



ICT Media Assisted Problem Based Learning for Critical Thinking Ability

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Abstract

The objective of this research is to improve the critical thinking ability in accounting education through ICT Media assisted Problem based Learning model utilization. Action Research approach was used in this study. The sample of the research is vocational school students selected by using cluster random sampling technique in Boyolali, Indonesia. The data were collected via observation, interview, test and documentation. Data validity test were performed by method and source triangulation. As a result, ICT Media assisted Problem based Learning successfully improve the student's ability of critical thinking which were reviewed from the ability to conduct questions, ability to give argumentations, ability to collect and composing information, ability to analyze problems, and ability to make decisions and conclusions

Keywords: Critical Thinking; PBL; ICT;

Introduction

Education is one of the key to enhance human resource. In other words, education, both formal and informal, plays an important part in human's daily activity. In Indonesia, education sector is considered as one of important sector with the largest Indonesian budget share. But, based on the report from statistical data of Kemendikbud (Ministry of education and culture), the education in Indonesia still far from perfect with the rank of 69th from 76th countries total. This could be caused by many factors, i.e. low education quality, unevenly education facility among the vast area of Indonesia and ineffective teaching methods by the teacher. Teacher should focus on the 4 dimensions of education, namely 21st century skill, which is Communication, Collaboration, Creative and Innovation and Critical thinking and problem solving (4C). Critical thinking is considered the most important among the other due to its impact not only for the academic result but also for the future.

Thinking is a continuing process of interactions between strings of minds and perceptions. Thinking process happen along with the engagements of our new experiences and applying knowledge we've learned. Hence, the ability to assume, give ideas and conducting a valid conclusion, which are thinking and learning process, are always improving. Critical thinking is a state of mind that exist outside of the person's interest, or even a group of people, and it is also depend on the standard quality and the depth of experiences that the thinkers have thought related to a particular problem or question (Backmann

and Weber., 2016: 57). Critical thinking could not be possessed naturally (Eggen and Kauchak 2012: 112). Cognitive skills used for critical thinking need intellectual discipline, self-evaluation, re-thinking, oppositions, challenges, and supports. Santrock (2008: 309) stated that there are four advantages when a people improve their critical thinking ability, e.g. improved information processing ability, improved knowledge by thinking, improved ability to build and combine new knowledges and improved ability to make strategic planning, choice and supervision.

Critical thinking is important in formal education. To improve Indonesian student's critical thinking ability is by revolutionizing the teaching methods occurs in the classroom. Students could not only be considered as an object and passive consumer who learn passively from the knowledges passed by the teacher, but as subject of learning and active knowledge creator from what their own knowledge and skills (Meier., 2005: 42). Teachers should play their role as a media, motivator, and facilitator of the students while they learn. The main ideas teachers should understand in such case is: 1) teacher should let their students find, shape and develop the knowledge; 2) Teachers should be able to influence the students build their knowledge actively; 3) Teachers should develop the competency and ability of their students, and 4) Teacher should understand that education is private interaction between a teacher and students (Lie., 2010: 4). Hence, It is clear explicitly that interaction is needed in a learning atmosphere therefor a learning process could be conducted in an active and exciting way. Active and exciting learning that could conjure ability to think critically among students is depending on the learning process design.

Ability to think critically in students will help them when they enter business world (Eggen and Kauchak., 2012: 111). The students are expected to be able to analysis a problem and solve it in an easier way, especially in basic banking study. The students had internship in banking world such as BPR (Rural bank) could be considered as the improvement factor, which confirmed the research by Thompson and Washington (2015: 2). Thompson and Washington stated that improved critical thinking among accounting students is needed to help them accustomed to be critical in every problem they'll face therefor their work will be much easier. As example, the critical person in banking world will affect the accounting world in the future. The students are demanded to be able be critical to analyze and solve problems. Critical thinking students exhibits better intellectual skills to help the people surrounding them (Eggen and Kauchak 2012: 111). In the other hand, critical thinking will make students perform better in class (Senda and Odabasi., 2009: 137). Reinstein and Bayou (1997: 336) says that required an increase in critical thinking ability learners accounting so that when students leave secondary heading to jobs, they have become accustomed to thinking in critical. In line with the opinion of the Chabrak and Craig in He, Craig, and Wen (2013: 149) says "have drawn attention to the importance of developing students 'critical thinking for support they cite". Bierstaker, Bedard and Biggs (2015: 32) also suggested educators or teachers to enhance the critical thinking ability learners as part of the implications of the knowledge students will need accounting, because accounting capabilities more critical thinking in decision making.

Recommended learning process is to allow students to be active and independent which improve their ability to think critically therefor teacher should be aware of the students' ability and prepare a learning model that influence students to be active and independent, in which such method is considered as student centered learning model (Permendikbud., 2013). The students should be able to think critically, laterally, systematic in problem solving this model will make the students as the main target and the main actor or subject of the study. Student centered learning will make students learn faster and also influence students to be independent in learning therefor their critical thinking ability can also be improved. This method sets the fundamental aspect of Problem Based Learning (PBL) and is described in revised Indonesian curriculum of 2013 (K13) in year 2017 which stated contexts. Al-Bawarni, Al-Ani, dan Azmat (2012: 25) stated that learning model expected can change student's behavior to get some knowledge and skills. Bridge and Hallinger in Yeo (2007: 876) stated that the benefits of PBL are improving performance in human resource development, especially in leadership training using curriculum directed at self-directed learning and team.

According to Eggen and Kauchak (2012: 307), Problem Based Learning is a sets of teaching model that utilize problems as the focus to develop skills of problem solving, subjects and self-control. To enhance the impact of PBL, some educators use media such as mind mapping picture, sound, traditional games, etc. According to Arends (2004: 43) revealed that problem-based learning has three objectives of investigation skills and skills to overcome problems, behavior and social skills according to the role of adults, and skills to learn independently. Asyari, Muhdhar, Susilo, and Ibrohim (2016: 41) stated that the problem-based learning model can improve students' critical thinking ability. Gijsselaers and Wilkerson (1996: 5) say that Problem Based Learning centers on learners and learners must take responsibility for their own learning, identifying to better understand and manage problems and determine direction for information. This is consistent with Chen, Lin and Chang's statement (2011: 518) which explains that Problem Based Learning refers to a learning approach that focuses on the problem-solving process by learners in obtaining the necessary knowledge.

ICT or Information and Communication Technology could be applied as media in PBL. Research conducted by Almekhlafi and Almeqdadi (2010: 168) reveals that there is a positive impact on teachers using ICT as a medium in the learning of the students in the class. Teaching media that increase students' critical thinking is one of many alternatives that could be applied by teachers to improve their students' critical thinking. ICT media assisted problem based learning model is purposed by Sendag and Odabasi (2009: 139) as a way to improve students' ability of thinking. This model use ICT as software application-based media in learning process. Using this method, the students could engage in the learning process as the subject individually or in a group. The learning activities are held in accounting laboratories using computers. The teacher as facilitator could provide an application with educational videos, teaching material, and evaluation program which later improve students' ability to think critically.

Chen and Chen (2010: 10) stated clearly that ICT assisted problem based learning method will make teacher and students process of learning inside classroom easier. The combination of ICT and PBL will improve intelligence and the quality of the study. Other research also stated that applied PBL with ICT media help students to think actively to solve problems of everyday life in such detail based on the knowledge. The differences in this study, an ICT Media assisted Problem Based Learning model is utilized to enhance Indonesian students' critical thinking ability. The ICT media used in the study is a video-based banking problem. To the best of our knowledge, such approach has never been reported.

Methodology

This research utilizes action research as an approach. The data source for this research obtained from interview with informants, location or place, occurrences, documents and archives. The informants of this research including basic banking subjects teacher, 10th grader accounting students of class 1 and class 2 SMK Negeri 1 Banyudono. Document or archive obtained from student daily evaluation tests script and students personal data. Data collecting is performed by observation, interviews, tests, and documentations. Data validity test were performed under source-method-valid content triangulation. Data analysis of this research is in the form of quantitative and qualitative data. The procedure of the research is: 1) activity planning; 2) activities implementation; 3) observation, and 4) reflection.

Results and Discussion

Students' critical thinking ability data are collected by observation sheets which consist of five aspects i.e. the ability to conduct questions, ability to give argumentations, ability to collect and composing information, ability to analyze problems, and ability to make decisions and conclusions. Critical thinking ability of the students is analyzed in basic banking subject/study as a preparation for

their internship in market place thus the students could think critically. This also approved for students in Accounting Major. In the last of the session, the students were given an evaluation test to measure their cognitive skill.

Before the last exam are held, the questions of the exam are validated, making it only 10 validated questions out of 16 proposed questions that will be given during the last study session. 16 questions were validated by 36 of 11th grade students who already being given and studied about the problems. The questions considered in medium level of difficulty. Based on the observations, the result is presented in Table 1.

Table 1 Improvements of students critical thinking ability

Indikator	SMK Negeri 1 Banyudono					
	Critical Thinking					
	Pre-cycle		cycle I		cycle II	
	Have	No	Have	No	Have	No
Ability to conduct questions	22	49	43	28	63	8
Ability to give argumentations	19	52	39	32	61	10
Ability to collect and composing information	45	26	53	19	64	7
Ability to analyze problems	24	47	41	30	56	15
Ability to make decisions and conclusions	14	57	37	34	57	14

(Source: Processed primary data, 2018)

Based on the data given in Table 1 and Fig. 1, the achievement target percentage is successfully reached. Critical thinking of the students analyzed by five aspects explained in the Research Method section are altered during first and second cycle which is an improvement in all of the aspects. The ability to form a questions were increased from the value of 30.98% to 60.56% (cycle 1) with the difference of 29.58% and increased in cycle 2 with the value of 88.73% with the difference of 28.17% between cycle 2 and cycle 1. The ability to argue before the using the approach were 26.76% but increased to 54.93% in cycle 1 and later increased in cycle 2 with the value of 85.92%. The ability to collect and compose information aspect are increasing from the pre-cycle value of 63,38% to cycle 1 value of 74.65% (11.27% difference) and from cycle 1, the value is increasing to cycle 2 value of 90.14% (15.49% difference). The fourth aspect exhibits an improvement from the value of 33,80% to 57.75% (23.95% difference) and to the value of 78.87% (20.82% difference). The fifth and the final aspect also exhibits an improvements from pre-cycle 19.72% to cycle 1 value of 52.11 (32.39% difference) and furthered increased to the value of 80.28% (28.17% difference).

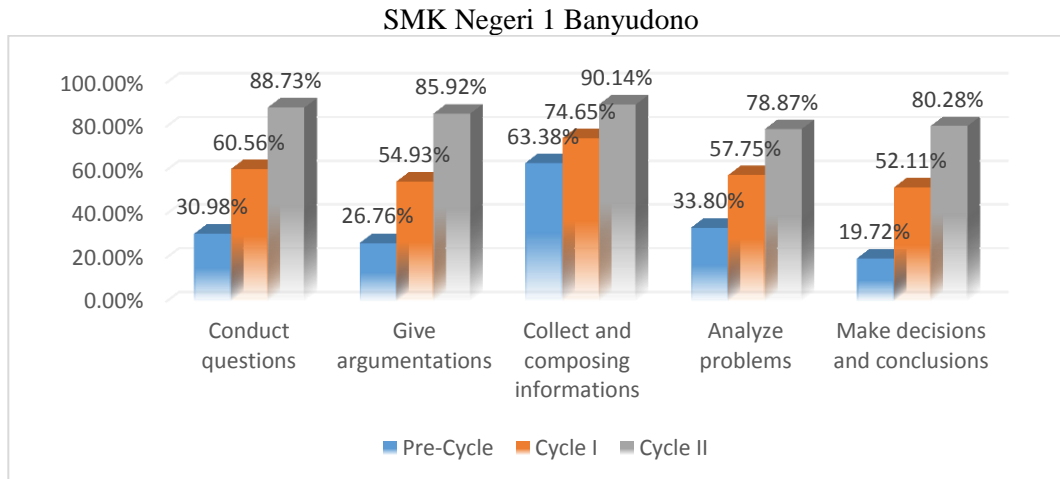


Fig. 1 Percentage of improvements of students critical thinking ability
(Source: Processed Primary Data, 2018)

Based on the implementation of cycle 1 and cycle 2, there is an improvement of critical thinking ability among accounting students by using ICT Media assisted Problem Based Learning Model. This could be concluded that ICT Media Assisted Problem Based learning model is become the main factor of such success. Each cycle consist of three class sessions. In the first session, the teacher explained about the learning objectives which later studied by the students. Next, the teacher divided the class into groups using puzzle game to decide which student belong to which group. After group of six students are formed, the group were given an ICT Media with a set of problems of account balance from video learning which student needs to analyze later. The students answered the given problems with the help of books or internet sources. After the problems are answered, the group made a brief power point presentation about the answers which presented in the front of class later. In the second session, the group presentation continued, followed by teacher explanation of problems. The group made a conclusion about teacher explanation. In the third session, a test is held to comprehend the students study result. In all these three session, the observer made an observation during the process and made an assessment using observation sheets. Target achievement percentage in cycle 1 is considered low due to some aspect that not exceeding the standard (75%). Thus, cycle 2 is held with revised method e.g. influencing student to be active and think critically with reward if the student do so. This reinforces the research done by Downing, Ning, and Shin (2010: 64) which states that problem-based learning has a significant effect on students' attitudes. Eggen and Kauchak (2012: 307) stated that learning based on problem is a set of teaching model that utilize problems as the focus to develop skills of problem solving, subjects and self-control. Problem Based Learning have the strongest teaching method in influencing student to apply a responsibility in a learning process (Chakravarthi and Vijayan., 2010: 39). Study by Problem Based Learning is an active learning model that utilized problem of the real world which demands a solving and solution from students which is a strategic technique of effective learning (Tan and Frank., 2006: 436). The problem could be given in the form of video which is considered as ICT Media (Information, Communication and Technology). Buckingham (2003: 97) stated the use of ICT Media will push students to be a critical thinker in the matter of asking questions. Study by ICT also conducts an improvement of students' thinking process. According to Diem (2006: 148) states that when teachers use ICT as a media of learning in the classroom, it will be able to improve the critical thinking skills of learners. According to Tezci (2011: 486) reveals that the benefits of ICT are a substitute for the conventional learning model used by teachers, transform instructional practices and contribute to new instructional methods. Chen and Chen (2010: 7) said the utilization of PBL will ease the teacher and student during class session. Barrows

(2002: 119) said that the model of PBL can assist learners in developing the ability of solving problems, critical thinking and independent study while gaining knowledge in various fields of learning material.

Conclusion

Based on data analysis, it is concluded that the implementation of Problem Based Learning model assisted by ICT media improves the ability of critical thinking among SMK Negeri 1 Boyolali students. The improvements proved from five aspects of observations i.e. formulating questions, argumentation proposal, collecting and composing informations, decisions making and conclusions. Thus, it is suggested that ICT Media-assisted Problem Based Learning model should be applied by teacher during class sessions, giving an opportunity of critical thinking ability enhancements among their students. The other researchers is suggested to perform further research on the development or the increase of critical thinking by use problem based learning with ICT Media.

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