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Development of Monopoly Digestive Media Based on Educational Games as Student Learning Resources on Food Digestive System Concept

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Rida Oktorida Khastini [1*], Wineng Siti Rohmah [2], Tiara Putriana[3]

[1,3]Department of Biology Education, Faculty of Teacher Training and Education, Universitas Sultan Ageng Tirtayasa, Serang, Indonesia

[2]SMAN 1 Malingping, Lebak, Indonesia

Corresponding email: *rida.khastini@untirta.ac.id

Abstract

The use of learning material is crucial to the learning process. Teachers can communicate knowledge more effectively by using the appropriate media. However, many teachers continue to solely employ uninteresting material, which might negatively affect their students' motivation for studying. Therefore, innovative and fun learning resources, such as learning media containing play elements, are needed. The research aims to develop learning media on food material and digestive systems using Borg and Gall research & development (R&D) method. The research data was obtained from a product assessment questionnaire using a questionnaire. The research results obtained from the media expert test average score and material expert test were 85%, and the results from the student response test average score were 89%, categorized as very feasible to be used as student learning resources.

Keywords: Borg and Gall methods, Learning Material, Monopoly

INTRODUCTION

The 4.0 industrial revolution era has impacted technological advances, especially in education. Education is the essential pillar in the country's efforts to produce a quality generation where technology can support creativity in each individual. According to Fadiah (2021), education is expected to produce the nation's next generation with intelligent and quality individuals. The youth generations can take full advantage of existing advances. With the development of technology in education, it is hoped that it will be a solution for educators to be creative in providing effective learning. Teachers must build the necessary competencies for learning to be effective. The talents of students and their freedom to think are impacted by effective teaching techniques (Xing & Qi, 2022).

The learning process is an activity that involves interaction between teachers and students. Teachers use various methods, models, and learning media when delivering material to students. According to Wahyuni, et.al. (2022), learning objectives are achieved if students can understand the subject matter conveyed by the teacher through communication during the learning process. So that with a good learning process and good communication between teachers and students, it is necessary to have suitable media to shape conditions and communication for teachers and students (Masyhudi & Afifah, 2020). However, one of the

problems in the learning process is biology because students think learning biology is challenging to learn, where many terms and scientific names are used. Hence, students need help memorizing these terms. When students are motivated to participate in the learning process, they spend more time on a learning assignment and learn more successfully. Thus, motivation might serve as an innate motivator for students to relate to the information being taught in the classroom. Students may also be motivated by external factors, such as the educational material they employ.

Based on observation and interview processes with teachers and students in one of the state high schools in Malingping, Banten Province, showed that there was difficulty in learning biology. In the concept of the human organ system and organs, particularly in the food digestive system, teachers usually only use PowerPoint media and printed books. The media tends to be less exciting and entertaining, resulting in unsatisfactory student learning outcomes. Various areas for improvement in the media used make it difficult for students to understand the material presented. It looks monotonous and stiff, so it is not easy to understand and not interested in learning (Wahyudi et al., 2017). According to Xie (2021), what is fundamentally important is the extent to which teachers attempt to make the class more engaging and make the activities harder so that students would feel more engaged and less bored. Teachers are also responsible for imparting instructional information in courses. It found out that the secret to avoiding boredom is engagement. Students who are more actively participating in the class feel less bored and find the lessons less repetitive. So, the teacher seeks to design creative and fun learning resources to build student interest in learning and achieve learning goals. Therefore, learning resources that are applied in learning can be in print media and digital media, such as magazines, posters, infographics, and others. Learning resources have an essential role in the teaching and learning process because without learning resources, the learning process will not be carried out correctly (Suhirman, 2018; Awaliyati et al. 2021). One component of learning resources that can involve student activities is the use of media.

Media is a tool used in sending messages, stimulating students' thoughts, minds, attention, and intentions to be involved in learning activities (Nor et al., 2021). So developments in the field of learning media are needed to adjust the exciting learning that will be given to students (Uma et al., 2022; Baga et al., 2021). Learning in the 21st century requires students' abilities and skills to think at a higher level, including analytical, evaluation, and creativity (Ichsan et al., 2019). So a way to support 21st-century skills by presenting learning media as a game is called an educational game (Kawuryan et al., 2018).

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Educational game-based learning is a learning medium expected to impact students to encourage active learning during the learning process (Muhajarah & Rachmawati, 2019). Meanwhile, educational game-based learning media must be by students' character to create fun learning, and students become active in learning. With well-packaged material in the game, it can be used as a learning tool that can increase student interest in learning to achieve better learning outcomes (Aryani et al., 2019). In line with Pan et al. (2021), games-based learning is a study style that incorporates educational games into classroom instruction and self-directed learning. It is defined as using games or comparable components, concepts, procedures, or systems in learning. Consequently, students may experience immersive learning while understanding concepts and abilities. Therefore, using educational game-based learning media that can be implemented in learning is a monopoly.

Teachers may integrate enjoyable learning and include student activities into their lessons using game-based learning materials. For example, this monopoly media contains material on the digestive system of food in semester 1 of class XI SMA. This media aims to teach about the digestive system in fun, so students feel energized and produce satisfying learning outcomes to achieve learning goals.

METHOD

The research and development (R&D) design by Borg & Gall (1996) was used in this study to produce products and test the use of the product. The stages of complete research and development include potential problems, data collection, design, design validation (expert feasibility), design revision, trial use (limited), and product revision. The stages of MONOPEN media development can be illustrated in Figure 1.

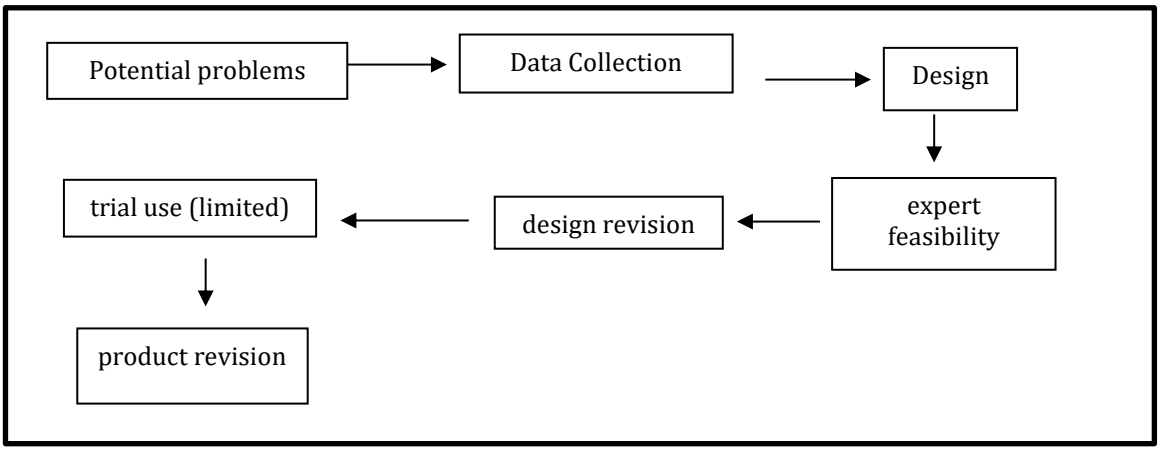

Figure 1. Borg & Gall Development Research Design

The research method aims to produce certain products and test the effectiveness of using the developed products. However, researchers use the stages of the research method only up to the product

trial stage. This is due to the limited time available for development. The data collection technique used in this research is using an instrument in the form of a product assessment questionnaire with a Likert scale. The results of the data obtained from the Likert scale measurement will be included in the presentation assessment form. The answers can be adjusted based on the following score categories, as can be seen in Table 1

Table 1. Score categories of assessment questionnaire

Categories	Score
Very suitable	5
suitable	4
enough	3
fair	2
less	1

(Sugiyono, 2011)

To find out the effectiveness of MONOPEN media as a learning resource for students, it can be calculated according Purwanto (2009).

$$NP = \frac{R}{SM} \times 100$$

Notes:
NP : Expected percent value
R : The score obtained
SM : Maximum score
Then the percent value of learning media feasibility interpreted as Table 2.

Table 2. Learning Media Feasibility categories

Categories	Value
Very unfeasible	0%-20%
Not feasible	21%-40%
Decent	41%-60%
Feasible	61%-80%
Very feasible	81%-100%

(Riduwan, 2003)

RESULTS AND DISCUSSION

The learning resource developed in this study is an educational game-based learning media, monopoly digestion (MONOPEN). According to Gudadappanavar et al. (2021). game-based learning is quickly becoming a cutting-edge method of instruction. The developed media in this study contains games discussing food and the digestive system in class XI. The content has been adjusted to basic competencies in the 2013 curriculum. For the digestive system, the basic competencies which student need to fulfill are analyzing the relationship between the structure of the organ-composing tissue in the digestive system in relation to

nutrition, bioprocesses, and functional disorders that can occur in the human digestive system. The digestive monopoly learning media was developed as a learning resource that aims to increase student motivation in learning biology, especially in food material, and the digestive system as an innovative learning resource. In addition, this media can be used in groups so students can socialize well. Given that it places a strong emphasis on "hands-on" and "minds-on" activities in the classroom, game-based learning has become one of the most effective educational strategies (Byusa et al, 2022).

The developed educational game-based learning media contains several items such as monopoly boards, literacy cards, question cards, chance cards, dice, pawns, houses, and monopoly money. Monopoly board sized 50×50 cm of buffalo paper. The board is designed to contain 40 boxes with an image that matches the title of the box. The display of the digestive system of the monopoly board (MONOOPEN) can be seen in Figure 2.

Figure 2. MONOPEN board display

This literacy card contains information on the digestive system that students must learn, and the price of the house players want to buy. The same type of paper, buffalo paper, is used for both the board and the character cards but with a smaller size compared to the board, which is 15×15 cm. The sample of literacy cards can be seen in Figure 3.

Figure 3. Sample of literacy card used in MONOPEN

Question and chance cards contain game questions and bonuses. Question cards can be used to evaluate students' cognitive aspects because they have questions that refer to the C1-

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C4 bloom taxonomy. The card is sized 22.3 × 3.9 cm and made of art paper. A Chance card is to move players, often with bonus or lethal consequences. Figure 4 shows the sample of the question and chance card.

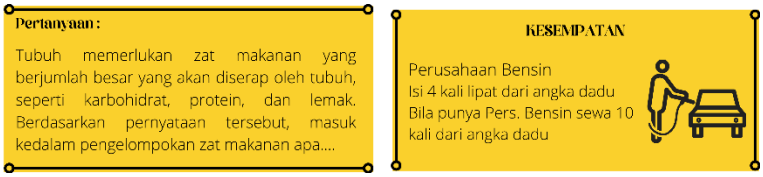

Figure 4. The sample of question and chance cards in MONOPEN

The other tools used are pawns which represent the steps of the player/student in the game. The houses signify that the asset plot has been mastered by students who have succeeded in describing the digestive system content. Play money as a transaction tool for every purchase of assets or fines.

The next step is validation, carried out by media experts, material experts, and trials on students. In order to assess the viability and quality of the media, the validity test step was performed using a questionnaire as an assessment instrument. The average feasibility value of digestion monopoly media is 85%, with a very feasible category. Therefore, monopoly digestion media (MONOPEN) has fulfilled the product feasibility category based on this average value. The average value of product feasibility in all aspects can be seen in Figure 5. Based on the results of the due diligence assessment of digestion monopoly media (MONOPEN) as a whole in the figure above, it was found that the media aspect obtained an assessment of 90%. However, both were still included in the very feasible category.

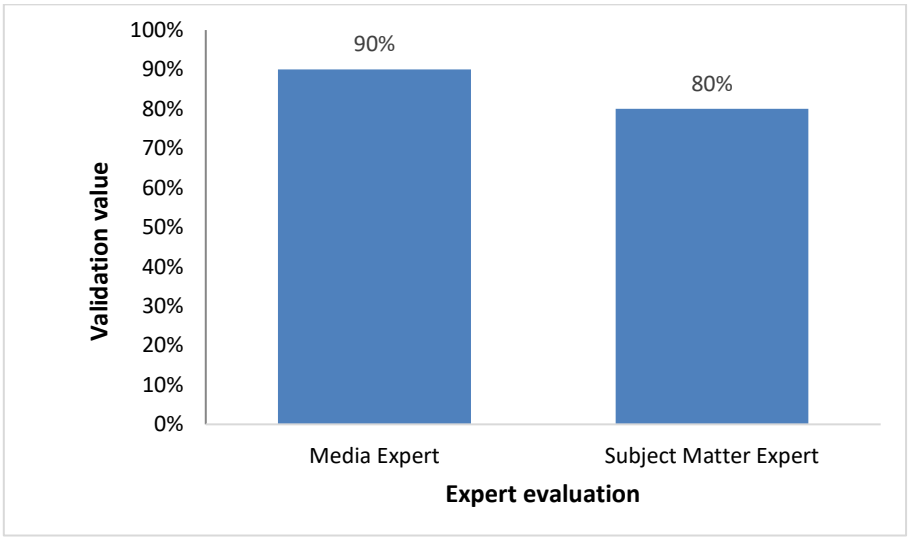

Figure 5. Expert validation result of MONOPEN

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After conducting media feasibility and material tests, the next stage is testing students' responses. In the student response tests, students in class XI IPA have previously studied food material and the digestive system. The number of student respondents used was 30 students. The trial of these students was included in the group test in small groups conducted at SMAN 1 Malingping. Student response tests were conducted to obtain responses to the developed media so that the media could be used as an innovative and fun learning resource. The student responses were assessed using a questionnaire via Google Forms which can be accessed at https://forms.gle/pv5X5ouL8QJtxvxk8.

In this assessment, three aspects are assessed: the design of the monopoly board, pictures appropriate to the context, and interest in learning. The average score obtained from the results of the student response test was 89% which is included in the product criteria and is very feasible to be used as an innovative learning resource on food materials and the food digestive system. The average value of the trial response to students can be seen in Figure 6 below.

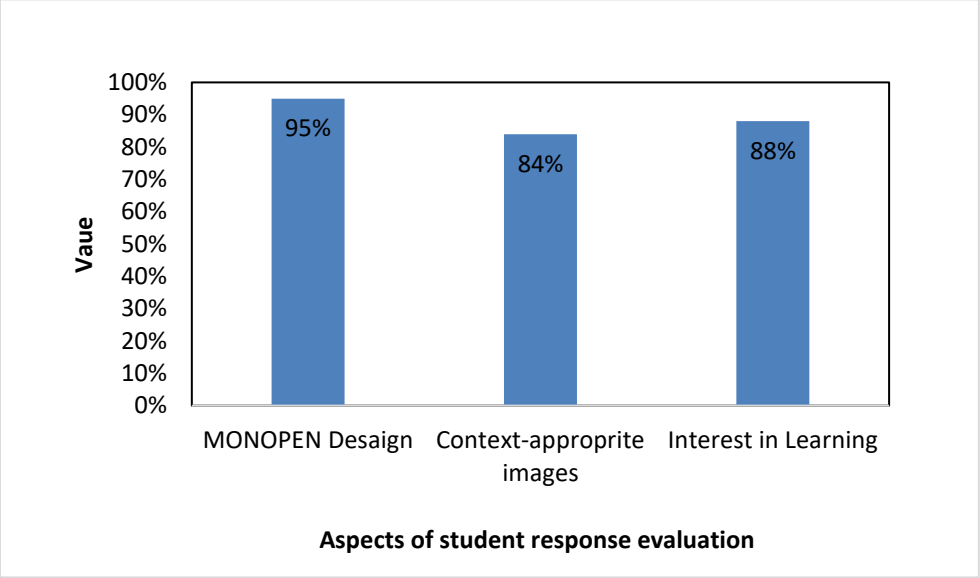

Figure 6. Student response evaluation on MONOPEN

Based on the due diligence assessment results, the students' responses obtained the greatest value of the three aspects, namely the monopoly board design score of 95%. The average assessment of student response test results on monopoly digestive media (MONOPEN) is 89%, so this average can be said to have fulfilled the product feasibility category as a learning resource for students. This average shows that students have a high learning interest in learning using digestive monopoly media based on educational games. The use of learning media as an innovative learning resource aims to improve the quality of the learning process, which will impact student learning outcomes. Learning media functions to

increase students' interest in learning. This is because the media used tends to be fun because it is game-based (Kurniawan, 2020).

Based on the validation test that has been carried out, monopoly media (MONOPEN) from various studies that have been carried out can be said that the use of educational game-based media can have a positive impact on students. So, students are interested in learning, and digestion monopoly media is used as an innovative learning resource and fun.

CONCLUSION

This educational game-based learning media can be an alternative learning resource for teachers. Based on the results of the tests carried out, digestion monopoly media (MONOPEN) is very suitable for use in the learning process. The very feasible category can be seen from the average score of the media expert test and material expert test of 85%, and the results of the average student response test score of 89% are categorized as very feasible to be used as a student learning resource.

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