Effect of Learning Module with Setting Contextual Teaching and Learning to Increase the Understanding of Concepts

Putu Yulia Angga Dewi [a,1,*], Kadek Hengki Primayana [b,2]

[a] Sekolah Tinggi Agama Hindu Negeri Mpu Kuturan Singaraja
[b] Sekolah Tinggi Agama Hindu Negeri Mpu Kuturan Singaraja
[1] anggadewiyulia@gmail.com *; [2] hengkiprimayana@stahnmpukuturan.ac.id
* corresponding author

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ABSTRACT

This study aims to analyze differences in conceptual understanding between students facilitated by learning modules with Contextual Teaching and Learning settings and direct learning models. This study was a quasi-experimental study using a pretest-posttest nonequivalent control groups design. The data collected in this study are data understanding concepts with concept understanding tests. Then the concept understanding data was collected by concept understanding tests in the form of reasoned objective tests consisting of 19 items. Data on understanding concepts were analyzed descriptively using one-way analysis of variance. Research shows that understanding the concept of groups of students learning by facilitating learning modules containing Contextual Teaching and Learning is higher than the group of students who learn through direct learning models. Based on these findings it was concluded that there were differences in understanding of physics concepts between students facilitated by learning modules containing Contextual Teaching and Learning and direct learning models.

1. Introduction

Education is a process of humanizing humans to be able to actualize themselves in life, where good education is education that does not only prepare students for a profession or position, but to solve the problems it faces in daily life. Ideally education does not only encourage students to develop talents that are tailored to the knowledge acquired at school, but education also aims to improve the quality of human beings who are faithful and fearful of God Almighty, noble, personable, independent, advanced character, tough, smart, creative, skilled, disciplined, work ethic, professional, responsible, productive, and physically and mentally healthy. According to Law Number 20 of 2003 concerning the National Education System (in Asyhari et al., 2014), it has been clearly stated that national education functions to develop capabilities and shape dignified national character and civilization in order to educate the life of the nation.

Improving the quality of education is directed at improving the quality of Indonesian human beings through training, thinking, sports, and sports in order to have competitiveness in facing global challenges. Increasing the relevance of education is intended to produce graduates who are in accordance with the demands of the needs of Indonesia's natural resource potential. Education is one of the most important human necessities of life in its efforts to maintain life and develop itself in the life of society and the state. The progress and development of a country depends on the quality of its education, because through education humans will be free from poverty. With quality education quality human resources will also be produced, so as to be able to develop the ability to think so that

knowledge of technology (science and technology) is literate and able to follow and take advantage of its development.

The school as a character building is expected to prepare students to have identity based on the values of the nation without asking for new views in the process of modernization, so that they can build a whole human being [1]. Abilities that need to be mastered in the future generation in addition to emphasizing mastery of material and routine thinking, but also focus on the ability to communicate, be creative, think clearly, and be critical by considering the moral aspects of a problem, being responsible citizens, tolerant, live in a globalized society, and have a broad interest in life, readiness to work, intelligence in accordance with their talents or interests, and a sense of responsibility towards the environment [2].

Physics is the most fundamental science among natural sciences, because physics can provide a basic and theoretical conceptual framework for the development of technology and other natural sciences. Therefore, physics has been specifically given at the high school level [3]. The purpose of learning Physics is the formation of reasoning abilities in students that are reflected through logical thinking skills, systematic and have the objective, honest, discipline in solving problems. However, the reality in the field is not yet in line with reality[4]. In this case Physics subjects provide a variety of learning experiences to understand the concepts and processes of natural knowledge and emphasize that students become active and creative students. Until it is able to find itself (new knowledge) obtained from the environment around the school and its residence. Because the teacher's task in the class is not just to convey information for the achievement of learning goals, but also to create a student learning experience, the teacher must strive so that the activities in the classroom can provide the widest opportunity for the students' experience. Physics is a subject related to how to find out and understand the universe systematically, so Physics is not only a mastery of a collection of knowledge in the form of facts, concepts, principles but also a process of finding. Character education can be integrated in learning on Physics subjects.

But in reality, in reality, there is a lack of understanding of this concept in every school that is influenced by how students learn to memorize subject matter without understanding it first so students will quickly forget about the subject matter they have learned. This is very related to the presentation of the material delivered by the teacher during learning [5]. During learning, only the teacher is centered. Students just sit quietly and receive lectures from the teacher. During the process of learning Physics, most students are unable to connect between the material they learned and its use in real life. Understanding of students' academic concepts is only an abstract thing. Therefore, understanding the concepts that are lacking results in less maximal Physics learning outcomes which have an impact on not achieving classical and individual completeness.

Previous research has proven that the comparison between learning and conventional methods with innovative learning methods can improve students' understanding of concepts reported by a study entitled "The Influence of Blended Learning Model on Understanding Physics Concepts of Class X Students of SMA 1 Sukasada 2013/2014 Academic Year" by Cristina (2014). There is an increase in the average value of conceptual understanding of students who learn to use the Blanded Learning model differently from the average value of conceptual understanding of students who learn to use conventional learning models. Thus, the use of learning models in the learning process has a varied influence on achieving student understanding of concepts [6].

Slameto states that ordinary teachers teach by lecture method only so that students become bored, sleepy, passive, and just take notes [7]. After the teacher presents the lesson with the lecture method, the teacher usually asks students to do the assignments related to what has been explained by the teacher. After working on the task, students are required to remember the lessons that have been delivered by the teacher in front of the class. Learning activities that are still dominated by the teacher cause students to be less active during the learning process. This is certainly not in accordance with what the 2013 curriculum wants that requires active students in the learning process [8].

Wenno states that teaching styles of science teachers always tell students to memorize various concepts without understanding the concepts so that students cannot develop them when in a new situation. Less understanding of the concept results in less maximal Physics learning outcomes which have an impact on not achieving completeness in classics or individuals. This makes students more quickly forget about the subject matter they have learned because students do not understand

the subject matter but only know and memorize it. This shows that understanding is very important in achieving the success of learning physics. Where understanding is a mental process of adaptation and transformation of knowledge related to educational reform, the general goal of education should be directed towards achievement.

One learning approach that can be used is contextual learning or Contextual Teaching and Learning (CTL). Approach Contextual Teaching and Learning (CTL) is a way of presenting lesson material by exposing students to problems that must be solved or resolved in order to achieve educational goals associated with everyday life. Similar research was also conducted by Komalasari , namely "Contextual learning has a significant effect on civic skills because it is meaningful for students and develops meaningful learning to develop students' critical thinking and participative skills in their daily lives "Which means that applying contextual learning has a significant influence on people's ability to deal with it because it is natural for students and develops meaningful democratic learning to develop students' critical thinking and participatory skills in their daily lives.

Nurhadi states that learning with the CTL approach involves seven main components of effective learning, namely (1) constructivism (constructivism), (2) asking (questioning), (3) finding (inquiry), (4) learning community, (5) modeling (modeling), (6) reflection (and) (7) actual research (authentic assessment). In line with this, the study of Hasaruddin entitled "Application of contextual learning to improve critical thinking in student teaching and learning strategies classes" states that learning strategies need to shift to the basis of contextual learning where students actively build their own knowledge, able to think critically and have independence in learning. In addition, students must have life skills and the ability to work together, the ability to communicate, the ability to become diligent learners, and be able to make the right decisions in solving real life problems. Smith said that Contextual Teaching and Learning in the conception of teaching and learning helps teachers connect the content of subject matter to real world situations [9].

The contextual Teaching and Learning model is learning that helps teachers associate material taught with real world situations and encourages students to make connections between their knowledge and their application in their lives as family members and society. Contextual learning has provided the widest opportunity for students in groups or working together to develop and integrate a physics problem. Based on the description above, the author is interested in conducting a research on "The Effect of Learning Modules with Setting Contextual Teaching and Learning to Increase the Understanding of Concepts in Class X Multimedia Students".

2. Method

This research is an experimental study in which one or more variables are manipulated in the experimental group. The results obtained are compared with the control group (which is not manipulated). In this study, not all variables and experimental conditions can be tightly controlled, in other words it is impossible to manipulate all relevant variables, so this study is categorized as quasi-experimental or quasi-experimental [10].

The research will be carried out using a pretest-posttest non-equivalent control groups design. In accordance with the scope of this study, one group will be used as the experimental group and one group as the control group. Hypothesis testing is used F test through variance analysis. The testing criteria are significant differences if the price of Fcount> Ftable, with Ftable obtained from the distribution table F with a significance level of 5%. The F test in variance analysis only gives an indication of the difference between the population mean. Hypothesis testing is done at a significance level of 5%. To find out how big the different degrees are, as a follow-up the ANAVA tests the significance of the average score between groups using Least Significant Deference (LSD). Significance level (0.05), N = total sample number, a = number of groups, n = number of samples in the group, and MSE = Mean Square Error. The test criteria used were differences in mean between groups if significant.

3. Results and Discussion

Discussion of the results of research and testing of the hypothesis contains the understanding of the concept of class students in the student class group facilitated by learning modules containing Contextual Teaching and Learning (CTL) and class groups direct learning model (MPL).

3.1 Contextual Teaching and Learning (CTL)

Contextual Teaching and Learning (CTL) is learning that encourages learning activities and learning in the classroom. Selvianiresa in his research showed CTL learning, succeeded in learning using collaborative collaboration with students, high levels of activity in lessons, connections to real world contexts, and integration of science content with other content and areas of expertise. Therefore, CTL learning can be applied by learning mathematics in elementary schools[11]. Learning that is done correctly uses methods carried out on group work carried out by students in the classroom[12]. The application of CTL is influenced by the teacher's teaching ability. The teacher has an important role in every learning process. teacher professionalism is also influential, although in Beijaard's research found that the teachers currently see their professional identity as consisting of the distinct aspects of expertise. Most teachers' current perceptions of their professional identities are reportedly differing from their prior identities during their period as beginning teachers[13]. The expectations of this learning activity are able to develop the abilities of high-level students so that Creativity and innovation define the creative abilities of new and useful ideas; describe, revise, analyze, and evaluate ideas to improve and maximize problem solving efforts[14]. To achieve essential competencies needed in the 21st century. CTL is expected to give birth to CBL. Community-based learning (CBL) was introduced at An-Najah University, Palestine for the first time published through an agreement led by the Center for Excellence in Learning in 2013. On the one hand, environmental learning was provided to resolve directly with Palestinian community organizations through applications to the needs of these organizations. On the other hand, through such participation, students are expected to develop critical thinking skills that study independent learning, make decisions, and consider theoretical models related to community problems[15].

3.2 Class groups direct learning model (MPL)

Sara explains what is meant by effective principles and principles of behaviorism and holism[16]. Direct methods produce an understanding of comparable science concepts in approximately the same teaching time. Obtaining differences between instructional modes was not statistically significant in the natural variations observed from students, teachers and classrooms[17].

Discussion of the results of research and testing of the hypothesis contains the understanding of the concept of class students in the student class group facilitated by learning modules containing Contextual Teaching and Learning (CTL) and class groups direct learning model (MPL). Before being given treatment in each group, both student groups facilitated by learning modules with CTL and MPL groups, students were first given prestige. Based on descriptive data analysis it was revealed that there were differences in the average score of the pretest in the group of students facilitated by learning modules with CTL and MPL groups. The average score of the student group pretest facilitated by CTL-charged learning modules was higher than the average pretest of the MPL group. This difference is not too significant because the average score of the student group pretest facilitated by the CTL-charged learning module and the average score of the MPL group pretest.

After being given treatment in each group, both student groups facilitated by learning modules with CTL and MPL groups, students were given posttest. Data shows that there are differences in posttest mean scores between groups. The average score of the posttest results of the student group facilitated by the CTL-charged learning module is 63.85. The average score of the posttest results of the MPL group is 46.32. If converted into PAP guidelines, then the average score of the posttest results in the student group facilitated by the learning module with the CTL setting is in very high qualifications, while in the group the average score of the posttest results of the MPL group is high qualification. The difference in the average score of the posttest results in the two groups is caused by differences in the learning models used and with the help of learning modules with CTL settings.

Based on the results of the pretest and posttest results, it can be seen the difference in the increase in the average score of the understanding of physics concepts in the two groups or the normalized gain average score data presented in Table 4.7. The normalized gain scores of the student groups facilitated by the CTL-loaded learning module were higher than the normalized gain scores of the MPL group. The normalized gain score achieved by the student group facilitated by the learning module with the CTL setting of 0.71, while the normalized gain score achieved by the MPL group was 0.43. Based on the results of the one-way ANAVA test that has been done, it can be seen that the influence of the learning model on the understanding of physics concepts students has a statistical value of F = 114,989 with a significance of 0,000. This significance number is smaller

than the 0.05 significance level. Statistically, the results of this study indicate that MPCTL and MPL differ significantly in achieving the understanding of physics concepts.

The degree of average difference between the learning groups can be known by doing an LSD analysis. The results of LSD calculations for the MPCTL group and MPL group were 2.31 with 17,535, where> LSD. Based on the results of these calculations it can be stated that there are significant differences between the average score of understanding the physics concept of the MPCTL group and the average score of understanding the MPL group physics concepts.

Discussion

Based on the results of descriptive analysis and analysis of variance can be interpreted that there are differences in understanding of physics concepts between groups of students who learn by facilitated learning modules with CTL settings and groups of students who learn with direct learning models. Understanding of physics concepts in groups of students who learn by facilitating learning modules with CTL settings higher than understanding physics concepts group direct learning models. This is seen from the results of the gain score analysis of concept understanding indicators. Based on Table 4.9 and Table 4.10, it shows that students who learn by facilitating learning modules by setting contextual teaching and learning have a gain value for each indicator, namely: for indicator interpretation 0.40 with medium category, indicator giving 0.98 with category high, classification indicator 0.32 with medium category, indicator summarizes 0.91 with high category, indicator concludes 0.70 with high category, indicator compares 0.75 with high category and indicator explains 1.17 with high category. Indicators of understanding concepts that are still in the moderate category in groups of students facilitated by learning modules with CTL settings, namely indicators of interpretation and indicators of classification.

Based on the experience of students who are only accustomed to multiple choice, the essay and with the data obtained above indicate that students have not been trained in working on expanded multiple choice tests. This type of test also requires students to understand and master the concepts tested in the test and demand students' skills how to compile sentences that are good, precise, logical and support the selected answer options. These demands have not been fulfilled by students in the results of student answers, most students answer their options without writing down the reasons for choosing the answer. Classification occurs when students know something (a particular example or event) including a particular category (for example, a concept or principle). Classification includes: the discovery of relevant features or patterns, which match specifications and concepts or principles. The low classification ability in the student group facilitated by the learning module with the CTL setting, due to the lack of intensity of the teacher explained in classifying the material elasticity of the material.

The second factor that has a high likelihood of not understanding the concept of physics is that students are not used to it when given an initial that requires them to give the right choice to several choices of answers then complete it with reason. Why is the understanding of students' physics concepts facilitated by learning modules by setting contextual teaching and learning higher than groups of students who study with the direct learning model? The following are explained by these reasons. The direct learning model places students as learning objects that act as recipients of passive information, student behavior is built on the habitual process and students learn more individually by receiving, recording, and memorizing learning material. In this direct learning students are only emphasized on content recitation, without giving students enough time to reflect on the material presented, connect it with previous knowledge, or apply it to real life situations. Opportunity for students to develop their abilities in terms of 1) interpretation (interpreting); 2) exemplifying; 3) classifying; 4) summarizing; 5) inferring; 6) comparing (comparing); 7) explaining is very rarely given by the teacher. This results in understanding students' concepts to be low because the learning process is less meaningful for students.

Unlike students who learn by facilitating learning modules by setting contextual teaching and learning, students' ability to adopt changes in the paradigm of learning is relatively fast. Students have been able to accommodate the changes that have taken place in their activities which originally used conventional learning models to become learning models of contextual teaching and learning. Students who were previously accustomed to using the lecture method in learning activities turned out to be able to turn into active subjects to gather information in learning. With learning outcomes it is expected to be more meaningful for students. Students are greatly assisted by the existence of

contextual-based learning modules, with the module students can prepare themselves before starting the learning process. Through the contextual module the teaching and learning process in the classroom is more active because there is reciprocity from students. Students are not just silent and waiting for the teacher to explain. The learning process takes place naturally in the form of activities students work and experience, not the transfer of knowledge from teacher to student. Through the learning model of contextual teaching and learning which emphasizes the importance of the natural environment that is described in the learning process so that the class is more alive and more meaningful because students experience for themselves what is being learned. The contextual approach is an approach that allows students to strengthen, expand and apply their academic knowledge and skills in a variety of life settings both at school and outside of school. So that students will be faster in mastering learning and in remembering more strongly. The learning model of contextual teaching and learning assisted by contextual modules using the CTL syntax results in an understanding of physics concepts higher than the direct learning model. With the help of contextual modules can facilitate students in the learning process because in multimedia classes there are no modules from the school.

Although the treatment given in this study was able to facilitate students in terms of achieving a higher understanding of physics concepts than the control class, students could not even reach an understanding of high physics concepts evenly. This is caused by the following things.

First, students are still fixated on the lecture method as the teaching method applied so far. In this method, students are accustomed to copying what is explained by the teacher, even how the teacher completes the sample questions from a subject matter. Students are used to giving examples of problems first before giving problems. This causes students to lack independence in solving problems given. Secondly, students who study with teaching and learning contextual learning models are not yet accustomed to carrying out real experiment activities independently, therefore many students do not know what to do, so that the minimum time is 2x45 minutes is wasted a lot. To overcome this, researchers provide more guidance to students so that the experiment runs smoothly. Third, students are not familiar with presentation activities in class. When the teacher gives an opportunity to one group to make a presentation, the group of students is still hesitant and waiting for each other in taking the initiative. This has an impact on the inefficient learning time. To overcome this, the researcher provides an explanation that will get points for students who make presentations, so that all groups are competing to make presentations. Fourth, students are not familiar with the form of reasoned multiplechoice test that is used, so students feel difficult and not all the questions given can be done with complete reasons. While the form of a test that is often used in schools an objective test that only requires one answer without including the reason why to choose the answer. This provides a great opportunity for students to guess in answering. Fifth, there is limited time for learning meetings. The time provided for practicum is only 2 hours of study (2x45 minutes), while practical activities are quite time consuming. This greatly affects the planning and implementation of learning activities including the implementation of observations of student performance.

4. Conclusion

Based on the results of the study and considering the implications of the research above, some suggestions can be proposed as follows, (1) The results of the study show that there are differences in understanding of concepts that are significant between students facilitated by the learning module with the contextual and learning contextual settings. In order to understand students' concepts in physics lessons, educators should use a learning model that emphasizes the process of constructing knowledge, not merely in achieving learning outcomes. In other words, the learning model of contextual teaching and learning emphasizes more on giving direct experience to students to get to know more closely about nature so that students are more interested in the learning process. This is very important for educators to help students associate the relationship between knowledge that is owned and their application in daily life or find relationships between concepts (content) that learners will learn by applying (the context). (2) Teachers are advised to maximize learning modules by setting contextual teaching and learning in physics lessons and teachers need high-intensity members in the learning process for the understanding indicators of groups that are still in the low category, because applying the CTL learning model students will be able to associate the lessons presented with real life so that it further strengthens students' involvement in the material taught.

Based on the gain score that has a high category is exemplifying, summarizing; in-ferring; compare (com-paring); explaining (explaining) and which are in the middle category, namely interpretation (inter-preting) and classification (clas-sifying). So that the concept of learning for students will be learning to do, learning to be, and learning to life together.

The next researcher is suggested to develop this research by paying attention to several other factors as moderators who influence the success of the contextual learning and learning model towards increasing understanding of students in the multimedia class. The factors in question include achievement motivation, socio-economic, climate or learning, learning styles, and so on.

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