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Implementation of Discovery Learning Model using Educative Game to Improve Students' Learning Outcomes

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Abstract

Discovery learning model is one of innovative learning models that enable students to build and enrich their knowledge by searching new information through investigations and observations. This learning model is appropriate to be implemented in the science learning process to facilitate students in comprehending the concepts easily. This study aims to describe students' learning outcomes after the implementation of the discovery learning model using educative game. This type of research is a classroom action research that is implemented in two cycles, each cycle is divided into four stages, i.e., Planning, Action, Observation, and Reflection. The research was conducted in the odd semester of the 2023/2024 academic year at SMP Negeri 1 Tanjungbumi, toward the students of class VIII A. The instrument of the retrieval was a written test of excretion system consisting of 20 questions. The results of the study showed that in cycle 1 the pretest results obtained an average score of 52.69 and a percentage of completion of 44.00% and the post-test obtained an average score of 76 and a percentage of completion of 68% and when carrying out the post-test obtained an average score of 79 and a percentage of completion of 83%. To conclude, the implementation of the discovery learning model using educative game can improve student learning outcomes in the topic of excretion system.

Keywords: discovery learning, educative game, excretion, learning outcomes

INTRODUCTION

Technology has developed rapidly that are accompanied by changes in people lives, however this development is felt to be unable to meet the need for learning media that are in accordance with the dynamics of these lifestyles (Dincer, 2024; Avinal & Aidin, 2022). The increasingly development rapid of information and technology in the current era of globalization has an impact on the world of education which demands that learning adapts to information and communication technology for the world of education,

especially in the learning process (Lailan, 2024).

Learning topics in science subjects, especially excretory system, are one of the topics that are difficult for students to understand, especially in discussing the kidneys. This is because the concepts on the human excretory system contains a series of processes that occur in the human body and involves organs in the body that are difficult to explain without using supporting tools or technology (Suherman et al., 2023). Therefore, a tool or technology is needed in the learning process that can describe the concepts representatively.

To teach excretory system, teachers generally still uses 2D teaching media that only show the external form of the human excretory system. Learning process using the direct-teaching method is usually used to explain the concepts. The teacher explains science concepts using this model, then at the end of the meeting students are given question and answer questions which aim to find out how much students understand the newly presented lesson topics, but there is a drawback, that some students have not been able to answer correctly. This indicates that some students are not serious about following the lesson so that understanding of the topics is uneven (Sukarman, 2022). Based on observations toward students at a junior high school in Bangkalan, it was found that students were less interested in learning science so that it could reduce the quality of their learning outcomes.

This study aims to determine the increase in learning outcomes after implementing the discovery learning model assisted by educative game applications that can be involved in science learning. Educative game is a form of game designed to help learners achieve certain learning goals and at the same time provide motivation. The use of game can help design metaphors or game designs in learning. In addition, android-based game developed as digital educative game can contain features that have the potential to provide interesting experiences (Pratama & Haryanto, 2018; Farihah et al., 2021). Educative game is also designed to help

learners achieve certain learning goals and at the same time provide motivation. Educative game also can be categorized as one of the multimedia learning presentation formats (Piero et al., 2019; Hasanah et al., 2022). Furthermore, educative game can be integrated into learning models, one of which is discovery learning.

Discovery Learning is a learning model that encourages students to ask questions, formulate temporary answers, and conclude general principles from examples or practical experiences that they find independently. This learning model can be used in the learning process to provide students' active learning by making discoveries of understanding or concepts that are learned independently through established research procedures so that the knowledge is more cognitively sustainable (Khasinah, 2021). In addition, the discovery learning model is also proved that enable to improve student learning outcomes in the human excretion system (Asriningsih et al., 2021; Sulfemi, 2019).

Students' learning outcomes will increase if teachers motivate, guide and mentor students in carrying out their activities. Teachers are also asked to develop students' interests and curiosity with various learning models (Samputri, 2020). In addition, teachers should help students to push their thinking and work on their own initiative, actively process information and avoid rote learning (Yerimadesi et al., 2023). One alternative way to overcome this condition is by implementing the discovery learning model. Discovery learning model guides students to identify what they want to know by searching for information themselves, then students organize or form (construct) what is known and understood into a final form (Purwaningsih et al., 2020). Discovery learning model is also used to develop active learning activities by finding out and investigating actively, so that the results obtained will last a long time in memory so that they are not easily forgotten by students (Suja et al., 2023).

Learning outcomes are the culmination of students' learning success towards the learning objectives that have been set, in which students' learning outcomes can include cognitive (knowledge), affective (attitude), and psychomotor (behavior) aspects. The implementation of the discovery learning model can improve learning outcomes in social studies content (Suja et al., 2023). The discovery learning model involving all students in learning can improve students' understanding, so that learning can be more meaningful for students. Furthermore, this learning model is also proved that can improve students' problem-solving abilities, direct students' activities to learn independently by involving their cognitive, motivation, communication improve skills, and increase self-confidence through the process of finding the knowledge discussed (Purwaningsih et al., 2020).

Discovery learning model using educative game is used to improve student learning outcomes (Budi et al., 2021). The complexity of the teaching topics to be delivered to students can be simplified with the help of learning media so that students can understand the concepts faster (Ristanto et al., 2022). The educative game applied in the study was a tool that contained information about the excretory system, in addition there were practice questions that were useful for improving students' understanding on certain concepts.

Based on the explanation above, this study aims to describe students' learning outcomes after the implementation of the discovery learning model using educative game.

METHOD

This research is included in classroom action research. The research was conducted on November, 2023 at SMP Negeri 1 Tanjung Bumi toward students of eighth grade.

Procedures in Classroom Action Research planned in this research are implemented in two cycles, in which each cycle is divided into four stages, namely:

1. Planning

At the planning stage, preparations are conducted to design science learning activities in the topic of excretory system, by preparing learning tools and educative game.

2. Action

The activity of implementing and conducting learning is conducted based on the planning stage. Learning activities consist of preliminary activities, core activities, and closing. Actions are taken to determine student learning outcomes after the implementation of discovery learning model.

3. Observation

At the observation stage, the teacher observes the students. This activity can be done with the teacher as a research partner. The collected data will be analyzed by assessing the observation results using the observation sheet format.

4. Reflection

Data obtained from the actions that have been carried out are then collected and analyzed and reflected upon so that it will be known whether there has been an increase in learning outcomes or not.

The data collection technique uses quantitative data analysis by observing the student's learning outcome scores obtained from the pretest and posttest scores using the following calculations:

$$P = \frac{N}{T} x 100\%$$

Note:

P: percentage of learning outcome N: number of students who reach more than 70

Furthermore, data is analysed using the criteria in Table 1:

| Table 1. The criteria of students' l | learning |
|--------------------------------------|----------|
| outcome | 0 |

| Score Range | Learning Outcome | |
|-------------|------------------|--|
| | Criteria | |
| 72-100 | Good | |
| 51-71 | Moderate | |
| 0-50 | Bad | |
| | | |

(Source: Munawaroh et al., 2022)

RESULT AND DISCUSSION

Classroom action research was conducted on the subject of science on the topic of the human excretory system. Classroom action research conducting in two cycles was held to determine student learning outcomes.

The implementation of the discovery learning model by utilizing virtual laboratories is proved that enables students to be more active in problem solving efforts (Khairuna et al., 2021). Based on the research that has been carried out, starting from the initial stage to the second cycle, it can be seen that there are different results of the first and second cycle of classroom action research.

The implementation of the discovery learning model will be very helpful in improving student learning outcomes, this is proven by the increase in average learning outcomes in each cycle (Sukarman, 2022). Student learning outcomes can be known after a pre-test at the beginning of learning and a post-test at the end of learning. The results of the implementation of learning in the first and second cycle can be seen in Table 2.

| | Pre-test | | Post-test | |
|------------|------------------|------------------------------|------------------|------------------------------|
| | Average score | Class comple- tion (%) | Average score | Class comple- tion (%) |
| Cycle 1 | 44.0 | 52.69 | 45.0 | 55.0 |
| Cycle 2 | 76.0 | 68.0 | 79.0 | 83.0 |

 Table 2. Result of Class Action Research

Findings of a total of 25 students were obtained when carrying out the pre-test and obtained an average score of 52.69 and a percentage of completion of 44.00% and when carrying out the posttest obtained an average score of 55 and a percentage of completion of 43.00%. This learning outcome value was obtained after finding the results of cycle 1 learning which were still not good and needed to be improved. Students still need guidance from teachers to work on questions and implement existing games, however some students paid less attention to the teacher's explanation in learning.

Therefore, the data found in cycle 1 will be material for reflection to make improvements in cycle 2 of the learning process. The completion of students in cycle 2 was obtained as many as all students when carrying out the pre-test obtained an average score of 76 and a percentage of completion of 68% and when carrying out the post-test obtained an average score of 79 and a percentage of completion of 83%. The findings of these learning outcomes indicate that learning in cycle 2 was good and has been completed. This study obtained results that are in line with the study that the discovery learning model has an effect on science process skills and student learning outcomes, because the learning model involves the problemsolving process in learning activities with the use of educational games that require students to play an active role, so that it can improve students' cognitive abilities (Amyani et al., 2018; Yerimadesi et al., 2023).

The implementation of discovery learning model is proved that enable to improve students' learning outcomes. It is in line with the theory of cognitive development in which that learning process is able to encourage students in enriching experiences and knowledges (Mayub et al., 2020). Furthermore, the discovery learning model is also proved that can engage students to discover facts, correlations, and new concepts (Syawaludin et al., 2022).

Discovery learning model is oriented for students to build concepts and knowledge based on students' prior knowledge and learning experiences. Furthermore, students' learning experiences is enriched through the relevance activities or understanding of a concept by giving various questions to guide students to reach certain conclusions. Due to this learning process, the teacher also directs questions for learning discussion.

Educative game in the topic of excretory system have positive benefits, one of which is its ability to increase and train brain activity, improve concentration, train problem-solving strategies, and train honesty so that students become more knowledgeable about the excretory system (Afidah & Subekti, 2024).

CONCLUSION

This study aims at describing the students' learning outcomes after the implementation of the discovery learning model using educative game on the topic of human excretory system. Based on the results of the study, it was found that in cycle 1 the pre-test results obtained an average value of 52.69 and a percentage of completion of 44.00% and the post-test

obtained an average value of 55 and a percentage of completion of 43.00%. While in cycle 2 the pre-test results obtained an average value of 76 and a percentage of completion of 68% and when carrying out the post-test obtained an average value of 79 and a percentage of completion of 83%. Therefore, it indicates that the implementation of discovery learning model using educative game can improve students' learning outcomes.

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