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Development of LKPD PBL assisted by Articulate Storyline (Digestlearn) for Elementary School Students

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ABSTRACT

This study aims to develop Problem Based Learning-based LKPD using Articulate Storyline on human digestive organs material for grade V elementary school students. The method used is the Borg & Gall model through seven stages of development. The instruments used include expert validation sheets and practicality questionnaires. The data analysis technique was quantitatively descriptive. The results showed that the Digestlearn LKPD was very valid with an average score of 89.2 and very practical with an average score of 90.4. Therefore, it can be concluded that the Digestlearn LKPD developed has met the valid and practical criteria for use by elementary school students

INTRODUCTION

The development of the 21st century is marked by the advancement of information and communication technology that requires humans to further develop and improve their abilities and competencies so that later humans will be able to balance themselves in the modern era. The existence of technology can certainly make all affairs easier, one of which is in the world of education. With the impact of technology on the world of education, it has caused a change in the learning pattern that was originally educator-centered, now student-oriented (Legina & Sari, 2022).

The world of education is very important in developing creativity in learning that uses modern technological media as it is today. The development of the advanced technological age, of course, teachers must further increase their creativity in order to adapt to the 21st century. Therefore, teachers must continue to learn so that when teaching, they are not far behind the students to be taught. So it can be a reference for whether teachers can keep up with developments in utilizing technology-based learning media, in addition to technology facilitates and will form a new process that will be felt by students later with the potential to increase students' interest in learning because it seems that learning is not only listening but also being able to learn and operate from the media that has been prepared by the teacher and no longer needs to spend energy Because students can learn independently so that the teacher's function as a facilitator (Pratama & Batubara, 2021).

In fact, there are still many elementary school teachers who, even though they have been supported by good internet network facilities in schools, have not made optimal use of technology in the creation of learning media. Most teachers still use conventional media that are not yet technology-based in delivering material. In fact, in general, teachers have basic skills in using technology, but some of them do not have the will to learn and develop technology-based learning media. As a result, the learning process becomes less interesting and tends to be boring for students. One of the solutions that can be applied is to develop interactive learning media that is able to increase student engagement and create a more interesting and meaningful learning experience.

Learning media is a tool or means used to help the teaching and learning process to be more effective and efficient. According to Nurrita, (2018), Learning media has an important role in improving student learning outcomes, because it can provide a more real and interesting learning experience. In addition, Zahwa & Syafi'i, (2022) revealed that the selection and development of information technology-based learning media can support more interactive and fun learning. Thus, the development of learning media continues to undergo innovation to support a more effective and efficient teaching and learning process. The use of interactive learning media such as LKPD based on a scientific approach in IPAS content has also been proven effective in improving students' understanding of concepts in elementary school (Suwastini et al., 2022). This shows that learning media designed with the specific needs of students in mind can help them to be more active in the learning process.

The Student Worksheet (LKPD) is an important instrument in the learning process that is used to help students understand the subject matter independently. The LKPD usually consists of sheets that provide a series of tasks or activities that must be done by students to achieve certain learning objectives. According to Aini et al., (2019), LKPD is designed to help students understand the subject matter through structured and systematic activities, so that it functions as a guide in the learning process. In addition, according to Suwastini et al., (2022), LKPD functions as an interactive learning media based on a scientific approach that has been proven effective in improving the quality of learning in elementary schools. This is in line with the research of Kristyowati, (2018) who states that environmentally oriented LKPD can increase students' awareness of the importance of protecting the environment while deepening their understanding of IPAS material. Thus, LKPD not only facilitates independent learning but also provides a contextual and meaningful learning experience for students.

Efforts to understand more deeply about LKPD as an integral part of interactive learning media, research on previous studies are very important. Researchers have examined a variety of literature that discusses the development of LKPD, including research by Suwastini et al., (2022) which emphasizes the effectiveness of LKPD based on scientific approaches in improving understanding of science in elementary schools. In the study, it was found that designing LKPD that considers the specific needs of students can improve their learning activities, a conclusion that is in line with the findings of Kristyowati, (2018) who developed an environmentally oriented LKPD IPA. This implies that LKPD must not only be interactive but also relevant to the environmental conditions around students to maximize its effectiveness.

Problem Based Learning (PBL) is a learning model that emphasizes the active involvement of students in solving contextual problems related to learning materials. This model aims to improve students' critical thinking skills and problem-solving abilities through systematic stages that involve problem identification, investigation, and resolution. According to Ahmar et al., (2020), the application of the problem-based learning (PBL) model has been shown to increase student involvement and their abilities in the teaching-learning process, as well as effectively develop analytical abilities and high-level thinking skills. Furthermore, Kurniawan et al., (2023) stated that the implementation of PBL can significantly improve students' understanding of concepts; Students not only understand theory, but are also able to apply concepts in real contexts, so that learning becomes more meaningful and applicative. In addition, (Setiyaningrum & Sari, 2023) emphasizes PBL's orientation to real problems: the learning process begins by presenting relevant and challenging problems, which serve as a learning stimulus and encourage students to seek solutions based on knowledge and skills they already possess or that they need to develop. The use of the PBL model can also increase students' motivation in participating in learning (Azizah et al., 2024). Therefore, it can be concluded that PBL not only improves students' willpower and conceptual abilities, but also prepares them to face real challenges with a more critical and solution-solving approach.

This research was conducted at SD Inpres 6 Lolu School in grade V. Through observation and interviews with Class V teachers, it was found that learning in this class still uses lecture methods and traditional learning media such as books and picture media. Teachers Use Learning Media in the form of LKPD which only contains question sheets for students to do without discussing the problems discussed. According to Nurrita, (2018), learning media has an important role in improving student learning outcomes, because it can provide a more real and interesting learning experience. In addition, Zahwa & Syafi'i, (2022) revealed that the selection and development of information technology-based learning media can support more interactive and fun learning. Therefore, there is a need to develop LKPD Problem Based Learning that utilizes technology in grade V of SD Inpres 6 Lolu.

LITERATURE REVIEW

Based on the above background and problems, a development research was carried out that aimed to produce LKPD Problem Based Learning which can provide convenience for students to learn independently in learning activities through the media that has been developed. Articulate Storyline is a software that plays an important role in the development of interactive learning media. The software is widely known for its ease of creating engaging and interactive e-learning content without requiring in-depth technical skills. According to research conducted by Akhlilia et al., (2024), the use of Articulate Storyline has been shown to be effective in improving students' critical thinking skills. This study found that learning media that uses Articulate Storyline is able to stimulate students' active participation in the learning process, thereby strengthening their analytical skills. In addition, Retnaningtyas et al., (2024) also revealed that Articulate Storyline can improve problem-solving skills in IPAS learning. Based on their findings, Articulate Storyline-based media provides in-depth simulations and realistic scenarios that require students to apply their knowledge in a practical way. Therefore, Articulate Storyline is an invaluable tool in educational contexts because it can provide a richer and more immersive learning experience. The title of the development research carried out is "Development of LKPD Problem Based Learning assisted by Articulate Storyline for Elementary School Students".

METHODOLOGY

The research used by the researcher is a research and development method or Research and Development (R&D) with the Borg and Gall model. The following are the stages of the Borg and Gall research and development model in Okpatrioka, (2023) conducted by researchers:

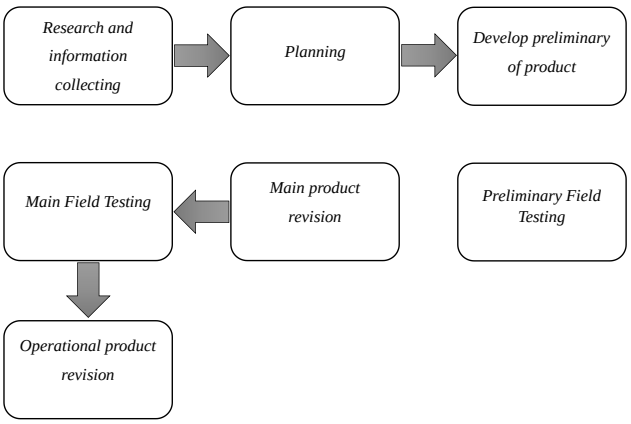

Figure 2. Borg and Gall Research and Development Model Stage

This research and development model includes: (1) preliminary study, (2) planning research, (3) product design, (4) design validation, (5) design revision, (6) product trial, (7) product revision after trial. This research develops LKPD based on Problem Based Learning (PBL) supported by Articulate Storyline for IPAS subjects with material on digestive organs in humans.

The subjects in this study are teachers and students of grade V of SD Inpres 6 Lolu. Data collection techniques include observation, interviews, and the use of validation and practicality instruments. Data collection is carried out systematically to obtain information relevant to the development of LKPD. Observation and interviews were used at the potential and problem identification stages, while validation and practicality instruments were used to assess the level of validity and practicality of LKPD based on user responses.

The instruments used in this study consist of validation and practicality assessment sheets. The data obtained through these instruments were analyzed with qualitative and quantitative approaches to obtain a comprehensive picture of the quality of the LKPD developed. The determination of the level of validity and practicality of the product can be calculated with the percentage formula according to Riduwan and Akdon in Oktafiana et al., (2020) as follows:

$$P = \frac{\sum \text{score obtained}}{\sum \text{maximum score}} \text{ X } 100\%$$

Table 1. Criteria for Evaluating the Validity of a Product

Value Scale	Criteria	Rating (%)
5	Excellent	$81 < N \leq 100$
4	Good	$61 < N \leq 80$
3	Keep	$41 < N \leq 60$
2	Not Good	$21 < N \leq 40$
1	Bad	$0 < N \leq 20$

Table 2. Practical Assessment Criteria of a Product

Value Scale	Criteria	Rating (%)
5	Excellent	$81 < N \leq 100$
4	Good	$61 < N \leq 80$
3	Keep	$41 < N \leq 60$
2	Not Good	$21 < N \leq 40$
1	Bad	$0 < N \leq 20$

The results obtained ≥ 61% show that the LKPD Digestlearn has met the valid and practical criteria, so that it can be continued to the limited trial stage with the note that revisions are made first based on the findings of the questionnaire results.

RESULTS AND DISCUSSION

The results of this study show that the development of LKPD based on Problem Based Learning (PBL) with the help of Articulate Storyline through Digestlearn is effective in increasing students' interest in learning and involvement in learning. These findings are in line with the research of Viola & Waldi, (2023) which proves that interactive media based on Articulate Storyline 3 and the PBL model are very valid and practical for learning in grade V of Elementary School, with validity test results above 90% and a high level of practicality from teachers and students In addition, these results are also supported by the research of (Supriatna et al., 2023), who developed a PBL-based LKPD with the help of Liveworksheets, and obtained a very high level of validity and practicality, demonstrating the effectiveness of the PBL approach in improving the quality of learning. The research of Simbolon et al., (2023) also supports these results, where the development of inquiry-based LKPDs using Articulate Storyline shows excellent levels of validity, practicality, and effectiveness, both in individual, small-group, and large trials.

Theoretically, the use of PBL refers to a constructivist approach that emphasizes solving real problems through collaboration and reflection, thereby being able to improve students' critical thinking and communication skills. Articulate Storyline as a visual aid also supports multimedia learning theory which states that the presentation of information in the form of text, images, and interactivity can strengthen concept understanding. Based on the results of

observations at SD Inpres 6 Lolu, it is known that lecture methods and traditional media still dominate, and the LKPD used has not been able to facilitate meaningful problem-based learning. Therefore, the development of Digestlearn interactive LKPD is the right solution because it brings together various learning elements – objectives, materials, instructions, activities, and evaluations – in one digital medium that is engaging and easily accessible to students.

Thus, the results of this study not only strengthen the previous findings, but also make a real contribution in providing a learning model that suits the needs and characteristics of students in elementary school, especially in grade V of SD Inpres 6 Lolu.

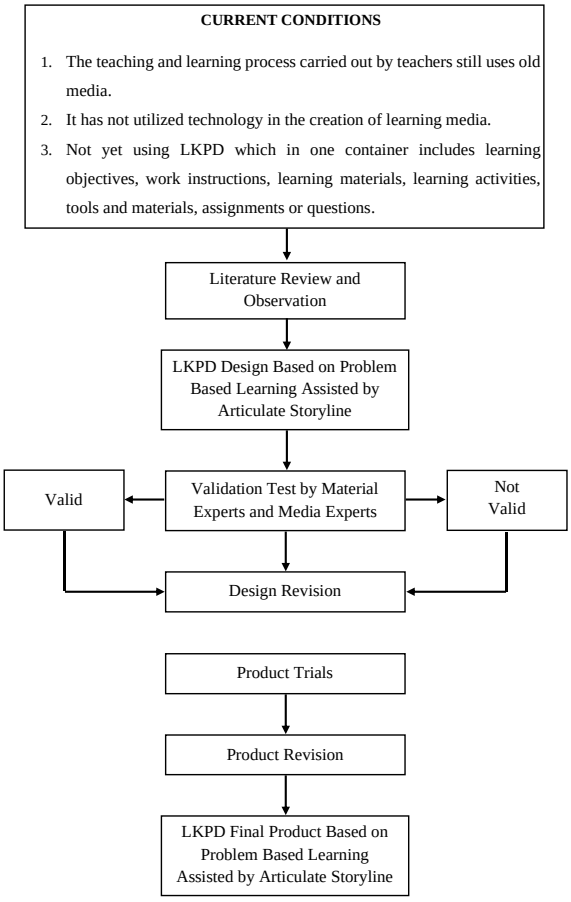

Figure 1. Conceptual Framework

This research focuses on the development of LKPD Digestlearn, which is designed to be accessible through Android devices and laptops to help grade V elementary school students understand the material of the digestive organs in humans. LKPD Digestlearn was developed as a tool in the learning process in the classroom, so that it can improve students' communication skills and understanding of the concepts taught. Each stage in the Digestlearn LKPD development procedure has gone through a series of trials and evaluations to ensure its quality, validity, and practicality. The results of each stage of development will be presented as follows:

Preliminary Studies

Preliminary studies are conducted to identify the problem and find the right solution. Based on the results of observations and interviews with homeroom teachers and students at SD Inpres 6 Lolu, it was found that the LKPD used only contained a question sheet without containing problems that could be discussed. The learning process is still dominated by lecture methods, and the teaching materials used are limited to printed books from the government. In addition, there are no teaching materials that are relevant to real life. This shows that schools do not yet have LKPD based on Problem Based Learning (PBL), thus having an impact on the lack of student involvement in contextual learning.

Planning research

Information collection is very important to find out the needs of students for the products developed. The initial stage was carried out by identifying problems at SD Inpres 6 Lolu through observation and interviews with teachers and grade V students. After that, the author collected various references that are relevant to the problem, such as journals on Problem Based Learning, journals on LKPD, application-assisted learning journals, class V thematic books, and other supporting sources.

Product Design

At the design stage, the researcher designs the initial concept of the product as the basis in the development process. Activities at this stage include designing the structure, flow, and key features of the application, including the selection of learning strategies that are in accordance with the Problem Based Learning (PBL) model. The design is still conceptual, but it has included an overview of the interface, user interaction, and multimedia elements used. In addition, the design also considers pedagogical, aesthetic, and accessibility aspects for elementary school students, so that the products developed can provide an effective and engaging learning experience. This product is also designed so that teachers can monitor the results of student work online.

In the initial stage, the researcher designed a product display that included backgrounds, icons, animations, and material about the human digestive organs. In addition, the researcher also compiled interactive quizzes to test students' understanding. This initial design was created using the Canva app to make it appear more attractive and easier to understand. Once the design is complete, all elements are incorporated into the Articulate Storyline, with the addition of various supporting elements to enhance interactivity. The resulting final product is designed to be in harmony with the Problem Based Learning (PBL) syntax, so that it can help students understand the material through a problem-solving-based approach.

The Problem Based Learning (PBL)-based LKPD on the material of the digestive organs in humans is arranged in order consisting of several parts, here are some initial views of the design of the LKPD Digestlearn product:

Figure 3. Digestlearn Button Design Initial Appearance

Figure 4. Digestlearn Home Page Design Initial View

Figure 5. Digestlearn Menu Page Design Initial View

Design Validation

The design validation is carried out using a questionnaire that has been made and then submitted to the Expert Validator, namely material experts, media experts to be assessed based on the content and quality of the LKPD Digestlearn learning application. The validation process is carried out by subject matter experts to assess the suitability of the content with the curriculum and the relevance of the material presented in the application, as well as by media experts to evaluate the design of the application. The results of this validation are used to assess the feasibility of the Digestlearn application developed to know its weaknesses and shortcomings.

1. Material Validation

The validation of the feasibility of the Digestlearn application material on human digestive organs was carried out by Mr. Pahriadi, S.Pd., M.Pd., a lecturer in the Elementary School Teacher Education Study Program at Tadulako University. The validation process was carried out twice, namely on January 30, 2025 and February 14, 2025. In the first validation, the subject matter expert provides input to add elements relevant to the material, such as images of the stomach and intestines, to improve the suitability of the content and strengthen the linkage between the learning components.

The validation results are analyzed by calculating the score based on the score of each answer given by the validator. Calculations are carried out for each aspect assessed. There are four aspects assessed in the material validation questionnaire, namely the suitability of learning outcomes, the suitability of learning objectives, the presentation of the material, and the depth and breadth of concepts. Analysis of validation scores by subject matter experts using a score interval of 100 scale. The results of the material validation are presented as follows:

Table 3. Material Validation Assessment Results

No.	Assessment Aspects	Value	Category
1.	Suitability of Learning Outcomes	80	Good
2.	Suitability of Learning Objectives	90	Excellent
3.	Presentation of Materials	80	Good
4.	Depth and breadth of concept	72	Good
Average		80,5	Good

Based on the results in the table above, the Digestlearn app obtained a score of 80.5 which is included in the valid category for application eligibility. Therefore, Digestlearn is expected to be able to present learning materials that are more precise, relevant, and in accordance with student needs.

2. Media Validation

Media validation was carried out twice by an expert, namely Mr. Sisriawan Lapasere, S.Pd., M.Pd., a lecturer in the Elementary School Teacher Education Study Program at Tadulako University, on February 3, 2025 and February 14, 2025. In the first validation, the media expert gave suggestions to improve the interactivity of the evaluation by adding a selection of images and

including a display of the quiz results at the end of the session that allows students to send their work results online to the teacher in the form of a spreadsheet. In the validation process, there are five aspects that are assessed, namely simplicity, emphasis, balance, shape, and color. Each aspect is assessed using a scale of 100 to provide a more detailed assessment of the quality and suitability of the media in the Digestlearn application. The results of this validation are then used as a basis to refine the application design elements to better suit the learning needs and expected standards.

Table 4. Media Validation Assessment Results

No.	Aspects	Value	Category
1.	Simplicity	96,6	Excellent
2.	Emphasis	100	Excellent
3.	Balance	93,3	Excellent
4.	Shape	100	Excellent
5.	Color	100	Excellent
Average		97,9	Excellent

Based on the results of media expert validation, the Digestlearn application obtained a score of 97.9 on five aspects of the assessment, namely simplicity, emphasis, balance, shape, and color. With this score, the Digestlearn application is declared valid and feasible to be used in learning.

3. Design Improvements

a. Expert revision of the Material

The revisions provided by the material experts have been followed up by the researcher through improvements to the LKPD Digestlearn. The following is presented the appearance of the application before and after the revision based on input from material experts:

Figure 6. App menu page view before Validation

Figure 7. App menu page view after Validation

Description: The appearance of the menu page has been changed to be more engaging and loved by children, and adapted to the theme of the digestive organs to support the connection between design and learning materials.

b. Media Expert Revision

The revisions provided by media experts have been followed up by researchers through improvements to the LKPD Digestlearn application. The following is a comparison of applications before and after revision based on input from media experts:

Figure 8. View of application evaluation results before Validation

Figure 9. Display of application evaluation results after Validation

Description: The display of evaluation results in this application is equipped with a 'KIRIM JAWABAN' button that allows students to send their work results online to teachers in the form of a spreadsheet.

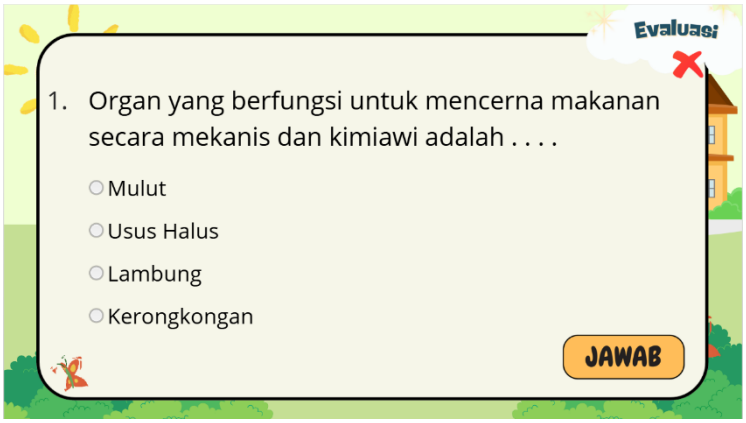

Figure 10. Display of application evaluation questions before Validation

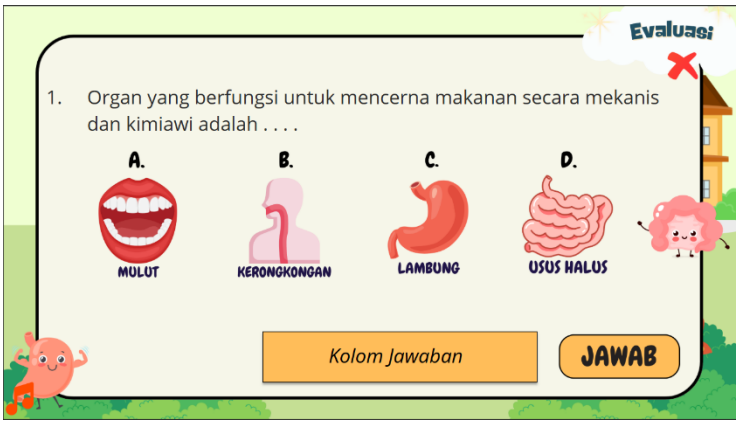

Figure 11. Display of application evaluation questions after Validation

Description: The evaluation question display in this application has undergone development, where the answer options that were originally only in the form of words are now presented in the form of a combination of words and images. These changes aim to increase visual appeal, strengthen conceptual understanding, and support students' visual learning styles.

c. Product Trials

Digestlearn application products that have been declared valid by material experts and media experts are then tested to teachers and students as users. The trial was carried out on one teacher of class V and six students of grade V of SD Inpres 6 Lolu as a small group.

The trial of teacher and student responses will be carried out directly on February 26, 2025. After using the Digestlearn application, teachers and students as users are asked to fill out a response questionnaire to obtain data on the level of practicality of the application.

Table 5. Results of User Practicality Assessment (students)

Student						Score	Value	Criteria
1	2	3	4	5	6			
60	64	60	63	68	66	381	84,6%	Excellent

Based on the results of the analysis of the questionnaire that had been filled out by the students, an average score of 84.6% was obtained which was included in the good category. These results show that the LKPD Digestlearn application gets very practical results and can be used by students in the learning process.

Table 6. Results of User Practicality Assessment (Guru)

Value	Category
88	Excellent

Based on the results obtained from filling out the questionnaire given to teachers, an average score of 96.25 was obtained with the category of Very Good for the practicality of the Digestlearn application.

d. Product Revision After Trial

After a product trial was carried out to assess the practicality of LKPD PBL on human digestive organ material, the results showed that the product was included in the "excellent" category so no further revision was needed. Thus, this LKPD can be used as one of the learning resources for students and used as a learning medium by educators at SD Inpres 6 Lolu.

This research aims to develop PBL LKPD that can help students in improving their understanding, as well as encourage 4C skills, especially Communication. In addition, this multimedia is also expected to be a reference for teachers in the learning process. The product developed is LKPD, which contains material on the digestive organs in humans for grade V elementary school students in phase C. The results of the needs analysis show that there is no LKPD used to teach science learning of digestive organs material in humans. Based on the results of observations, it was found that the school still uses the lecture method by relying on package books in the learning process. Therefore, it is necessary to develop LKPD products to support the learning process and improve student communication.

The design stage was carried out by compiling the LKPD, which was named by the researcher, namely LKPD Digestlearn. The choice of this name is adjusted to the chosen material, namely the digestive organs in humans in the IPAS subject. Articulate Storyline has various advantages that can support the learning process effectively. Firstly, the software can be easily used by anyone, both experienced and novice users. Second, Articulate Storyline allows the integration of different types of files, such as text, images, videos, and

animations, thus enriching the appearance and learning materials. Third, the available audio and visual features allow users to add sounds and images directly into the app, thereby increasing the appeal of learning media. Fourth, the platform also provides a feature to create quizzes directly without the need to upload files from external sources, which makes it easier for teachers to compile learning evaluations. Finally, Articulate Storyline is able to present interactive content that engages students more, making learning more engaging, participatory, and easy to understand. Purwati & Darussyamsu, (2021) explain that the PBL model is able to make the learning atmosphere active by providing complex and real problems. This model is able to improve communication skills because it emphasizes the activeness of students which is carried out through group discussions, exchanging ideas and ideas to solve problems.

The next stage is the development stage, where the LKPD Digestlearn product begins to be designed. The initial design was created using the Canva app, then developed into the interactive app Digestlearn. After the product is completed, a validation process is carried out by media experts and material experts. The validation results from media experts showed a score of 97.9, while material experts gave a score of 80.5, which indicates that the content presented is in accordance with the curriculum and relevant to learning needs. The average score of the two validators was 89.2, so it was in the category of being very valid and suitable for use in learning.

Furthermore, the trial was carried out on users, namely six students and one teacher. The results of the test on students showed a score of 84.6, while the test on teachers obtained a score of 96.25. The average score of the two trials was 90.4, which was categorized as very practical. Thus, the development of the Digestlearn LKPD proved to be valid and practical for use in the learning process. A valid predicate indicates that the content of the Digestlearn application has been adjusted to the applicable curriculum. The material presented is relevant, well-structured, and supports the achievement of the expected learning objectives. Thus, this application not only conveys accurate information, but also covers all important aspects needed in the teaching and learning process according to educational standards.

Meanwhile, the practical predicate means that Digestlearn is designed to be easy to use by users, both students and teachers. The features in this app are designed to make navigation and interaction easier, so users can focus on the learning material without experiencing any technical difficulties. The combination of content validity and ease of use makes Digestlearn an effective and efficient learning medium.

Based on research by Suwastini et al., (2022), the development of LKPD as an interactive learning media based on a scientific approach on elementary school science content was declared feasible to use because the validation results from media experts reached 88.75% and material experts reached 93%, thus meeting the eligibility criteria. The LKPD developed is adjusted to the characteristics and needs of elementary school students so that the learning process becomes more active and meaningful through scientific steps such as observing, questioning, trying, reasoning, and communicating. The feasibility of

the material can be reviewed from the suitability of the content with the learning objectives, while the feasibility of the media is seen from the format, quality, and suitability of the media concept.

This is in line with research by Purwati & Darussyamsu, (2021) which shows that the application of the Problem Based Learning (PBL) learning model is effective in improving students' communication skills. The PBL model requires students to actively discuss and exchange ideas in groups so that students' verbal communication skills are significantly improved. The students' activeness in conveying ideas and solutions clearly is an indicator of the success of this method in developing communication skills. Thus, the application of interactive learning media and learning methods that encourage students' active participation is essential to simultaneously improve students' academic and communication competencies.

CONCLUSION AND RECOMMENDATION

Based on the results of the study, it can be concluded that the Digestlearn LKPD was developed through seven stages of the Borg & Gall model, namely: (1) preliminary study, (2) planning, (3) initial product design, (4) design validation, (5) design revision, (6) product trial, and (7) post-trial product revision. After going through all these stages, LKPD Digestlearn is declared feasible and effective in supporting the IPAS learning process, especially in human digestive organ materials. The results of the validity test by material and media experts show a very high level of validity, which is obtained after product revision and refinement. In addition, the results of the practicality test at SD Inpres 6 Lolu show that this LKPD is very practical to use, based on positive responses from teachers and students during the learning process.

FUTHER STUDY

The implementation of LKPD in this study is limited to one topic in science subjects, so it does not provide a comprehensive picture of its effectiveness in other topics or different subjects. Therefore, it is recommended in future studies to test the effectiveness of LKPD in a wider scope, covering various learning topics and levels of education. In addition, a more comprehensive analysis of improving 21st century skills, such as problem-solving skills, cooperation, and critical thinking, is needed to strengthen the evidence of the effectiveness of the use of LKPD based on Problem Based Learning supported by Articulate Storyline.

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