



Effectiveness of Problem Based Learning in Increasing Understanding of Health Data Processing Management Subject

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ABSTRACT. The aim of this research was to investigate the difference in comprehension of health information processing subject between students taught by problem-based learning and those who were not. The study employed a quasi-experimental design with a control group to compare the effectiveness of the two teaching methods. The research used a pretest-posttest design with a control group to collect data from students in the Public Health Study Program at STIKES Bhakti Husada Bengkulu. The sample comprised 35 students in the control class and 43 in the experimental class. Data were gathered through pre-test and post-test questionnaires, observation, and documentation. Analysis of the data revealed that students in the experimental class who were taught using the problem-based learning model had a higher level of understanding, with an average score of 81.05, compared to those in the control class who were taught using conventional methods and had an average score of 69.30. The t-test analysis confirmed that the difference in understanding between the two groups was significant, with a sig value of 0.003, indicating that the problem-based learning model led to an increase in mastery of processing health information among students.

Keywords: Data Management · Learning Models · Problem Based Learning

1 Introduction

The accuracy of data management process for the Puskesmas (Public Health Center) Information System at the Health Office level is crucial in producing quality information that is used for decision making at a central or higher levels [1].

Along with technological developments, especially in the field of information technology, the use of computers to assist human tasks is necessary to achieve high levels of effectiveness and efficiency. This applies in all fields, including in the field of health services. Health care is one of the rapidly growing fields of information technology application. We can see the development of the application of information technology from the development of clinics to hospitals that have begun to develop from manual techniques to computerized one [1, 2].

Teaching tools are various teaching materials used by educators in an effort to achieve learning outcomes in an independent curriculum. The teaching tools used by educators in carrying out the current independent curriculum are teaching modules. The developed teaching modules must be student-centered so that students will be able to compile their own knowledge in solving problems and seeking solutions. The Independent Curriculum is a learning approach that can assist educators and administrators in transforming the learning process to become more relevant, engaging, and enjoyable. One effective learning model that can be utilized is Problem-Based Learning (PBL). The implementation of the Independent Curriculum occurred in stages, commencing in 2022 and is anticipated to be fully integrated at all primary and secondary levels by 2024, through six phases labeled A to F. During a learning activity, several challenges will be presented, and these challenges can be tackled using various learning models, such as the Problem-Based Learning approach. By utilizing the PBL approach, students can actively analyze the material being taught, fostering their curiosity and encouraging them to explore knowledge further. This learning model also enables students to learn independently by providing them with real-life problems to solve. As a result, students can develop critical thinking skills [3, 2].

The primary objective of a hospital is to offer health services to the public, with the intention of enhancing the overall health status of the community and providing administrative services. These services may encompass a range of activities, such as promotive, curative, preventive, and rehabilitative services [4].

Learning models are usually developed based on various principles or theories of knowledge by experts. These principles or theories can be derived from fields such as learning principles, psychological or sociological theories, systems analysis, and other related theories. Joyce & Weil's research has identified four learning models based on learning theory. These models are general patterns of learning behavior that aim to achieve specific learning objectives. According to Joyce & Weil, a learning model is a plan or pattern that can be utilized to shape the curriculum (long-term learning plans), develop learning materials, and guide learning in the classroom or other settings. Teachers can select an appropriate and effective learning model to achieve their educational goals, using the learning model as a pattern of choice [5] [6].

If an inappropriate learning model is used, students may become disinterested, lack understanding, and experience monotony, resulting in decreased motivation to learn. This is especially true when dealing with information technology-based lecture material, which can be better understood with direct practice. Through observations, researchers have found that teachers still rely heavily on discussion and demonstration-based learning or lectures. However, discussion learning may lack visualization, which can make it less interesting and less conducive to understanding concepts, resulting in a lack of understanding among students. On the other hand, demonstration or lecture-based learning can be passive, with only the teacher taking an active role, resulting in passive students who remain disengaged and only active students who are interested and understand the material. It is crucial for students to understand concepts properly and correctly, as without this understanding, they cannot apply these concepts in real-life situations [5].

The Problem-Based Learning (PBL) model can encourage all students to take an active role in the learning process by presenting contextual problems that stimulate their

desire to learn. With the focus on core concepts and principles of a particular subject area, this learning model involves students in problem-solving investigations and other meaningful tasks. As a result, educators and teachers can use PBL to provoke students and encourage their participation in the learning process [5].

Learning refers to the combination of teaching and learning concepts, with the emphasis on the growth of student activity. It involves the accumulation of knowledge and skills through the process of instruction and learning [8]. On the other view, learning involves creating a favorable environment that influences students towards the acquisition of knowledge, and enables them to organize and retain the information effectively. Therefore, teaching is a crucial aspect of learning that must be optimized to provide students with a conducive learning environment [10]. In order to achieve learning objectives, it is important for teachers to select the appropriate learning model, as this can significantly impact the students' ability to comprehend the concepts being taught [9].

Problem-based teaching refers to a teaching approach that uses practical problems as a basis for learning, whereby students learn through the process of problem-solving. Problem-based learning strategies, on the other hand, involve exposing students to practical problems, which are often ill-structured or open-ended, as a means of stimulating learning [8, 11].

The Problem Based Learning (PBL) Model is an educational approach that presents students with problems, allowing them to construct their own knowledge and develop higher-order thinking skills, as well as independence and confidence. The objective of PBL is to enable students to master the content of heuristic disciplines and to enhance their problem-solving abilities. Additionally, PBL is associated with acquiring knowledge beyond the subject matter, interpreting information, collaborative and team learning, and reflective and evaluative thinking skills [12]–[14] [15].

Previous researchers have developed learning media in form of a medical record information systems, which was well-received by students. This study aims to provide additional learning models to enhance and strengthen students' comprehension of health data processing management.

2 Methods

This study is classified as experimental research with a quasi-experimental design. Quasi-experimental research includes a control group, but external variables that may affect the experiment cannot be fully controlled. The design used in this study was the Nonequivalent (Pretest-Posttest) Control Group Design. The population for this study included all second-semester students in the Public Health Study Program, with a control group of 35 students and an experimental group of 43 students. The sampling technique used was total sampling of the classes. The data collection instrument included a learning achievement test with case studies and observation sheets. The data were analyzed by comparing the averages of the two groups using the T-test.

3 Results and Discussion

To begin the study, a pretest was administered in form of a case study that had a moderate level of difficulty to evaluate the students' understanding of the material. Then, the students were taught using the Problem Based Learning model through case study questions. Finally, the students were given a posttest that evaluated their understanding of data processing management, which also had a moderate level of difficulty and was presented in the form of a case study.

The purpose of the test was to evaluate the extent to which the Problem Based Learning model can enhance students' understanding of health data processing management compared to the traditional model. The post-test results showed that 14.02% of students had a low level of understanding, 40% had a medium level of understanding, and 45.08% had a high level of understanding. The average score of the experimental group that was taught using the Problem Based Learning model was higher than that of the control group. The statistical analysis using the SPSS program confirmed that the hypothesis was valid since the significant value of the t-test was 0.003, which is less than 0.05. This indicates that there is a significant difference in the understanding of health data processing management between students who were taught using the Problem Based Learning model and those who were not.

The study's findings suggest that there is a notable improvement in the comprehension of health data processing management content among students taught using the Problem Based Learning (PBL) model compared to those who did not use PBL. The t-test analysis supports this conclusion, with the experimental group comprising 43 students and the control group 30 students. The experimental group's average score was classified as low, medium, and high, and the t-value was found to be 0.003, indicating that H1 is accepted, and H0 is rejected. Therefore, it can be concluded that there is a statistically significant difference in understanding health data processing management between students taught using the PBL model and those who are not.

The increasing in students' comprehension of health data processing management is demonstrated by the improved scores of students in the experimental group compared to those in the control group. Therefore, the successful outcomes of this study can be identified by obtaining an 80% increase in scores for students in the experimental group, which is consistent with findings from previous research [17, 18].

The Problem Based Learning model requires students to collaborate and discuss with their peers in solving problems. Through this approach, students become more confident in sharing their ideas and presenting the results of group discussions. The results of the study showed that the experimental group had higher mastery of learning compared to the control group. Thus, it can be concluded that the use of Problem Based Learning model can enhance students' understanding of Health data processing material [19, 20].

The implementation of the Problem Based Learning model in the experimental class has been found to enhance students' comprehension of the concepts. This improvement could be attributed to various factors, both intrinsic and extrinsic, such as the students' attitudes, the use of a new learning model in the classroom that may have attracted their attention to the presented material, while the control group did not exhibit a significant improvement in their understanding of the concepts. The reason behind this could be that the learning approach adopted by the researchers was dull, which is not compatible with

the students' needs in the 4.0 revolution era, where students face diverse educational challenges. The study was initiated due to the students' lack of interest in traditional learning approaches that seemed tedious [21, 22].

4 Conclusion

The average score of students' understanding of health data processing management who were not taught using the Problem Based Learning model was 69.30, while the average score of students' understanding of health data processing management taught using the Problem Based Learning model was 81.05. This indicates that the Problem Based Learning model has a positive influence on students' conceptual understanding, with the average score falling into the high category. Therefore, there is an improvement in understanding of health data processing management material between students who were taught using the Problem Based Learning model and those who were not taught using the same model.

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