintain and develop themselves. Provision of scaffolding continues until students are truly able to achieve their learning goals. (Reigeluth et al., 2016) suggest instruction (guidance) must be given until reaching a new point of achievement when students have difficulty in learning achievement.

In this phase, the students solve the problem collaboratively. The teacher forms a small group of 4 to 5 students. The teacher encourages students to have a discussion and come up with strong argument for making decisions. Students identify problems with 5W + 1H. Identification in this stage makes it easier for students to understand problems in reading. The problems that arise generally about the main message conveyed by the author to the reader. When identifying this reading, students identify the subject or object, place, and time contained in the reading. In addition, students are led to recognize the smallest unit to the largest unit in the linguistic element. Next, students define their learning goals. The purpose of learning to read is defining the definition of text types, defining the structure of the text (generic structure), defining social functions, defining the language features used in the reading. In addition, students also define the meaning of words, phrases, and sentences. Furthermore, students explore strategies to solve the problem related to text. Exploration is a learning

process that connects one concept to another (I. P. Sari, 2015). The exploration method starts with understanding the problem, analysing, making guesses to making conclusions. Ahmadi & Gilakjani (2012) state that students who learn reading strategies try to recognize the main points of the paragraph, describe words, phrases, or sentences that are not clear, and summarize their reading. These strategies help the reader to solve their problems when reading the text and assess the planning and results. The students are facilitated to explore the meaning of words, phrases and sentences in the dictionary that they have or the dictionary provided by the teacher. In addition, the importance of students exploring before making decisions based on information, evidence, and knowledge from various learning sources. This can be done by searching for resources in libraries, the internet, personal sources or conducting exploration and investigations. They also explored the linguistic elements found in a text through a search engine. Furthermore, the students act on solving problems in reading. The students answer several questions presented by the teacher. The students work on the tasks needed in learning. Problem solving in question is the answer to the questions the teacher presents. The students put forward logical reasons for his decision. Finally, the students look back at their decision. It is important to re-examine something done in making a decision, train students to always be careful in making decisions. They can consider right and wrong on their decisions in problem solving. In this phase, students are guided to discuss the results of decisions with their groups. By discussing, they can get used to evaluating the results of group work.

Encourage individual and group investigations

Investigation is the aspect of critical thinking (Arends, 2015). In this phase, the teacher facilitates students to find more information about the language elements contained in the descriptive text and argumentative essay. The students gather a number of information from various learning sources. The information sought in this phase is different from 'explore' in phase two. The difference in the investigation phase is a deeper investigation of the linguistic elements by looking for comparisons of various examples in descriptive text and argumentative essay. The teacher guides students throughout the investigation process by providing instructions on learning resources that are relevant to the achievement of the discovery that information. Accurate information obtained during an investigation helps students in making decisions. The ability to make reasonable decisions depends on critical thinking. Critical thinking allows analysis and evaluation of arguments. This leads them to find a concept and connect the concept to the understanding of reading. The students can find more information about the definition of a reading, text structure, social function, and language display. Whereas in the smallest unit of language that is the search for the meaning of words, phrases, and sentences. Learning resources can use the library, database, internet, personal resources during the investigation phase. Arends (2015) suggests teachers should provide assistance throughout the investigation phase. Through this investigation phase, students get accurate information so that they can find explanations and solutions that fit their learning goals. The students collect evidence in accordance with the data / information needed from various learning sources into notes. The students make decisions in solving problems. Argumentation is giving reasons in communicative situations by people whose purpose is justification of

actions, beliefs, attitudes, and values Critical thinking increases the use of information and advocacy. Teaching and learning critical thinking are important roles of education.

Present artifacts and work (Post-reading Activity)

In this phase, the teacher guides the creation of works in the form of models, for example, artifacts, reports, expositions, serial images, multimedia, ppt, or video. Physical representations of problem situations or solutions, presentations of these models to display student work openly to be communicated (Arends, 2015). Presentation of the work requires students' creativity in elaborating their thinking skills in the form of writing, pictures, tables, or graphics. In this phase students are guided for elaboration. Elaboration enables the students to predict reading, integrates students 'initial knowledge and experience, gives space to behave, creates higher-level thinking skills, connects reading with students' initial knowledge, learning resources, and personal experiences in the world (Lim et al., 2015). Self-explanations also help readers to engage in elaboration, which involves linking text content with what is already known. This process plays at least two roles in facilitating text processing in depth: (a) filling conceptual gaps in text and (b) integrating text content into pre-existing knowledge structures (Reigeluth et al., 2017).

In this phase the students' activities include students collecting a number of new ideas. Then, students compile a work in the form of written essays or text. Students evaluate the work or artifacts from other groups. There is argumentation that critical thinking allows analysis and evaluation of arguments (Sternberg, 1986). The argument shows statements that are designed to convince the opinions of others by using strong reasons. Argumentation is giving reasons in communicative situations by people whose purpose is justification of actions, beliefs, attitudes, and values. Critical thinking increases the use of information and advocacy. Furthermore, the production of coherent arguments shows solutions in solving unstructured problems. Therefore, teaching students to argue and learn critical thinking is an important role of education.

1. *Reflection*

In this phase, the teacher guides students to conclude the learning material. The teacher reflects on the stages of problem solving by students. In the final phase, students conduct analysis and evaluation of their thought processes. However, to minimize the instructional process, it is used the term 'reflection'. Here, teachers and students reflect by analysing and evaluating their learning thought. In addition, the students analyse and evaluate investigative and intellectual skills that are used on their own. (Kalaitzidis et al., 2016) states that teachers/instructors can allow students to articulate why their work does not meet their goals and to ponder why they do it differently. The students are given the opportunity to reflect on their learning experience, reflect on the failures made by finding different alternatives in overcoming the problems they get.

How critical thinking can impact students'?

This research conducted the observation during the teaching and learning process using observation sheets with Likert scales 1 - 4. They are 1: Strongly disagree, 2: Disagree, 3: Agree, and 4: Very agree. The score given by two observers (the English teachers). The researcher conducted the teaching process himself to make sure all the syntax was run well during the teaching and learning process. Then the observer fills in the observation table and is analysed with a formula of percentage of agreement. The instructional

strategy is practically done well if it has a percentage of agreement of 75% (Borich, 2016). This observation must be carried out so that researcher get the desired learning outcomes in PBL learning. Desired learning outcomes are students' critical thinking skills in English lessons. Therefore, it can find out the difference in results between before and after learning. The following table is an observation sheet used during the PBL process.

The data shows that the result of observation score was 100% done well. This means that PBL syntax of this instructional design was conducted well. Therefore, this implementation was categorized very practical for learning English in enhancing students' critical thinking. The learning presents reading skills. The research was conducted four times in a topic descriptive text and argumentative essay. The first meeting was pre-test, the second was PBL class (reading material about descriptive text), the third was PBL class (reading material about argumentative essay), the last was post-test.

The results showed on pre-test was low critical thinking. The students got average score 40. It meant that the students were not able to solve the problems because they had no experience during learning process. Their background knowledge was less of critical thinking, so they could not connect into new items of critical thinking, especially on argumentation. According to Nussbaum and Sinatra (2003), arguments help clearer roles in solving unstructured problems. The important of argumentation during instructional process in the class, it could train students to think critically. In fact, based on English teacher's information during interview, the instructional process in his class always use direct instructional in English teaching. Such condition lead students learnt passively. The students allowed to listen, memorize, and do some tasks in every meeting. It caused students were not able to produce their argumentation, analyze, and evaluate their thinking. There was no interaction between teacher and students.

During this research, the English teacher and students got new experiences in learning English. The new experiences were instructional syntax, social system, principles of reaction, supporting system, and instructional impact. The table below shows the instructional activities and its impacts for students.

Table 1. The Implementation result of PBL and its impacts.

Numb.	Observation Aspects
Syntax	
1	Orienting students to the problem (Pre-reading Activity)
	Students observe a situation presented
	Students analyse problems in a given situation
	Students pay attention to the information conveyed by the teacher
	Students ask questions to the teacher
2	Organizing students to solve problems (While-reading Activity)
	Students form small groups (4 to 5)
	Students read a descriptive text carefully.
	Students identify problems with 5W + 1H (identify the problems).
	Students define the purpose of learning in solving problems in a reading.
	Students define generic structure of the text.
	Students define social function of the text.
	Students define language feature of the text.

Numb.	Observation Aspects
	Students explore reading strategies to solve the problems.
	Students act on argumentation that support the decision on solving the problem.
	Students look back and evaluate each decision in solving the problem they have done.
3	Encouraging individual and group investigation Students investigate the information needed in group.
	Students gather a number of information from various learning sources.
	Students decide the right solution.
	Students make important notes in solving problems.
4	Developing and presenting artifacts and works (Post-reading Activity)
	Students present and argue the results of their work.
	Students present their work in the front of class.
	Students evaluate the work based on arguments and relevant evidence.
5	Reflecting
	Students conclude the understanding and elements of reading text.
	Students reflect the stages of problem solving that have been done

Social system	
1	Leading students to interact with students, the environment, and other learning resources
2	Facilitating students to explore information that they do not know.
3	Giving students the opportunity to ask questions about the object being observed
4	Guiding students to work together with other students.
5	Guiding students to learn actively.
6	Motivating students who lack or have not actively participated
The principles of reaction	
1	The teacher gives a positive response on student performance results
2	The teacher appreciates each student's actions, decisions, and answers
3	The teacher inspires students in finding new solutions to each problem they face
4	The teacher appreciates the products produced by students.
5	Student-centered learning
Supporting system	
1	The syllabus developed refers to the learning objectives
2	Learning implementation plan refers to the instructional objectives to be achieved.
3	Student textbooks and student activity sheets are used in accordance with learning objectives
4	Student textbooks and student activity sheets used are easy for students to understand
5	Teaching materials used in student textbooks are adjusted to the characteristics of students.
6	The suitability of the technique and type of assessment in the student worksheet is adjusted to the learning objectives
7	The arranged test can measure students' skills in critical thinking and reading comprehension
8	Logistics needs are provided at the beginning of the learning process
Instructional Impact	
1	Learning directly impacts the improvement of critical thinking skills
2	Learning has a direct impact on students' ability to understand reading

From the table above, it showed that the instructional strategy facilitated students to analyze, evaluate, argue, solve problem, communicate, and work

collaboratively during learning process. The social system was built among students. They could interact among them. There was a principle of reaction between teacher and students. The teacher gave positive response, motivation, and appreciation to students' performances. The teachers were also as facilitator in learning process. The supporting system was well prepared such as syllabus, text books, students' worksheet, and logistics need. The last was the instructional impact. Learning outcome improved students' critical thinking. There was difference score between pre-test and post-test critical thinking score. The students got average score (80) higher than pre-test. In conclusion, the instructional strategy used PBL could enhance critical thinking skills in reading English lesson in certain indicators.

CONCLUSIONS

Problem Based Learning was an effective in English instructional strategy for vocational school of Blega of Bangkalan. It presented the problems in daily life. However, without scaffolding that it seems hard for students with low problem-solving skill such class in this study. The provision of appropriate scaffolding is needed to explore students' abilities and habits of thinking about the roles and responsibilities needed in the PBL environment (Chua et al., 2016) . Therefore, the scaffolding given could facilitate them to solve problems. IDEAL problem solving is an easy way to use for solving problem with some procedures discussed above. It also could enhance students to think critically during learning to solve. The instructional strategy designed had a valid criterion from expert justice. It could be implemented in the teaching and learning English for vocational school students. This can be developed in other lessons and other grade for further research. However, it needed more time to design and implemented in English class. Teacher must prepare ill structured problem, logistics, and other PBL environment well. In conclusion, this learning was in line with the expectations of the 21st skill. The role of PBL in supporting graduate competency standards and learning process standards could be harmonized with the competency standards of vocational high school graduates who must have five basic skills, namely able to do: (1) critical thinking, (2) solving problems, (3) creativity, (4) working together, and (5) communicating.

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