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Implementation of Problem Based Learning and Group Investigation (PBL Go-In) to Improve Vocational Students' Competence

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Abstract

The purpose of this study was to determine the effectiveness of a combination of problem-based learning and group investigation (PBL Go-In) methods on the competence of the Motorcycle Engineering and Business Program students. This study is an experimental implementation method using quasi-experimental design with a non-equivalent control group design. The results of the study obtained the application of the PBL Go-In model consisting of 7 stages, namely, presentation of problem situations, investigation and exploration, formulation of tasks, learning activities, analysis of progress, presentation, and assessment. The results of the analysis suggest that there are differences in the level of competency of students before and after the PBL Go-In method is implemented. The percentage of students passing minimum grade of 75 before treatment was 8.7%, and after treatment became 82.6%. Thus, it can be said that PBL Go-In learning model is potential to improve the students competence.

Keywords: Competence, Group investigation, Problem-based learning, Vocational school.

INTRODUCTION

Competence, according to Spencer (2008), are the essential characteristics that are owned by an individual related causally to meet the criteria necessary to occupy a position. Competence consists of five types of personalities, namely the motive (consistent willingness as well as a cause of action), congenital (character and consistent response), the concept of self (self-image), knowledge (information in a particular field) and skills (the ability to carry out tasks). Competence according to Spencer if associated with an increased ability to study vocational learners in doing a job under the existing standards,

In Bloom's Taxonomy (Bloom, 1956), competencies are divided into three categories, namely cognitive, affective, and psychomotor domains. Cognitive domain consists of six types of behavior as follows: (1) knowledge, attain knowledge memories of things that have been learned and stored in the memory, this knowledge with regard to the facts, events, understanding, rules, theories, principles or methods, (2) an understanding , including the ability to grasp the meaning and significance of the study, (3) the application, including the ability to apply the methods and rules to deal with new issues and real, (4) analysis, include the ability to specify a whole into parts so that the entire structure can be understood well, (5) synthesis, including the ability to form a new pattern, and (6) evaluation, include the ability to form an opinion about some things based on certain criteria. If connected with the vocational learning students must learn to remember the stages of the knowledge gained, the students will understand the material being studied. So that memory does not quickly disappear, then learners do application or practice and analyze the experience learned. After that, learners do the synthesis and evaluation of the learning undertaken. So that memory does not quickly disappear, then learners' do application or practice and analyze the knowledge gained. After that, learners do the synthesis and evaluation of the learning undertaken. So that memory does not

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quickly disappear, then learners' do application or practice and analyze the knowledge gained. After that, learners do the synthesis and evaluation of the learning undertaken.

Affective attitude consists of five aspects, such as acceptance, response and reaction, judgment, organization, and internalization. The behaviors of the five domains include: (1) the sensitivity, the sensitivity of certain things and willingness to pay attention to it, (2) participation, includes the willingness and participate in an activity, (3) assessment and attitude determination, which includes receiving a value, appreciate, acknowledge, and take a stand, (4) organizations, including the ability to form a value system as a guide and a handle on life, and (5) the formation of the pattern of life, which includes the ability to live up to the values and shaping it into a pattern of personal life value.

Psychomotor consists of seven types of behavior, namely: (1) perception, the ability to sort out, (2) the readiness, including the ability to put yourself in a situation where there will be a movement, or a series of movements, (3) movements guided, is the ability motion appropriate example or movement imitation, (4) movements are accustomed to, the ability to move without the sample, (5) complex movements, including the ability to move or skill that consists of many stages smoothly, efficiently, and accurately, (6) adjustments patterns of movement, including the ability to make changes and adjustments to movement patterns with particular acceleration in force, and (7) creativity, including the ability to give birth movement patterns that just on the basis of its own initiative.

The 21st century education model one character is creative teaching and learning methods. Every individual is unique and different skills; the teaching and learning methods must pay attention to the diversity of the "learning style" of each individual (Parinduri, 2017). The learning method is a technique or how to teach teachers to help students understand the subject matter, Problem-based learning method is based on learning theories construction using a variety of thinking skills of the students individually or in groups as well as the real environment (authentic) to overcome the problems that they are meaningful, relevant, and contextual. Problem-based learning to solving complex, practical problems approach performed using case studies, research, and determination of the solution to solving the problem (Trilling & Fadel 2009), Barrows (1996) reveals some characteristics of Problem-Based Learning as follows: (1). The learning process is student-centered, (2) the learning process takes place in small groups, (3) the teacher acts as a facilitator or guide, (4) the issues presented is a stimulus of learning, (5) new information obtained from independent learning (self-directed learning) and the problem is a vehicle to develop problem-solving skills.

According to Kauchak & Eggen (1993) Group investigation is cooperative learning strategies putting students into groups to investigate a topic. From these statements, it can be concluded that the GI method has a significant focus on the study of a subject or a specific object. Investigation relating to the activity observed in detail and assessed systematically. So the research is the survey carried out by someone. That person subsequently communicates the results of placement, can compare with the acquisition of another person because in an investigation can be obtained by one or more results. According to Sharan (1992), Group Investigation is planning and organizing a general class in which students work in small groups using cooperative inquiry, discussion groups, and collaborative planning and projects. According to Slavin (1990), The syntax of the model consists of six stages GI, which includes grouping (grouping), planning (planning), investigations (investigating), organizing (organizing), presentation (presenting), evaluation (evaluating).

The process of learning through a combined model of problem-based learning and cooperative learning type group investigation is deemed relevant and able to encourage students to develop thought patterns in a problem-solving (Umatin, 2017), PBL learning GO-In will trigger and encourage students to think by showing a variety of problems in the environment around them. GI can help students develop the ability to discover and build knowledge independently. Model PBL will provide opportunities for students to receive real experience during the learning process (Prasmala, 2016), Stages - stages in PBL method comprises Go-In of 9 steps, namely, preliminary, the small groups, the selection of topics, planned cooperation, implementation, analysis and synthesis, the presentation of the final results, analyze and evaluate the process, and evaluation (Prasmala, 2016).

METHODOLOGY

The type of research used in this study is a mixed-method (qualitative and quantitative). The design of this study uses sequential explanatory; namely, the research model is done by collecting data and analyzing quantitative data in the first stage, then collecting data and analyzing qualitative data in the second stage, then analyzing the overall data and then drawing conclusions from data analysis. Place of research in Vocational School in Magelang. The collection of data through observation, questionnaires, written tests, practical tests, and documentation. The subject of this research uses purposive sampling method (Tongco, 2007).

RESULTS AND DISCUSSION

The first implementation is to present a problematic situation with regard to subjects on a motorcycle ignition system consisting of a) a motorcycle does not turn on; b) cause no spark plugs spark; c) battery in DC ignition system; d) ignition coil can increase the voltage; e) a scheme of conventional DC ignition system; f) motorcycle died when a hot engine. This stage of teachers/instructors conveys a problematic situation with regard to the ignition system. Students observe the case presented the problems of teachers and develop other possible causes of the interaction between teachers and students.

The second stage is the investigation and exploration. This stage of the teacher guiding the process of research. Students explored by exploring issues that have been delivered using the existing modules in school or on the internet. Students at this stage will find the key to the problem so that it can be developed in discussion groups. Teachers at this stage aim to summarize the critical subject-matter of the notebook, respectively.

The third stage is the formulation of the learning task. This stage teacher divided the class into groups of 4-5 students/groups. Teachers also spur the spirit of the discussion group. The teacher distributes tasks to be performed by associating the motorcycle ignition system problems. The job is how this work, components, ignition system diagram, the symptoms of the problem, according to the procedure groove repair and troubleshooting. Students divide these tasks into groups per individual student.

The fourth stage is learning activities. This phase, only teachers monitor the implementation of discussion. Students held talks with a group according to the task given in the previous stage. Students who have individual learning activities further convey the results of their study group. Students deliver all the materials of the different tasks in turns, here occurred the interaction peer teaching so that in each document can be peeled in detail and detail.

The fifth stage is the analysis of the progress. This stage of teachers monitors the activities and development of each group. This stage is used to anticipate when a few groups did not go according to plan so that it can be repaired and direction to the group. Students check back from the discussion of the group if there are still shortcomings, do follow up looking for information together in groups, and discussed together. The group that has been completed to submit the results of discussion for teachers to do the draw percentage of the group.

The sixth stage is a group presentation. This stage is performed by the serial number percentage drawing; it is to condition students to remain favorable and more equitable. Groups that get number 1 percentage prior conduct, all members of the group came forward to presenting class discussion results. Each member presents the material so that all group members are resources. The purpose of this presentation nourishes the spirit, confidence, and courage in displaying the content. The group discussion ended with a question and answered session with the other groups. The problem is limited to a maximum of 5 people, so time can be maximized and evenly divided into each group. Santosa's research (2019) supports the results of a study in student competency, the use of teaching methods both in class, and when street vendors can improve student competency.

The seventh stage is the assessment. The assessment was performed three aspects: knowledge, skills, and attitudes. Values obtained knowledge of multiple-choice questions, the number of skills with practice tests while the cost of approach with an attitude questionnaire. This assessment phase carried out before and after treatment, use PBL Go-In methods and conventional methods.

The last stage in the research is the implementation of the interview. Interviews from teachers, teachers from four schools say that the method of PBL-Go in fascinating and makes students more active in learning. The syntax presented in this method is also easy to understand the teachers and students. PBL-Go is complementary weaknesses of the practice of problem-based and cooperative learning group investigation. Research results relevant to Delaney (2017), which states can improve students' critical thinking and competence that leads to higher-order thinking skills (HOTS). Research from Günter (2017) also suggested the use of methods can affect an improved understanding of students in learning.

The results of the first study, there are differences in the level of competence of students before and after implementation of problem-based learning combined method - group investigation on the motorcycle engineering competence in the SMK in Magelang. So in this study proved that difference competence of students before and after treatment to experience the difference and improvement. Based on the hypothesis proposed in this research, it turns out the students' competency experimental class and control class differences before and after treatment.

These results are supported by the t-test analysis that shows the value of t is more significant than t table, so Ho rejected and Ha accepted, and the average difference in the experimental class for the knowledge test before treatment and after treatment amounted to 59.11 by 81.64 thus increased by 22, 53. Data seen from KKM percentage of 8.7% before treatment after treatment becomes 82.6%. While the control class for the knowledge test before surgery 51.79 and 62.29 after treatment equal to an increase of 10.5. Data have seen from KKM percentage of 2.4% before treatment to 17.6% after treatment.

The difference in average difference for the experimental class skills tests before treatment and after treatment equal 68.02 81.8, so that the gap increased by 13.78. Data have seen from KKM percentage of 31.5% before surgery to 85.9% after treatment. Class control before treatment equal to 63.41 after treatment same to 76.82, so that the difference increased by 13.41. Data have seen from KKM percentage of 82.4% before surgery after treatment of 42.4%.

The average assessment of the attitude of the experimental class total scores of 18.62, 17.75 control class alike showed the right approach, but there are differences in the value of the position of the PBL method-Go in the better. The data has been demonstrated that PBL-Go in learning methods used in learning more effective than using conventional teaching methods.

Relevant research from Sari (2017) states the use of methods to improve students' attitudes towards learning. The position of students increased after several cycles. A study from Faqihi (2015) also suggested the use of methods PBL Go-Incan develops students' approaches to learning. Learning methods affect independence, cooperation, confidence, and attention to students. Research from Purnomo (2017) supports that the use of the PBL method can improve student competence. His study says the PBL method can enhance the capability of students in class XI MC Vocational School country 2 Wonosari on manufacturing drawings engineering subjects. Edstrom (2014) states in the incorporation of the PBL method must be mutual learning between groups and should be able to play the role of mutual support in the implementation of knowledge. While the Dole (2017) and Alves (2016) suggest the use of methods to improve the learning attitude, learning a behavior and learning achievement, and promoting teamwork.

The second research result there are differences in the level of student competence in the implementation of problem-based learning methods and group investigation compared with the conventional method in a motorcycle engineering program at SMK in Magelang. This proved that there are differences in student competence in implementing PBL-Go in. Based on the hypothesis proposed in this research, it turns out the students' competency experimental class and control class differences. Data from the competence of students indicate that the learning method PBL Go-In better than conventional teaching methods.

These results are supported by the t-test analysis that shows the value of t is more significant than t table, so Ho rejected, and Ha accepted. Results calculated t value was 4,548 while t table is 1.984. T count> t table (4,548> 1,984) it is said that there are different aspects of student competency of skills among using conventional PBL-Go in with. As for the knowledge test results for t Whereas 13 121 t table of 1.984. Value T count> t table (13 121> 1.984) it is said that there is a difference in student competence from the aspect of knowledge between using PBL-Go in with the conventional. Ratings attitude result t for 3,652 while t table of 1.984. T count> t table (3,652> 1,984) it is said that there is a difference of student competence from the aspect of attitudes between using PBL-Go in with conventional, The data has shown that PBL-Go in learning methods used in learning more effective than using conventional teaching methods. Research Sudewi (2014) supports the results obtained, stating that the PBL method used to improve student learning outcomes. Students better understand the material and longer retention.

Research Klegeris (2017) also supports the intensification, mention the skills and knowledge of students in the learning outcomes, so that more students' competence which includes attitudes, education, and abilities. The research also confirms that some aspects

of soft skill skills that are affected by the PBL method of learning that is confidence and coping with stress, leadership, and communication, adaptability, and management skills. The study also found that students become more positive behavior, influenced by the real application implemented PBL learning method. Research Khasanah (2018) and Asyari (2016) declare the Implementation of cooperative learning model Group Investigation in good and excellent categories by percentage in each phase. GI research mentioned improving skills critical thinking and acting skills that include creative, productive, critical, independent, collaborative, and communicative. Critical thinking skills are active, continually impact on student competency. Jongsermtrakoon (2015) suggests the use of methods can enhance the understanding of teachers and increase digital literacy and non-digital. So that knowledge of students and teachers to be increased.

Implementation of the PBL method-Go in on Engineering Program Motorcycles in Vocational High School has been implemented systematically. The results showed a significant difference between the control and the experimental class improve the competence of students. Value students' competencies that include aspects of attitudes, knowledge, and skills between the power and the innovative quality there is a difference — concluded that the selection of the PBL-Go in a method is more effective than conventional methods for the competence of students.

CONCLUSION

The application of the PBL-Go in the model consists of 7 stages, namely, presentation of problematic situations, investigation, and exploration, formulation of tasks, learning activities, progress analysis, present, and evaluation. Every stage and implementation of PBL-Go to improve student competence runs smoothly. Competency data includes the value of knowledge, the value of skills, and attitude values.

Second, there are differences in the level of competency of students before and after the combined method of problem-based learning - group investigation implemented on the competence of motorcycle engineering expertise in Vocational Schools throughout Magelang District. So in this study, it was proven that differences in student competency before and after treatment experienced variations and improvements. Based on the hypothesis proposed in this study, it turns out that the skills of the experimental class and control class students have differences before and after treatment.

There are differences in the level of competency of students in the implementation of problem-based learning and group investigation methods compared to conventional methods in the motorcycle engineering expertise program in Vocational Schools throughout Magelang District. This result is supported by t-test analysis which shows the value of t count is higher than t table so Ho is rejected and Ha is accepted. it is said that there are differences in student competencies using the conventional PBL-Go in method

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