DEVELOPING STUDENTS' CRITICAL THINKING BY USING PROBLEM BASED INSTRUCTION STRATEGY

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ABSTRACT

The objective of this research was to obtain an empirical data about developing students' critical thinking by using problem based instruction strategy. The method of this research was experimental study and conducted upon 60 students of fourth semester of English Department at University of Indraprasta PGRI in 2015-2016 academic year. The instrument tests were firstly tried out to determine the validity and reliability. Hypothesis testing techniques performed by t_{test}, and obtained a value of 6,012 with significance level $\alpha = 0,95\%$, while the t_{table} was 1,701. Thus, it seen that t_{test} was higher than t_{table}, the hypothesis null (H_0) was rejected and research hypothesis (H_1) was accepted. So, it can be concluded that developing students' critical thinking by using problem based instruction strategy was significant.

Key words: critical thinking, problem based instruction, learning strategy

ABSTRAK

Tujuan penelitian ini adalah untuk mengetahui secara empiris tentang meningkatkan cara berpikir kritis siswa dengan menggunakan strategi pembelajaran Problem Based Instruction. Metodologi penelitian yang digunakan adalah uji eksperimen yang dilakukan terhadap 60 mahasiswa semester empat jurusan Pendidikan Bahasa Inggris Universitas Indraprasta PGRI pada tahun ajaran 2015-2016. Uji coba instumen terlebih dahulu dilakukan untuk mengetahui tingkat validitas dan reliabilitas. Pengujian hipotesis dilakukan dengan menggunakan uji t dan diperoleh nilai uji t sebesar 6,012 dengan taraf signifikansi $\alpha = 0,95\%$, sementara nilai tabel sebesar 1,701. Berdasarkan hasil tersebut terlihat bahwa nilai uji t lebih tinggi dibandingkan dengan nilai tabel, maka H_0 ditolak dan H_1 diterima. Dapat disimpulkan bahwa meningkatkan cara berpikir kritis siswa dengan menggunakan strategi pembelajaran Problem Based Instruction memiliki pengaruh yang signifikan.

Kata kunci: berpikir kritis, problem based instruction, strategi pembelajaran

INTRODUCTION

English as international language is a communication tool for all of mankind in the world. People need English to communicate in doing daily activities and making an interaction in their life. In Indonesia, English is a foreign language spoken by most people. The importance position of foreign language in society causes why teaching foreign language is more important and have many efforts which are made to find out how someone can master language.

Critical thinking is a complex activity and we should not expect that one method of instruction will prove sufficient for developing each of its component parts. We know that while it is possible to teach critical thinking and its components as separate skills, they are developed and used best when learned in connection with a specific domain of knowledge. We should not expect that a critical thinking course will develop students' competencies in this area. If students are not expected to use these skills in traditional courses, the skills will be disappear. Teachers must require students to use these skills in every class and evaluate their skills accordingly. Students are not likely to develop these complex skills without specific, explicit expectations, and their measurement in the form of important assessments.

In today's classroom, it's important to teach students to become critical thinkers. Engaging in higher order thinking exercises enables students to go beyond the simple memorization and regurgitation of facts. Developing these thinking skills helps students understand, infer, evaluate and apply information to solve problems both in and out of the classroom. Teachers can encourage the development of these thinking skills by incorporating thinking activities in the classroom.

Critical thinking is that mode of thinking about any subject, content, or problem in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them. Critical thinking is essentially the process of logically analyzing a situation. It's a skill that becomes particularly helpful when facing a problem. While some people are naturally more adept at problem-solving than others, anyone can learn the skill of critical thinking. Every time you solve a problem, you have exercised your own critical-thinking abilities. By becoming aware of what critical thinking is and applying its methodology to your everyday problems, you will improve your critical-thinking skills.

Nevertheless, students at general have difficulty in understanding English especially texts. Instead in meaningful group of words, they read word by word and often look up meanings in a dictionary. We know that effective reading involves all of the higher mental process. Good reading requires good thinking. When we learn English, especially in the beginning stages, we must built good thinking, too.

Structure mastery and critical thinking are the two things which have close relationship that should be completely mastered by a student, and interconnected between one and another. A good mastery of the sentence can be related to one's thought processes. Person's thought processes can be related to the mastery of the sentence. So it may be associated with the control sentences, critical thinking, and mastery of one's structure and critical thinking.

By seeing those facts, an appropriate learning strategy is needed especially in constructing whole

meaning based on the things they learned and read. Students will easily catch up the material transferred by using problem based instructed classical or individually. The problem appears then was how the problem based instruction learning strategy affected students' critical thinking.

Thinking critically means asking questions. Instead of accepting at face value what you read or hear, critical thinkers look for evidence and for good reasons before believing something to be true. This is at the heart of what it means to be a scientist, researcher, scholar or professional in any field. Whatever you are studying, critical thinking is the key to learning and to making progress.

The term of critical thinking can also as the ability to think clearly and rationally. It includes the ability to engage in reflective and independent thinking. Someone with critical thinking skills is able to do many things, such as a) understand the logical connections between ideas, b) identify, construct and evaluate arguments, c) detect inconsistencies and common mistakes in reasoning, d) solve problems systematically, e) identify the relevance and importance of ideas, and f) reflect on the justification of one's own beliefs and values.

Critical thinking is not a matter of accumulating information. A person with a good memory and who knows a lot of facts is not necessarily good at critical thinking. A critical thinker is able to deduce consequences from what he knows, and he knows how to make use of information to solve problems, and to seek relevant sources of information to inform himself.

The way of critical thinking should not be confused with being argumentative or being critical of other people. Although critical thinking skills can be used in exposing fallacies and bad reasoning, critical thinking can also play an important role in cooperative reasoning and constructive tasks. Critical thinking can help us acquire knowledge, improve our theories, and strengthen arguments. We can use critical thinking to enhance work processes and improve social institutions.

Critical thinking is the intellectually disciplined process of actively and skilfully conceptualizing, applying, analyzing, synthesizing, and/ or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue, assumptions, concepts, empirical grounding; reasoning leading to conclusions, implications and consequences, objections from alternative viewpoints, and frame of reference. It is the use of logic and reasoning to solve problems or answer questions. Critical thinkers are able to identify bias and how the bias influences thinking, allowing them to come up with more objective conclusions. Critical thinkers can also identify irrelevant information and discard it. Further, they understand that there is more than one possible solution to a problem.

Facione in Piaw (2004:65) stated "Critical thinking means making reasoned judgment or evaluations using the left hemisphere of the brain". Critical thinking includes how to learn effectively, set a study plan, manage stress, motivate to learn, think smart,

avoid hesitation, adjust decision-making, and solve problem, and make a great decision. Critical thinking, then, must allow for the existence of ambiguities, vagueness, and misunderstandings in our communications. A person who tries to think critically must endeavor to eliminate those factors as much as possible; for example, by trying to get key terms clearly defined early on rather than allowing a debate to proceed with people using the same words to talk about completely different concepts.

Facione (2000) based on the APA Expert Consensus Delphi Report described about strong critical thinkers, namely: a) inquisitiveness with regard to a wide range of issues, b) concern to become and remain well-informed, c) alertness to opportunities to use critical thinking, d) self-confidence in one's own abilities to reason, e) open-mindedness regarding divergent world views, f) flexibility in considering alternatives and opinions, g) understanding of the opinions of other people, h) fair-mindedness in appraising reasoning, i) honesty in facing one's own biases, prejudices, stereotypes, or egocentric tendencies, j) prudence in suspending, making or altering judgments, and k) illingness to reconsider and revise views where honest reflection suggests that change is warranted.
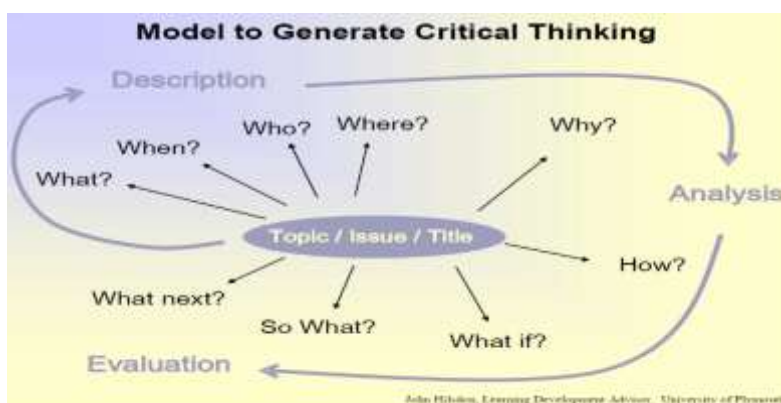

Figure. 1
Model to Generate Critical Thinking

Hilsdon (2010) explained the common question words: what, who, where, when, how, and why will help you to get started; along with the phrases: what if, what next, and so what. Attempting to answer these questions systematically helps fulfil three vital functions for any serious study – description, analysis and evaluation. These are the things you need to do, such as a) description, e.g. to define clearly what you are talking about, say exactly what is involved, where it takes place, or under what circumstances. Fulfilling this function helps you to introduce a topic.

More complex description will become analysis; b) analysis, e.g. examine and explain how parts fit into a whole; give reasons; compare and contrast different elements; show your understanding of relationships. In this way analysis forms the main part of any in-depth study; and c) evaluation, e.g. judge the success or failure of something, its implications and/ or value. Evaluations lead us to conclusions or recommendations and are usually found at the end of a piece of academic work, a paper, chapter or other text.

The teaching-learning process

needs the appropriate device to reach its goal. One of the devices as the material instruction is known as Problem-based Instruction (PBI) that was introduced by Howard Burrows, an American physician and medical educator, in the late '60s within the framework of the medical program at McMaster University in Canada.

The philosophy behind Problem-Based Instruction is that knowledge and skills are acquired through a progressive sequence of contextual problems, together with learning materials and the support of the instructor. Its core lies in collaboration, as well as in personal reflection, as one of its main objectives is to foster independent and long-life learners, where, however, teamwork substantially affects the quality of the work generated.

As a form of active learning, Pappas (2014) said PBI encourages knowledge construction and integrates school learning with real life dynamics, where learners learn how to develop flexible knowledge, and effective problem-solving skills, acquire intrinsic motivation, exchange ideas and collaborate. Through collaboration, learners are able to identify what they already know, what they need to know, as well as the way and the source of information they need, to successfully reach to the solution of the problem. Instructors facilitate learning, by supporting, guiding and monitoring their learners' progress, building their confidence, encouraging them to actively participate and stretching their comprehension. This method gives learners the opportunity to master their problem-solving, thinking, teamwork, communication, time management, research and computing skills.

Hmelo and Silver (2004) stated that problem-based approaches to learning have a long history of advocating experience-based education. Psychological research and theory suggests that by having students learn through the experience of solving problems, they can learn both content and thinking strategies. Problem-based learning (PBI) is an instructional method in which students learn through facilitated problem solving. In PBI, student learning centers on a complex problem that does not have a single correct answer. Students work in collaborative groups to identify what they need to learn in order to solve a problem. They engage in self-directed learning (SDL) and then apply their new knowledge to the problem and reflect on what they learned and the effectiveness of the strategies employed. The teacher acts to facilitate the learning process rather than to provide knowledge. The goals of PBI include helping students develop a) flexible knowledge, b) effective problem-solving skills, c) SDL skills, d) effective collaboration skills, and e) intrinsic motivation.

The five key techniques that are used in problem-based learning are: a) problems serve as a guide that motivates learners and grabs their full attention, b) problems take the form of a test, giving the opportunity to the instructor to determine if the learners fully understand the concept, c) problems are just examples that illustrate the concepts that are being taught, d) problems are used by instructors to examine the process, which means that the problem-based process becomes the lesson itself, and e) problems serve are a stimulus for activity, which means that they are utilized as a way to develop the skills required to solve them.

Problem-based learning constitutes a method with a wide range of benefits. Some of them are: a) learners have the opportunity to fully examine a problem and use their own personal

experiences to find the solution, b) problem-based learning encourages teamwork, thus improving the communication skills of the learners, c) learners learn how to develop their people skills, but also to effectively defend their position, and d) learners can discover on their own what they need to know, something that improves their self-directed learning skills.

PBI is a learner-centered educational method. Using this approach, learners are progressively given more and more responsibility for their own education and become increasingly independent of the teacher for their education. PBI produces independent learners who can continue to learn on their own in life and in their chosen careers.

Problem-based instruction (PBI) is an instructional strategy in which students actively resolve complex problems in realistic situations. As an instructional model, it demonstrates that any learning can be accomplished through "learning prompts," which serve both to intrigue the learner and ensure high quality learning outcomes. It can be used to teach individual lessons, units, or even entire curricula. PBI is often approached in a team environment with emphasis on building skills related to consensual decision making, dialogue and discussion, team maintenance, conflict management, and team leadership (Mergendoller, Maxwell, & Bellisimo, 2006).

METHOD

The research method is step or rule which is used in the research. The writer intended this research used quantitative approach. Research method was experiment method variables. The writer used a Posttest-Only Control Design. On this design, there were two members which was given a treatment (X) and obtained the result of research (Y). It means this method uses two classes. First, experiment class was treated by Problem Based Instruction and second, control class was conventional learning method.

There were two ways of collecting the data, library and field research. In the library, the writer read any reference books, articles, journals, and website as many as possible dealing to the topic discussion. Meanwhile, in the field research, the writer tried to get the factual data by providing test. The writer conducted observation and took posttest only to data research. According to Sugiyono (2008:102), the research instrument is a tool which used to assess a nature of phenomenon or social, all those phenomenon named research variable.

The students' critical thinking were obtained by 30 questions multiple choices form, a, b, c, and d, while correct answer of each question will have one score and incorrect is zero. Those questions were designed by the writer adjusted for the theoretical framework and research needs.

RESULTS AND DISCUSSION

Using PBI, learners encounter a problem and attempt to solve it with information they already possess allowing them to appreciate what they already know. They also identify what they need to learn to better understand the problem and how to resolve it.

Once they have worked with the problem as far as possible and identified what they need to learn, the learners engage in self-directed study to research the information needed finding and using a variety of information resources (books, journals, reports, online information, and a variety of people with appropriate areas of expertise). In this way learning is personalized to the needs

and learning styles of the individual. The learners then return to the problem and apply what they learned to their work with the problem in order to more fully understand and resolve the problem. After they have finished their problem work the learners assess themselves and each other to develop skills in self-assessment and the constructive assessment of peers. Self-assessment is a skill essential to effective independent learning.

PBI emphasizes student-directed learning and use of knowledge stimulated by the challenge of solving real-world problems in tutor-led small groups. Students first define or select an ill-structured problem that has no obvious solution. They develop alternative hypotheses to resolve the problem and discuss and negotiate their conjectures in a group. Next, they access, evaluate, and utilize data from a variety of available sources to support or refute their hypotheses. They may alter, develop, or synthesize hypotheses in light of new information. Finally, they develop clearly stated solutions that fit the problem and its inherent conditions, based upon information and reasoning to support their arguments. Solutions can be in the form of essays, presentations, or projects.

The responsibility of the teacher in PBI is to provide the educational materials and guidance that facilitate learning. As facilitators, teachers give students control over how they learn and provide support and structure in the direction of their learning. They help the class create a common framework of expectations using tools such as general guidelines and timelines. As cognitive modelers, teachers think aloud about strategies and questions that influence how students manage the progress of their learning and accomplish group tasks.

Teachers act primarily as cognitive coaches by facilitating learning and modeling higher order thinking and meta-cognitive skills. Teachers continually question students about the concepts they are learning in the context of the problem in order to probe their understanding, challenge their thinking, and help them deepen or extend their ideas.

Based on findings and cultivation of data, there were some important points that can be interpreted. The achievement of post-test using conventional strategy in developing students' critical thinking were acquired in the highest score 85 and the lowest 68, while the average score or mean was 77,93. On the other hand, the result score by using Problem Based Instruction strategy obtained such as the highest score was 95, the lowest score was 78 and the average was 87,73. According to the description above to compare between experiment class result and control class result explained that the highest score is 95 more than 85, the lowest point 78 was more than 68, the average or mean 87,73 was higher than 77,93. The mode was 88 and median was 88 in experiment class. The mode was 78 and median was 78 in control class. The result of research hypothesis test obtained ttest was 6,012 with significant level $\alpha = 0,95$ and (dk nA + nB − 2) with ttable score 1,701. Then, they were both compared and the result score for ttest was higher than ttable (6,012 > 1,701).

CONCLUSION

PBI is a pedagogical technique that situates learning in complex problem-solving contexts. It provides students with opportunities to consider how the facts they acquire relate to a specific problem at hand. It obliges them to ask what they need to know. PBI offers the potential to help students become

reflective and flexible thinkers who can use knowledge to take action. PBI has the advantage of suggesting a method to promote active and reflective knowledge-building-for-action. Still, careful research is needed to understand if and how these potentials might be realized.

According to the research investigation, the writer came to conclusion as follows: There was very different significance between students' critical thinking who were treated by using problem based instruction and those who were taught by conventional learning strategy. The Post-Test of experiment class was higher than control class. On the other hand, the result of research hypothesis test obtained t_{test} score = 6,012 and t_{table} score = 1,701. Then, those two results were compared and the result score for t_{test} was higher than t_{table} (6,012 > 1,701). It proved that result of research hypothesis (H1) stated that developing students' critical thinking by using problem based instruction strategy was accepted. Considering the explanation above, the writer summarized that using Problem Based Instruction strategy will improve students' critical thinking.

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