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Critical Thinking Ability Reviewed from Epistemic Curiosity Interest Type in Comic-Assisted Learning

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Abstract

Students' different ability in receiving information indicates that they have varying critical thinking skills. This study aims to describe the ability to think critically in terms of epistemic curiosity type of interest in learning models of Problem Based Learning class VIII about two-variable linear equation system material. The research design is a method of mixed triangulation-concurrent with the type of Mix-Method research. The findings in this study showed that teaching-learning process in this study was not qualified. Poor quality of learning results was caused by several obstacles during research, such as technical implementation, time allocation, learning preparation and have implications for the research results that do not have good quality, so descriptions of students' critical thinking skills with epistemical curiosity of high, medium, and low categories are invalid and mathematical critical thinking skills of students with each of these categories can not be measured.

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INTRODUCTION

As an effort to overcome the needs of human resources and preparing the Golden Generation 2045, in the field of education, Indonesia seeks to improve the curriculum that we currently know the 2013 curriculum. Learning process in that curriculum is based on three basic competencies, namely attitude, knowledge, and skill. The challenge of teacher pedagogy right now is to identify, teach, and assess high-level thinking skill. One of the education competencies in 4C according to the National Education Association (NEA) is critical thinking.

Critical thinking is an art to improve thinking skills in analyzing and evaluating certain problem solving (Paul & Elder, 2019). Information received by the students can come from the teachers and the surrounding environment. The students' ability to receive information is different from each other. This indicates that the students have different critical thinking skills. Critical thinking facilitates the students in planning strategies, thinking of alternative settlement, developing scientific ideas / arguments and providing evidence when they solve math problems.

The stages of critical thinking ability according to Watson-Galser in Giri & Paily (1) Conclusion (inferences), namely the students can distinguish between truth and error statements from the data provided; (2) The recognition of assumptions is that the students can recognize the assumptions stated clearly; (3) Deductions, namely the students can decide whether certain conclusions must follow the information provided or not; (4) Interpretations, namely the students consider the evidence given and determine whether the data generalization is justified or not; and (5) evaluation of arguments, the students are able to distinguish between strong relevant arguments and weak and also irrelevant arguments in certain problems.

The Ministry of National Education stated that the character's value embedded in students is an effort to build the character of the nation, one of which is curiosity. The curiosity is a way of thinking, attitude, and behavior that reflects a feeling of wanting to know something more to everything that is seen, heard, and learned deeply. The role of epistemic curiosity influences facilitating cognitive development, school and academic teaching-learning, interpersonal closeness development, personal growth, and job performance (Mussel, 2010). Epistemic curiosity consists of the type of interest and deprivation.

Interest type curiosity was found positively related to the setting of learning objectives aimed at achieving personal satisfaction (Lauriola, et al. 2015). Litman (2019) stated that the type of interest involves optimism about new discoveries. Interest type curiosity is positively related to the orientation of knowledge that realizes in searching of novelty, a self-regulatory strategy that involves optimistic judgments about the unknown things and set learning objectives are aimed primarily to learn new knowledge just for pleasure.

Covid-19 pandemic makes the whole world think of how to to learning process without face to face. Distance learning is a choice that is widely used at this time. Interview with Mathematics Teachers at SMP Negeri 37 Semarang said that there were several obstacles in mathematics teaching-learning in this pandemic period, including the lack of variations in the use of technology before pandemic made teachers and students confused about this current learning. Limited learning resources before using online learning and supporting facilities for online learning. The lack of students' knowledge of the importance of mathematics in their daily life, and the low spirit of learning and students' curiosity in mathematics inside and outside the learning process.

The challenge for the teachers is to utilize technology and remain consistent in learning practices and getting interest and attention of the students to subject matter. The use of social media such as the Free Conference Call as a online meeting needs to be balanced with the right media as a means of learning support.

Comic is a good choice as learning media because students tend to enjoy entertaining reading such as comics more than reading textbooks. Using comics as a teaching material tend to be more attractive for children and are expected to be more successful to make them motivated and eager to read mathematics (Toh, Chan, Cheng, Lim & Lim, 2018). The function of comics as learning media is deliver the learning message. Comics can be created by paying attention to the stages in the used learning

model so it's able to support the delivery of optimal learning messages and become a new way of communicating without needing to face face. Learning communication can run optimally if the learning message is conveyed clearly, prosecuting, and interesting (Wulyanto. 2005).

Comic is used to support PBL learning, so comic is created by paying attention to stages according to PBL learning syntax. The initial part of the comic in the form of a cover and the introduction of characters made as attractive as possible with the theme of the school. There are three main characters on comic namely Saprul, Kipli, and Mr. Galih as a teacher. The selection of themes related to the school environment is intended so that students can permeate the story of the comic as if they are their own experience. Through narratives on comic, understanding is easier to wake up and last longer with the concept of mathematics delivered through comics. Stories involving fictitious characters, story plots and humor associated with more memorable comics than ordinary mathematical rules for students (Martin, 2007; Ozdemir, 2017; Toh, 2020).

The preliminary part enters the PBL stage of student overcome to the problem. In this section explained about learning objectives using comic, that the students can make mathematical models from a real problem related to SPLDV and resolve daily life problems related to SPLDV using the substitution and elimination methods. Then the students are reminded of the linear equation material of one variable and two variables so that learning can run optimally. The next section is second PBL stage, namely organizing learning activities. At this stage there is a simple problem related to SPLDV, namely a figure named Kipli asks Saprul to buy food in the school canteen. This problem often occupies around the students, so that with this problem the students can explore characters from figures in the comic.

Figure 1. Comic with the second stage of PBL

At this stage the problem that happened is Kipli asked Saprul what the price of each of these foods is. Mr. Galih as a teacher's figure who was near them then tried to mediate the dispute.

The main part of this comic is the third PBL stage, independent guidance, and groups. At this stage, the teacher guides those two students to find and explore information that they can use to find the solution to the problem. Start from what they know, and what Kipli asked. When all information has been obtained, followed by making mathematical modeling to find solutions to the problem of two variables linear equations using the substitution and elimination method.

Figure 2. Comics with the third stage of PBL

The next is the fourth stage of PBL, the development and presentation of works. At this stage, the rewriting is described in a coherent manner starting from the information that is known, asked, the settlement strategy used to the solution of the SPLDV problem in the story in comic.

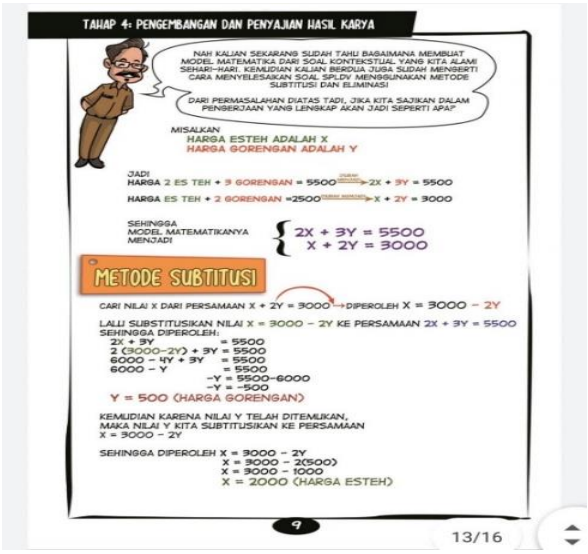

Figure 3. Comics with the fourth stage of PBL

The final part of the comic is fifth PBL stage, analysis and evaluation of the problem solving and epilog. At this stage, the teacher was described asking for help to buy some food in the school canteen and asking how much he had to pay. His two students could easily answer the question and the comic was finished with Mr. Galih asking the food to be delivered to his desk in the teacher room.

The selection of the right learning model is able to influence success in the teaching and learning process. According to Dewey in Jensen, et al. (2019), Problem Based Learning is based on the learning philosophy that takes a complex real-life problem. Development of the Problem Based Learning model with comic which compiled based on stages as described by Mulyasa (2014) as follows: (1) Orienting students on problems, (2) Organizing teaching-learning activities, (3) Guiding independent investigations and groups, (4) Develop and present works, and (5) Analysis and evaluation of the problem-solving process.

Based on that framework of thinking, the purpose of this study is to find out the quality of PBL learning model assisted by comic and descriptions of students' mathematics critical thinking ability reviewed from epistemic curiosity type of interest in Problem Based Learning models.

METHOD

This study uses Mix-Method research design with a triangulation-concurrent mix research strategy. The research design used is Nonequivalent Posttest-Only Control Group. Research began with preliminary studies and then collect quantitative data and analysis and interpretation of qualitative data. This study was conducted in Junior High School 37 Semarang in the Linear Two variable equation system. The study sample consisted of 19 students consisting of 10 experimental students and 9 control students.

Quantitative data collection technique was carried out by testing mathematical critical thinking skills. Qualitative data collection techniques use I / D Scales Litman, interviews and documentation. Widhiarso in Hasanah (2020) determined the classification of the subject in 3 categories of epistemical curiosity with the determination of group boundaries. Quantitative data analysis used normality tests, homogeneity tests, average different tests, proportion tests, test similarities of two on average, test the similarity of two proportions, and correlation tests. Qualitative data analysis follows the concept of

Miles & Huberman (2007) with data reduction measures, data display, and conclusions.

RESULTS AND DISCUSSIONS

The online learning process was done by Free Conference Call application for two meetings. At the end of each meeting was given a quiz through Google Form. During the online learning process, there were students who filled in attendance but were not present at the meeting. In addition, there were students who attended the first meeting but did not attend the second meeting. Another obstacle was that there were students who fill in the questionnaire but did not work on quizzes or critical thinking questions. Therefore, the sample was determined by the students who attended meetings 1 and 2, worked on quizzes and critical thinking questions, and filled in the I / D scale questionnaire.

The quality of PBL model assisted by comic with PBL stages is measured from three stages. In the validity stage of learning devices, learning instruments, and interesting type interesting questionnaires are valid on validity aspects as shown by Figure 7 below.

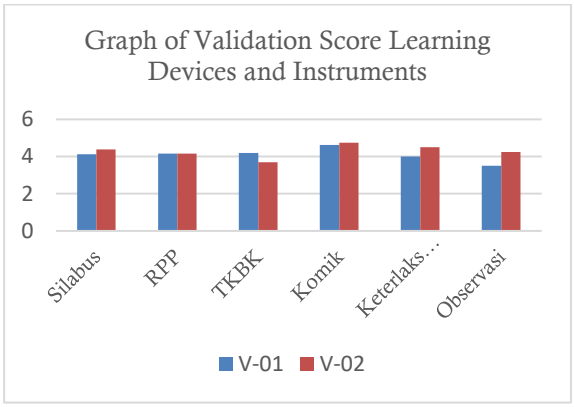

Figure 7. Graph of Validation Score Learning Devices and Instruments.

In the practicality aspects, PBL model assisted by comic is not practical to be applied in online learning in this pandemic period. The teaching-learning process had been carried out very well according to the plan that has been prepared before with the percentage of the implementation score reaching 81.5%. However, this is not balanced with student activities during learning that is only quite sufficient and does not reach a good category with a score percentage of 35.15%.

On the aspect of learning effectiveness, the PBL model assisted by comic with the PBL stage is not effective in this pandemic period using online learning. Proven based on the results of the statistical analysis that had been carried out, it was found that the average experimental class was the same as the control class, the proportion of completeness was less than 75%, the average critical thinking ability of the students in the experimental class was the same as the control class, and there was a relationship between curiosity Epistamic Interest type of mathematical critical thinking skills with medium categories.

Based on the three aspects of the quality of learning, it can be concluded that the PBL model assisted by comic is not of good quality. Less quality learning outcomes are caused by several factors that became obstacles during the research, starting from the technical implementation, time allocation, and preparation for learning. Unqualified learning has implications for unqualified research results so that the description of students' critical thinking skills with epistemic curiosity in the high, medium, and low categories of Interest becomes invalid and students' mathematical critical thinking skills cannot be measured.

Online distance learning is a solution in overcoming the sustainability of education during the current crisis. As said by Engelbrecht, et al. (2020), that the way of teaching must be adjusted to the current challenge by designing the learning environment in the network. Social interactions using multimedia and the Internet allow new social methods to build knowledge. The online learning process provides students in independence, especially in managing their learning methods. However, problems often arise when online learning ranges from technical problems, student adaptation problems, and a problem of teaching unpreparedness which results in learning not optimal and endless is not qualified.

Some of the obstacles that occur in online learning in this study include: students are not used to doing online classes, students consider ordinary days as holidays, lazy to get up early and join the class, saturated and lose interest in participating online learning which affected the decline awareness to

learn, not ready to learn independently, not used to searching from another sources other than those given by teachers, the gadget that is not compatible with online learning needs, unstable signal disrupts the capture of information during learning, and internet quota that runs out quickly. School provisions use the FCC application that does not include educational quota to accommodate the many students participating in learning making the regular quota of students run out quickly.

Another problem, the number of students who follow the learning is reduced by each meeting because students find it difficult to concentrate on the class for a long period of time, especially unilateral interactions from the teacher (Handayani, 2020). When interacting with the environment such as the school environment, the cognitive structure of children will continue to grow. Therefore, many students felt bored, due to lack of interaction and "presence" of the teacher so that the learning outcomes expected were not optimal.

According to Yudistira (2020), the PBL model may not affect learning outcomes if the factors that must be prepared from students carried out properly. One of these factors is that students must get used to finding information from books or friends. The conditions that occur in the field are students who are accustomed to finding information from the internet, but students only copy-paste answers given from Brainly or Google applications. Students do not change the slightest answer according to the desired questions so that when the questions given are slightly modified, the student's answer becomes inappropriate. In addition, the number of students who participated in learning and doing homework tends to be a little. This is in accordance with Pastoriko, et al. (2019) that mathematics homework is not a top priority of students.

Another obstacle is from the teacher as a facilitator with the lack of mastery of teaching strategies and learning models and time allocation in carrying out teaching-learning. The limited time of research by researchers has an impact on the lack of preparation for research instruments. Learning was forced to be compacted to only two meetings due to the time of approaching the final semester exam, where the results of the research obtained can be maximally recommended for minimum three or four meetings. In general, the obstacles faced by the teachers are found in the implementation of learning, especially in implementing models specified in the 2013 curriculum. Teachers cannot apply these learning models to each material due to not enough time allocation (Putri, R.F. F. 2017).

Utami, Y.P. (2020) suggested to consider the right time management in each learning model. This aims to make all student activities expected to be developed in accordance with the objectives of learning. Teachers need to conduct an analysis of learning to be carried out and must truly understand online learning so that learning can be carried out effectively, so that students' expectations and quality increases.

Emotional support, class organizations, and instructional support significantly influence student involvement and academic performance in mathematics (Alrajeh & Shindel, 2020). Therefore, mentoring through the WhatsApp group outside the learning time in the form of motivation and instructions is needed so that online learning can run more optimally. According to Susilawati & Supriyatno (2020), the Media WhatsApp is the most effective media because it can be used to distribute learning source files and others. The distribution of online class links with the FCC application also uses WhatsApp media.

The PBL learning process by involving authentic problems related to mathematics learning in schools is able to improve students' critical thinking skills (Napitupulu, et al. 2016; Novikasari, 2020; Sado, et al. 2020; Satwika, et al. 2018). However, in online learning that has reached the peak of the saturation of students, PBL learning is difficult to get the expected feedback. Student activities that have been saturated with online learning make two-way communication occur not optimally. The reasons stated by the students vary among others, sense of laziness begins to grow, the gadgets/mobile phones used do not support the use of video calling applications, and students often leave the place when the teaching-learning process still go on.

CONCLUSION

Conclusion of this study is comic-assisted PBL is not of high quality carried out online during the

COVID-19 pandemic. The comic assisted PBL model is valid on the aspect of validity, but not on the aspects of practicality and effectiveness. This shows that the learning process is not qualified. Not qualified learning outcomes are caused by several obstacles during the research such as technical implementation, time allocation, and learning preparation and have implications for research results that are not qualified so that the description of students' critical thinking skills with epistemic curiosity interest type in the high, medium, and low categories becomes invalid and the mathematical critical thinking abilities of students with each of these categories cannot be measured.

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