Development of Interactive Dispensia Media Based on Problem-Based Learning to Increase Motivation and Learning Outcomes of Human Digestive System in Grade V Students

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ABSTRACT

The problem that occurs in SMP Based on interviews and initial observations at SD Negeri Pangkah 01, Pangkah District, Tegal Regency, several problems were found including low student motivation, lack of availability of learning media used, IPAS learning methods that are still conventional and tend to be teacher-centred. The purpose of this research is to produce Interactive Dispensia learning media, analyse the characteristics, feasibility and effectiveness of the media in increasing student motivation and learning outcomes. This research is a Research and Development (R&D) development study using the ADDIE development procedure which is an instructional development process with 5 stages namely analysis, design, development, implementation and evaluation. This model was chosen because the stages of implementation are divided in detail and systematically. The research subjects totalled 40 students in class V of SD Negeri Pangkah 01. The results of this study include: 1) The characteristics of Interactive Dispensia media produced in the form of software in the form of applications, based on problem-based learning models, presenting material on the human digestive system clearly and accurately, using images, videos, animations and quizzes to increase student motivation and learning outcomes; 2) The feasibility of Interactive Dispensary Media based on problem-based learning developed based on the results of the material expert validation test, media validation test, and language validation as well as teacher and student practicality tests, obtained an average score of 96.51%. 3) The effectiveness value of Interactive Dispensary Media based on problem-based learning developed to increase student motivation obtained a result of 78.61% which was included in the very effective category; 4) Interactive Dispensary Media based on problem-based learning was declared effective with the difference between pretest and posttest scores, as well as the results of the n-gain test with an average of 0.62 classified as moderate. The conclusion of this study is that Interactive Dispensary Media based on problem-based learning of human organ system material is feasible to use and effective to increase student motivation and learning outcomes.

Keywords: Interactive Dispensary Media, Problem Based Learning, Motivation, Learning Outcomes

INTRODUCTION

Various very significant changes have occurred in the 21st century. This provides an opportunity for the young generation of Indonesia to innovate in the education sector. Schools must be ready to respond to technological developments in the era of globalization. The classroom is no longer just a closed room but can be in the form of a giant network that connects data/information centers around the world. Education is also the basis for being the key to building a solid foundation for learners to navigate future challenges and opportunities. Basic education is interpreted as education for children aged 7 to 13 years as education at the elementary level that is developed in accordance with educational units, regional potential, and socio-culture, while according to (Ihsan, 2013) Basic education is education that provides knowledge and skills, fosters basic attitudes needed in society, and prepares students to follow secondary education. Learning in schools using technology can be more effective. Ease of access from various information centers no longer makes teachers the only source of learning but requires teachers to be able to provide learning resources during their learning process (Wahyudin, 2015).

The demand to become an innovative teacher has increased with the birth of the Independent Curriculum. The Independent Curriculum is a curriculum with diverse intracurricular learning where the content will be more optimal so that students have enough time to explore concepts and strengthen competencies. Teachers have the freedom to choose various teaching tools so that learning can be adjusted to the learning needs and interests of students (Kemendikbudristek, 2022). Nadiem Makarim on the kemdikbud.go.id page said, "The key to the success of a curriculum change is if the principal and teachers choose to make the change". Therefore, there needs to be a balanced effort from education stakeholders to develop the attitudes, skills and knowledge of educators, especially teachers, in order to achieve educational goals. The reason is none other than to increase motivation and learning outcomes (Wahyudin, 2015). According to Anggraeni et al., (2021) learning motivation is the overall driving force within students that gives rise to learning activities, which guarantees the continuity of learning activities and provides direction to learning activities, so that the goals desired by the learning subject can be achieved. The motivation in students will encourage an activity as an effort to achieve goals. Motivation is not only important because it is a factor that causes learning activities to arise, but it can also improve learning outcomes.

Learning outcomes are used as a measure of the success of education. Learning outcomes according to Mayangsari et al., (2021) are the achievement of the learning process which is marked by changes in behavior. Agusti and Aslam (2022) in their research stated that learning outcomes are abilities acquired by students after receiving learning experiences from teachers or educators. According to Hamalik, learning is a form of growth or change in a person which is expressed in new ways of behaving, thanks to experience and practice (Wicaksono & Iswan, 2019). Benyamin S. Bloom stated that there are three taxonomies as learning domains. The three domains are cognitive, affective, and psychomotor (Nurseptyani, 2023). According to Priansa, learning outcomes are something that students achieve or obtain thanks to their efforts or thoughts which are expressed in the form of mastery, knowledge, and basic skills found in various aspects of life so that changes in behavior are seen in the individual (Koroh et al., 2023).

Learning outcomes are changes in individual behavior that include three aspects, namely cognitive, affective, and psychomotor. Learning outcomes are also a change in behavior from not being able to being able and from not knowing to knowing. The cognitive domain is related to results in the form of knowledge, abilities,

and skills. The affective domain is related to feelings, attitudes, interests and values. And the psychomotor domain is related to physical abilities such as motor and nerve skills, brain manipulation, and nerve conditions (Ulfah & Arifudin, 2021).

Based on the definition described above, learning outcomes are a very important variable that will be a benchmark for the success of learning. For elementary school level, learning outcomes will be a measure of the success of basic education that has been taken for 6 years, later becoming the foundation that will determine success in further education, namely Junior High School (SMP) Education. Increasing student learning outcomes can be influenced by the use of teaching materials in learning activities. By using teaching materials that are designed to be more interesting, it will motivate students to learn so that they can improve student learning outcomes. Thus, it is hoped that learning outcomes will increase over time, considering that it will be the foundation for success at the next level of education (Setyaningsih et al., 2020). Ironically, the results of the study actually showed low motivation and learning outcomes of elementary school students because of their relationship with the use of teaching materials. Based on an initial survey conducted by Lestari (2019), it was found that the teaching materials used by teachers were textbooks from schools. The book was purchased from several publishers, the textbook consisted of elements of title, material and exercises. In addition, the textbook does not have an assessment rubric, there are no instructions for learning activities and the material presented in the textbook is not contextual.

Pane and Sugiharti (2022) also found that teachers have tried their best to teach reaction rate material using school textbooks. However, student learning outcomes are still relatively low or have not reached 75, which is the Minimum Completion Criteria (KKM) for chemistry subjects at SMA Negeri 1 Kejuruan Muda. Fitrio and Merliza (2023) explained Based

on the results of a pre-survey conducted on mathematics teachers at SMP Negeri 4 Rawa Pitu, information was obtained that when teaching he usually uses printed books and modules. He explained that he had combined printed teaching materials with digital teaching materials, had not utilized information technology. The teaching materials used were not yet able to display material interactively, namely only using teaching materials provided by the school in the form of printed modules and in the form of pdf books that were distributed to students. The method used by teachers in classroom learning uses the lecture method. Meanwhile, teacher-centered learning makes students less active in learning. Students only receive the material delivered by the teacher and are not given the opportunity to solve math problems with their own ideas.

Justification regarding the low motivation and learning outcomes of students was also put forward by Hartono et al., (2022) that there were two teachers at SMP Negeri 8 Palangkaraya who were interviewed regarding the learning process during the pandemic with the results that during the learning process the teaching materials used were only textbooks then photographed and distributed to class groups and were not interactive. The results of the interview with the second teacher with the results of the teaching materials used during learning during the pandemic by making learning videos and then sharing them with class groups. The results of the interviews with the two teachers above stated that the school had not used interactive teaching materials during the pandemic. So that students are less motivated and their learning outcomes are low.

Based on interviews and initial observations on Monday, June 3, 2024 at SD Negeri Pangkah 01, Pangkah District, Tegal Regency, several problems were found. First, student learning motivation is low. This can be seen from the fact that most students get bored quickly during the learning process so that they tend not to pay

attention to the teacher while teaching. Many students joke, daydream, and play while learning is taking place. Many students also often go back and forth out of the classroom with the excuse of going to the toilet. Second, the lack of learning media used. This is evidenced by the absence of learning media in the classroom. Class teachers only rely on textbooks that are less interactive in learning. This causes students' learning needs to be less met. Third, the learning method in IPSAS is still conventional which tends to be teacher-centered. This is evidenced by teachers only using the lecture method in teaching which causes students to be less active and less motivated to learn. Fourth, student learning outcomes are still low. This is known from the questionnaire and formative values on the learning objective of understanding the human digestive system obtained by students who got an average score of 61.22 (KKTP 70). On the other hand, many students of SD Negeri Pangkah 01 have been provided with mobile phones by their parents but have not utilized them optimally to improve learning outcomes. They tend to use mobile phones for less useful activities such as playing games.

Based on the problems that occur, this study developed an interactive learning media product to improve student motivation and learning outcomes with elements of novelty combined with the PBL model in the form of which can be accessed both online and offline. In this study, a study was conducted with the title "Development of Interactive Dispensia Media Based on Problem Based Learning to Improve Motivation and Learning Outcomes of the Human Organ System".

LITERATURE REVIEW

Research conducted by Kurniawan et al. (2024) The results of the study stated that interactive learning media can improve students' understanding because information presented with attractive visuals is easier for students to understand and remember. The results of the t-test study obtained a sig. (2-tailed) value of $0.000 < 0.005$ so that H0 is rejected and Ha is accepted. From the results of the test, it shows the influence of interactive learning media so that the learning outcomes of class IVA students at Supriyadi Elementary School Semarang increase. Thus, interactive learning media is said to have an influence in improving the learning outcomes of class IVA students at Elementary School.

Another study conducted by Mutiara et al. (2024) on class VII students of SMP Negeri 1 Mojosari. The results of the pretest and posttest of students in the study showed that the use of interactive multimedia on the material on the rotation and revolution of the earth can significantly improve student learning outcomes.

Another study conducted by Nurhasanah et al. (2024) on class IV elementary school students at SDN Tegalkalong in the subject of science with Hindu-Buddhist kingdom material. The results of the study indicate that interactive media-assisted learning has an effect on students' science learning outcomes in the experimental class. The increase in learning outcomes that occurred before and after the implementation of learning using interactive media-assisted learning showed an effect. In addition, the increase in student learning outcomes can also be seen from the average pretest score in the experimental class of 41.26 and the average posttest score in the experimental class of 83.80.

Another study that supports this study was conducted by Akbar et al. (2024) on grade V students of SDN 98 Bontomanai, Bulukumba Regency on the human digestive system material. H The results of student knowledge after the application (posttest) of interactive media in science learning on the human digestive system material are included in the very high category with an average score of 82.64 from an ideal score of 100. From the results of the pretest and posttest, there was an increase in student knowledge as seen from the average N-gain test results of 0.75 on a scale of 1, which means that in the SDN 98

Bontomanai Bulukumba class there was a high increase, namely N-gain> 0.7.

Another study that supports this study is conducted by Rahma et al. (2024) by collecting and analyzing articles related to the use of digital media as interactive media for students. The design used is a literature review, articles are collected using search engines such as Google Scholar. The criteria for articles used are those published in 2019-2023. The results of the study indicate that digital media or interactive media, if used optimally, have great potential to increase student learning motivation and the quality of education in Indonesia. Motivation comes from individual awareness of the importance of learning and preparing for the future for self-development and improvement.

The novelty of this study from previous studies lies in the product developed. The product developed in this study is interactive media. This media is named Dispensia (Digital Human Digestive System). Interactive Dispensia Media has 3 elements of novelty. First, Interactive Dispensia Media is made using Smart Apps Creator (SAC) which can produce better visual effects. The second element of novelty is that in the Interactive Dispensia Media there are very interesting features such as learning materials, learning videos, and questions based on AKM. The third element of novelty is the Interactive Dispensia Media based on the Problem Based Learning (PBL) model which is able to improve students' critical thinking and motivate students to learn independently. The fourth element of novelty is that the Interactive Dispensia Media can also be accessed online or offline, so it does not require a quota to use it. (Raztiani & Permana, 2019).

METHODS

The procedure used to develop Interactive Dispensia Media is the ADDIE development model. ADDIE was first developed by Reiser and Molenda in the 1990s (Hidayat & Nizar, 2021). The ADDIE model has 5 stages, namely analysis, design, development, implementation and the final stage is evaluation. The use of this model is because the ADDIE model is presented simply and systematically. This model is also relevant in developing interactive multimedia designs and producing quality products and learning (Putra et al., 2022). The research flow in this study is depicted in Figure 1.
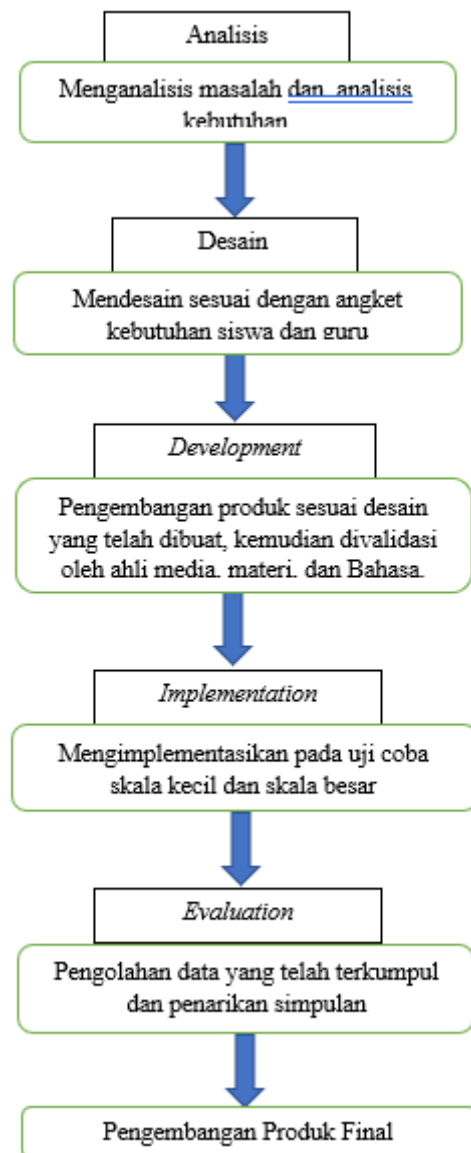

Figure 1. ADDIE Model

There are two types of subjects in this study, namely research subjects at the limited field test stage totaling 10 students who have received human digestive system material and research subjects from operational field trials totaling 40 students in class V of SD Negeri Pangkah 01, Pangkah District, Tegal

Regency. The research will be conducted in the first semester of the 2024/2025 academic year between July-December 2024, with stages, (1) preparation stage, this stage starts from submitting problem identification, compiling research proposals, compiling instrument grids, compiling research instruments, compiling learning plans, as well as consultation and permits for research locations. (2) implementation stage, including small-scale tests and large-scale Dispensia media product usage tests. (3) Completion stage, this stage includes data analysis and report preparation.

RESULT

The results of this study refer to the formulation of the problem, including: 1) Characteristics of Interactive Dispensia media based on problem based learning to improve motivation and learning outcomes of grade V students, 2) The feasibility of Interactive Dispensia media based on problem based learning to improve motivation and learning outcomes of grade V students, 3) How do students and teachers respond after using Interactive Dispensia media based on problem based learning to improve motivation in grade V students, 4) The effectiveness of Interactive Dispensia media based on problem based learning to improve learning outcomes of the human digestive system in grade V students of SDN Pangkah 01, Pangkah District, Tegal Regency.

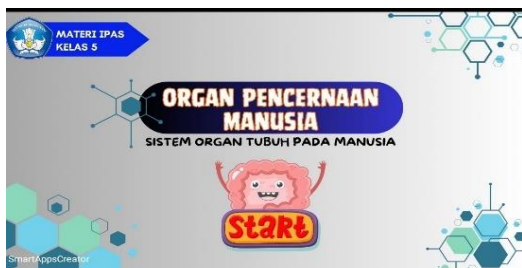## Characteristics of Interactive Dispensation Media

Figure 2 The front page of the Interactive Dispensia Media contains the title of the material, a star button to start and is intended for grade V of elementary school.

Figure 3 The second part of the Interactive Dispensia Media contains various menus from CP, Material, Video, practice questions and Learning Assessment.

Figure 4 Example of material explanation and video contained in the interactive Dispensia.

Figure 5 Practice questions and assessments to test understanding after studying the material contained in the Interactive Dispensia Media to determine student understanding

Figure 6 At the end of the Interactive Dispensia Media display, there is a developer of the media.

Characteristics of Interactive Dispensia media based on problem based learning that have been developed include: a) Interactive Dispensia media provides scenarios or cases

based on real problems that are relevant to everyday life; b) products can be accessed online anytime and anywhere; c) there are interactive features such as quizzes, simulations, or educational games to increase student engagement; d) this media supports various formats such as text, video, audio, and graphics to facilitate multi-channel learning; e) gives students the freedom to explore and find their own solutions with the support of relevant teaching materials; f) supports independent learning through applications.

Feasibility and User Response of Interactive Dispensia Media

After getting the results of the material validation test, media validation test and language expert validation test, the test and practicality test that have been carried out on Interactive Dispensia. The researcher conducted an average to obtain the percentage and eligibility criteria for Interactive Dispensia. The results of the eligibility of Interactive Dispensia Media can be seen in Table 1.

Table 1. Results of Interactive Dispensation Eligibility

| No	Tests Conducted	Test Results Conducted
1	Validation by Material Experts	92,8%
2	Validation by Material Experts	93%
3	Validation by Material Experts	97%
4	Practicality Test by Students	100%
5	Practicality Test by Teachers	99,75%
Percentage of Feasibility		90%
Criteria		Very Feasible

The feasibility of Interactive Dispensia Media based on problem based learning to improve students' motivation and learning outcomes is obtained from the results of the material validation test and media validation test and practicality test that have been carried out. The media validation results obtained a percentage of 92.8% with very

valid criteria. The material validation results obtained a percentage of 93.4%. The language validation results obtained a percentage of 97% with very valid criteria. The results of the practicality test by students obtained a percentage of 99.75% with very practical criteria. The results of the practicality test by teachers obtained a percentage of 100% with very practical criteria. The average result obtained a feasibility percentage of 96.51% with very feasible criteria with several suggestions and improvements from experts.

The Effectiveness of Interactive Dispensia Media on Increasing Learning Motivation

Small and large scale student response questionnaire scores on increasing learning motivation are used to analyze the increase in student learning motivation after using Interactive Dispensia media based on problem based learning.

Interactive Dispensia Media based on problem based learning to improve student motivation based on the results of student response questionnaires in small-scale tests obtained a calculation result of 96.33% and large-scale tests after using Interactive Dispensia Media based on problem based learning to improve learning motivation obtained a result of 78.61%. The effectiveness of Interactive Dispensia Media based on problem based learning to improve student motivation obtained an average score of 87.47%. This states that Interactive Dispensia Media based on problem based learning is stated to be very effective for increasing the motivation of fifth grade students of SD Negeri Pangkah 01.
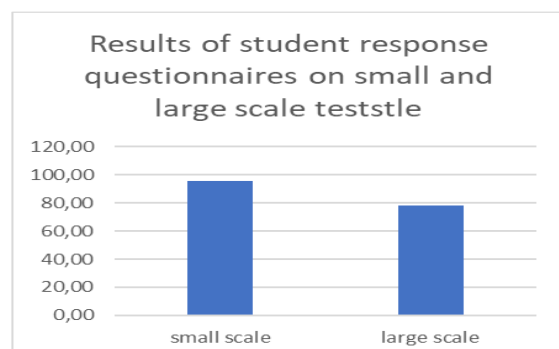
Effectiveness of Interactive Dispensation Media Based on Problem Based Learning Based on Learning Outcomes

The effectiveness test of Interactive Dispensia Media based on problem based learning was obtained from the pretest and posttest scores of students before and after using the Interactive Dispensia Media based on problem based learning that was developed. Before the effectiveness test was carried out, the data that had been obtained after the research was then tested for normality first.

Table 2. Data Normality Test Results

	Kolmogorov-Smirnov^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	,128	40	,095	,953	40	,094
Posttest	,208	40	,000	,896	40	,022

Based on the SPSS output data that has been done, the significance value is > 0.005, thus the research data obtained is stated to be normally distributed. The data that is said to be normal, then the data is tested in the Paired Sample T-test. The hypothesis used in the effectiveness test of Interactive Dispensia Media based on problem based learning is as follows.

The results of the output calculation in SPSS for the effectiveness test of Interactive Dispensia Media based on problem based learning are in Table 3.

Table 3. SPSS Output Results t-test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 Pretest - Posttest	-32,250	17,539	2,773	-37,859	-26,641	-11,629	39	,000

Based on Table 3, the research data produces paired t-test results showing that the Sig value (2-tailed) 0.000 <0.05 means that Ho is rejected and Ha is accepted. This shows that there is a difference in the average of the pretest and posttest data. The n-gain test was carried out after a significant difference was found between the pretest and posttest results. The results of the N-gain test calculation in this study can be seen below,

$$\langle g \rangle = \frac{81-49}{100-49}$$

$$\langle g \rangle = \frac{32}{51} = 0{,}62$$

Based on the n-gain test calculation that has been carried out, a conclusion was obtained that the effectiveness test in the development research obtained the results that Interactive Dispensia Media based on problem based learning has moderate effectiveness for improving student learning outcomes.

CONCLUSION

Interactive Dispensia Media based on problem based learning that will be used in research to improve students' motivation and learning outcomes has several characteristics. These characteristics include: The Interactive Dispensia Media produced is in the form of application software, based on the problem based learning model, presents human digestive system material clearly and accurately, uses images, videos, animations and quizzes to improve students' motivation and learning outcomes.

The feasibility of Interactive Dispensia Media based on problem based learning developed based on the results of expert validation tests, media validation tests, and language validations as well as teacher and student practicality tests. The feasibility of Interactive Dispensia Media based on problem based learning to improve students' motivation and learning outcomes obtained an average score of 96.51%. This states that the Interactive Dispensia Media based on problem based learning that was developed has met the feasibility requirements with a very feasible qualification.

The effectiveness of Interactive Dispensation Media based on problem based learning developed to improve student motivation is stated to be effective

based on the average results of the student motivation questionnaire responses which obtained a result of 87.47% which is included in the "very effective" category. So it can be concluded that Interactive Dispensation Media based on problem based learning is stated to be very effective for increasing the motivation of fifth grade students of SD Negeri Pangkah 01.

The effectiveness of Interactive Dispensation Media based on problem based learning developed to improve student learning outcomes is stated to be effective based on the results of the paired t-test which shows that there is a difference in the average pretest and posttest data, and the n-gain results obtain an average of 0.62 with moderate criteria.

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