



Effectiveness of E-Module Based on Problem Based Learning (PBL) on Human Digestive System Material (SMP Negeri 3 Suwawa, Indonesia)

*Frida Maryati Yusuf*¹, *Sitti Nur'ain Daulima*², *Margaretha Solang*³, *Masra Latjompoh*⁴, *Herinda Mardin*⁵, *Syam S. Kumaji*⁶

¹ Department of Biology (Faculty of Mathematics and Natural Sciences), Gorontalo State University, Gorontalo, Indonesia.

Email: fridamaryati@ung.ac.id

DOI : <https://doi.org/10.55248/gengpi.6.0125.0303>

ABSTRACT:

This research aims to describe the effectiveness of the E-Module based on Problem Based Learning (PBL) on human digestive system material . This research includes quantitative descriptive research. The instruments used are test sheets and student worksheets . E-Module used has been declared valid by 3 validators with an average value of 93 % in the very valid category . The research results show that the average pretest score is 4 6.5 % and the posttest score is 78%, with the N-Gain value obtained being interpreted as 0.5 9. with the medium category. The LKPD assessment obtained a score of 62.51%–81.25% in the good category . The research results show that e-modules based on problem based learning on the human digestive system can improve learning outcomes so that they can be used in the learning process at SMP 3 Suwawa.

Keywords: E-module, Problem Based Learning , effectiveness, learning outcomes, human digestive system.

Introduction

Education is an effort to prepare the younger generation to welcome and face developments in the global era, so education must be carried out as well as possible so as to produce quality education and increase human resources. Technological developments have an impact on the field of education. The learning process cannot be separated from media, methods and learning outcomes. ^[1]

Technology and information in the field of education today have changed the way of learning, obtaining various information and being able to interpret information, with these conditions teachers must be able to adapt responsively, wisely and wisely. A teacher is required to be more creative in presenting material to students so that they can make learning more interesting by mastering science and technology products. This is mentioned too. ^[2] that a teacher needs to develop electronic teaching materials or learning media with the aim of reducing the burden and making it easier for educators in the learning process .

Referring to the curriculum currently implemented is the 2013 curriculum, which provides teachers with opportunities to develop teaching materials and learning tools. Teachers are also required to be able to design good, active and fun learning. ^[3] The curriculum is one of the elements that makes a significant contribution to realizing the process of developing the potential quality of students, as the nation's next generation in the future. In the 2013 curriculum, learning is carried out using a scientific approach, namely the process of observing, asking, reasoning, trying and creating networks. ^[4] Through this statement, the implementation of the 2013 curriculum should make students more active in the teaching and learning process, especially for science and technology subjects such as science

Natural Sciences are subjects that are included in the realm of science which includes physics, chemistry and biology. One of the materials contained in it is the human digestive system. This human digestive system material has many abstract concepts, there are many scientific names for Biology and this material is one of the materials that is considered important because it is widely applied in everyday life, the abstract concept of the material causes students to have difficulty understanding it. \

Based on the results of interviews and observations conducted on science teachers at SMP Negeri 3 Suwawa, it shows that in learning they still use textbooks and the use of other teaching materials such as e-modules has never been implemented, the learning process is mostly focused on the teacher, so that in learning students are less active and difficulty understanding certain materials due to the lack of use of more creative and varied teaching materials that can foster students' enthusiasm and interest in learning. As a result of the limited use of varied teaching materials, it has been observed that student learning outcomes have decreased. This is proven by data on student learning outcomes in science subjects which can be seen from the results of tests (especially on digestive system material) with minimum completion criteria (KKM) Science 73. This is proven by data from the last

three years which shows that in the 2018 school year/ In 2019, 71.4% of students fulfilled the KKM, in the 2020/2021 school year 63.5% of students fulfilled the KKM, and in 2022/2023 this decreased to 48.9%.

The results of preliminary observations show that the school has implemented learning using a technology system, but only on certain materials. The technology system used is only a *power point* via LCD, even though the school is already equipped with several supporting tools such as computers and *WiFi*. Apart from that, most students think that in the current era technology has become a basic need, and most students already have *smartphones* or laptops at home. This is important in utilizing technological advances to improve the quality of learning, such as developing teaching materials that are varied, interesting and easy for readers to understand.

Based on the problems that have been obtained, effective innovation is needed, one of the teaching materials developed by utilizing technology is electronic modules. Apart from using learning media and supporting teaching materials, the learning process can also be carried out well if it is supported by an appropriate learning model to make it easier for teachers to convey the material and make it easier for students to understand the material. The learning model is a manipulative variable, where each teacher has the freedom to choose and use various learning models according to the characteristics of the learning material. ^[5] One learning model that helps students understand lessons by relating the material to real life is the *Problem Based Learning model*. ^[6] Students are presented with real problems that exist in the surrounding environment and students are required to solve the problems presented by searching for as much information as possible.

Based on the background above, the researcher wants to conduct this research with the title the effectiveness of problem based learning (PBL) based e-modules on the human digestive system material (SMP Negeri 3 Suwawa).

Method

The research method used in this research is quantitative descriptive. This research was carried out at SMP Negeri 3 Suwawa, Bone Bolango Regency, Gorontalo Province. This research was carried out in August 2023.

Results and Discussion

1. Pretest and posttest analysis

Student learning outcomes can be seen from the pre-test and post-test that have been given to students before and after using the e-module. The results of the analysis of the increase in learning outcomes obtained can be seen in the following graph.

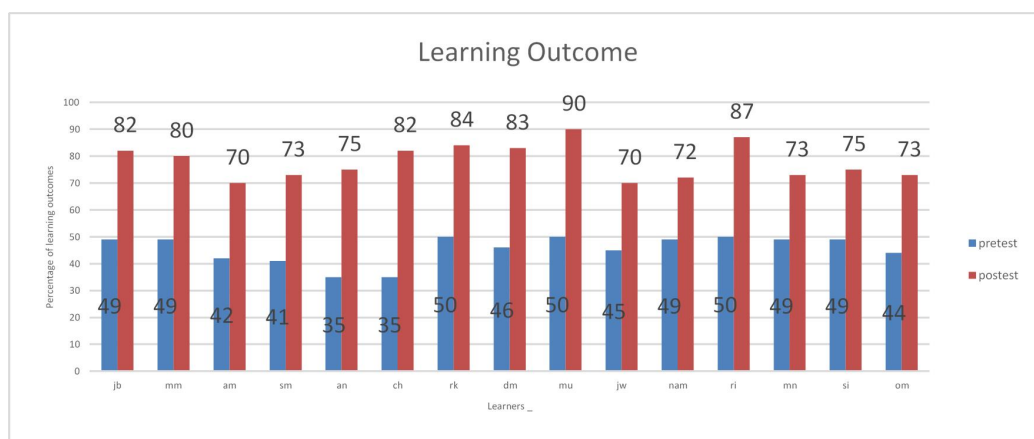


Figure 1. Pretest-posttest results analysis graph

Data from the analysis of pretest and posttest scores can be seen that the pretest score of 100% does not meet the standard of completion with KKM 73 with the lowest score being 35 and the highest score being 50. The posttest score has increased with the lowest score being 65 and the highest score being 90.

Table 1. N-Gain Calculation

Respondent	Average		N-Gain scores	Category
	Pretest	Posttest		
15	46.5	78	0.59	Currently

the pretest and posttest scores showed an increase in student learning outcomes, seen from the average pretest before learning using e-modules with an average of 65.5, then there was an increase in posttest results after learning using e-modules with The average value is 78. Furthermore, to see the

increase in student learning outcomes using *Problem Based Learning -based e-modules* on the human digestive system material, it can be seen from the results of the N-Gain score, obtaining an N-Gain score of 0.59 with medium criteria. , shows an increase in learning outcomes for students, so that by implementing an e-module based on Problem Based Learning on the human digestive system, it can improve student learning outcomes at SMP Negeri 3 Suwawa.

2. LKPD assessment analysis

The next effectiveness test is seen in the students' work on the LKPD. Work on LKPD by 15 students divided into 3 study groups which can be seen from the following picture.

Table 2. N-Gain Calculation

Score	Criteria	Amount Learners	%
Score 76%-100%	Very good	10	66.7%
Score 51%-75%	Good	5	33.3%
Score 26%-50%	Pretty good	0	0
Score \leq 25%	Not good	0	0
Amount		15	100

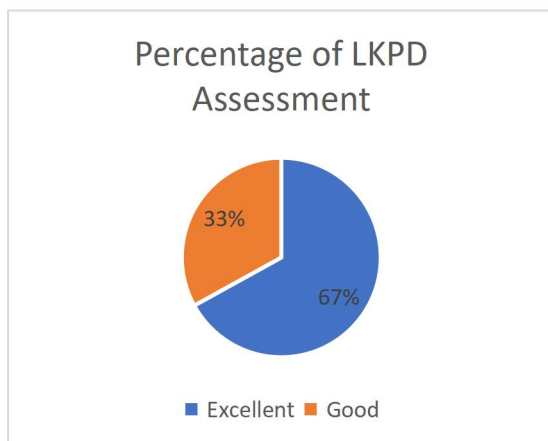


Figure 2. Percentage of LKPD Assessment

From the data presented above, information is obtained that the students' work scores fall within the criteria (score 65.51% -81.25%). Of the 15 students, 67% had criteria scores that were in the very good category, while 33% of the total number of students had scores that were in the good category. Accumulatively, 100% of students or more than 67% of the total number of students received grades classified as very good, and classical completeness was \geq 67%.

Conclusion

Based on the results of the research and discussion, it can be concluded that the E-Module based on *Problem Based Learning on* human digestive system material can be said to be able to improve and can be used in the biology learning process, especially on human digestive system material at SMP Negeri 3 Suwawa .

Author Contributions

Sitti Nur'ain Daulima as the conceptualization of this research includes research ideas, effectiveness of the E -Module, data analysis, coordination with schools, etc. Herinda Mardin and Mustamin Ibrahim as lecturers who validated the E-Module based on *Problem Based Learning* on the human digestive system.

Funding

This funding comes from researchers and supervisors.

Conflict of Interest

The authors declare no conflict of interest

Reference

- Nurfadillah, Septy et al. Development of Technology-Based Learning Media to Improve Student Learning Outcomes at SD Negeri Pinang 1. 3 (1) 153-163. (2021).
- Marisa Uci, Yuliyanti, Arief Rafman Hakim.. Development of an E-Module with an Environmental Care Character during the Covid-19 Pandemic. Unikama PGSD National Seminar , 4 (1). (2020).
- Tyasning , D. __ *Journal of Chemical Education* , 1(1):26-33. (2012).
- Yusuf, Frida Maryati. Improving the Cognitive Abilities of SMA Negeri 2 Gorontalo Students in Biology Subjects Through Project Based Learning Methods. 4(1) 174-185. (2015).
- Nugraha, MI, Tuken, R., & Hakim, A. (2021). Application of the Project Based Learning Model to Improve Learning Outcomes for Elementary School Students. *Pinisi Journal of Education* , 1 (2). (2021).
- Isma Teguh Wijaksana, Rido Putra, Tiara Indah Wicaksana, Elfi Tasrif, Asrul Huda. Improving Student Learning Outcomes through Problem Based Learning (PBL). *SCIENTIFIC JOURNAL OF EDUCATION AND LEARNING* . 6 Number 1, pp 155-164. (2021).
- Ayuningtyas Irma, Ipah Budi Minarti. Analysis of Learning Styles on Learning Outcomes of Class X Students in High School. *Educational Scientific Journal*. 1 No. 1. (2021).
- Mustofa, A., Zubaidah, S. , Kuswanto, H., Development of a project-based model based on cross-analysis of agronomic and morphological characteristics of soybeans to improve scientific process skills. 24-34. (2021).
- Purwanto. Evaluation of Learning Outcomes. Yogyakarta: Student Library. (2009).
- Costa. *Choosing the Right Assessment Method Pre-test* for Prospective Biology Teacher Students on Gram Staining Practical Material for Microbiology Subjects. *Bioeduciana* 02 (1). September 2017. (2014)
- Kurniawan, et al (2018). Comparison of the Application of Project Based Learning and Think Pir Share Learning Models Assisted by Teaching Modules on the Independence and Learning Outcomes of Kleas XI Students at SMKN 3 Malang. *Journal of Education*. 3(2), 80-85. (2018).
- Janna, Ria Dul, et al. Development of E-Modules Based on Problem Based Learning to Improve Students' Thinking Abilities and Learning Outcomes. *Literacy Journal*. 7(1). (2023).