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Development of Learning Media Model for Creating Three-Dimensional Applied Art Works Based on Flipbooks in High School

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ABSTRACT

The intent is to develop a valid, practical, and effective learning media model for creating three-dimensional applied artworks based on flipbooks at high school. This research is a research and development method that combines the ADDIE, 4D, and Borg & Gall models. This research was conducted at public high school 6 Bantaeng with a total of 25 research subjects of class XII and 1 art and culture subject teacher. The media experts' assessment yielded an average value of 4.3 for all aspects, indicating their high validity. The findings indicated that the assessment by the expert material validator yielded an average score of 4.9, placing it in the very valid category. The assessment results showed that art and culture teachers rated the practicality of the material with an average score of 4.8, which is considered excellent, while students gave an average score of 4.4, also in the excellent or very practical range. In the effectiveness aspect, the gain score calculation was carried out, and a score of 0.41 was obtained, which means that the learning media for creating three-dimensional applied art works based on flipbooks is in the moderate category. Therefore, it can be concluded that the learning media for creating three-dimensional applied art works based on flipbooks at public high school 6 Bantaeng is in the moderate and effective category.

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1. INTRODUCTION

Education plays an important role in creating quality individuals (Clarke, 2018). Science and technology have brought significant changes in various aspects of human life, including economics, socio-culture, and education. Therefore, we must make adjustments to ensure that education keeps pace with the advancements in science and technology. Additionally, advances in science and technology are increasingly promoting efforts to renew the use of technological outcomes in the learning process (Crittenden et al., 2019; Haleem et al., 2022). Facing future challenges, education becomes something very valuable and essential. Education in the future plays a crucial and fundamental role, where the dreams of a nation and state can be achieved (Bourn, 2021). Efforts must begin early through education to form quality individuals who are

ready to face various life challenges. Education is also very important because it is difficult to develop someone without it. In this context, it is crucial to enhance an innovative and adaptive education system, particularly by leveraging advances in science and technology (Mavroudi et al., 2018; Gligorea et al., 2023). The development of science and technology has resulted in growth in a more complex direction; improving the quality of education and the learning process in schools is the main focus.

In the world of education, this progress has opened up new opportunities to improve the learning process, expand access to information, and introduce various innovative learning methods (Alenezi et al., 2023; Rizki, 2024). The integration of technology in the education system is expected to produce a generation that is better prepared to face global challenges and has skills that are in accordance with future needs (Szymkowiak et al., 2021; Wanjara & Ogembo, 2024). Therefore, the components in the education process, such as students, teachers, teaching and learning processes, management, education services, and other supporting facilities, must be coordinated and work together well. This is in line with Permendiknas No. 41 of 2007 concerning process standards, including regulating the planning of the learning process, which requires educators in educational units to develop learning process planning. In learning activities, there are several components, including objectives, learning materials, assessments, methods, and tools or media. By utilizing various types of media such as audio, visual, and digital, teachers can create a dynamic and interactive learning environment (Nicolaou et al., 2019). Therefore, the use of learning media as an intermediary can facilitate and increase the enthusiasm of students to learn and the efficiency of learning so that learning objectives can be achieved. Media can convey concepts that teachers may struggle to express using specific words or sentences (Stewart, 2023; Abdullah et al., 2025).

Based on the results of initial observations by educators at public high school 6 Bantaeng, information was obtained that educators rarely utilize practical, innovative, and diverse learning media for various subjects, especially in arts and culture subjects that can attract students' attention. The material "Creation of Three-Dimensional Applied Art Works" was selected for development in this study due to the need for more engaging learning media that align with technological advancements. Although educators have used learning media, they are usually limited to the use of props and models, and the use of teaching materials is still limited because they still use books as the main teaching materials, which are often less effective in explaining the process of making three-dimensional works of art as a whole. Therefore, it is important for educators to overcome their shortcomings in the use of learning media. We hope that the use of digital flipbooks will enhance the learning process's interest and effectiveness.

Flipbooks can display learning videos that show the steps for making three-dimensional applied artworks in stages, which can help students understand the techniques and concepts of three-dimensional applied art better (Roemintoyo & Budiarto, 2021). Flipbooks allow students to access materials from their devices at any time, either in class or at home, increasing learning flexibility and helping students who need additional time to understand certain techniques in three-dimensional applied arts

materials (Dharmayanti et al., 2021; Fadillah et al., 2021). By utilizing this technology, three-dimensional applied arts learning is not only captivating but also able to adapt to the needs of students and the development of educational technology (Dayanti, 2021; Ahliana et al., 2025).

The results of pre-research conducted by researchers through interviews and observations showed several obstacles in learning arts and culture. One of the main challenges is the lack of variety of learning resources used by teachers, who often only use student handbooks and textbooks. The material presented in these books tends to be limited, so it is less effective at motivating students to be fully involved in the learning process. This limitation causes student enthusiasm to decrease and makes it difficult for students to understand arts and culture materials as a whole. The selection of three-dimensional applied art creation material was chosen as the focus of the research to be developed because its concrete and functional nature allows students to directly apply three-dimensional applied arts skills and concepts that can provide a visual experience so that pupils can understand the form, structure, and function of artwork in real terms. Related to this, the researcher plans to develop material for creating applied artworks of three dimensions based on flipbooks as a learning medium, which is a development of the digital book format. This choice is expected to attract the interest of students so that it can facilitate the process of learning arts and culture, provide more motivation, and introduce this learning medium, especially in high school.

The advantages of this learning media are good for independent learning because they are supported by the use of Android devices that can be accessed both online and offline (Hardiansyah, 2022; Fadhilah & Mulyani, 2024; Jayanti & Setyasto, 2024). In this study, the design of the flipbook was used to facilitate the learning process and increase student motivation so that the learning atmosphere is more dynamic and enthusiastic. The use of flipbooks also aims to prevent students from using their Android devices inappropriately and can provide significant benefits in the learning process. Therefore, the goals of research are to develop flipbook-based learning materials.

This process follows specific references and criteria that apply to create new innovations for products that will be developed to achieve the objectives of development research. In the development of learning media, choosing the right media is critical to increase effectiveness and efficiency in the learning process, because the media acts as a means that facilitates the delivery of material more clearly, interestingly, and relevantly for students. By choosing the right media, teachers can create an interactive learning atmosphere that allows students to participate more actively in learning.

2. METHOD

This type of research serves as a development model that focuses on creating a learning product. The development model used in this study combines three development models: ADDIE, 4D, and Borg & Gall (Gustiani, 2019; Hasbi et al., 2019; Spatioti et al., 2022). This research design is an important stage in planning and conducting research. The main objective is to compile a guideline or framework that will be used throughout the research process of developing a learning media model for

creating three-dimensional applied artworks based on flipbooks in class XII high school 6 Bantaeng.

The first stage needs analysis, which is carried out by combining the Research and Information Collection stage (research and data collection) in the Borg and Gall model with the Analyze stage in the ADDIE model. We carry out this stage by collecting data on student needs through observation and analysis. Furthermore, the 4D model combines the planning stage in the Borg and Gall model with the initial design of the product. Then, in the development activity stage in the 4D model, the product that has been previously designed will be validated by media and material experts and tested. The final stage is the evaluation of the ADDIE model. Once the media has undergone validation and testing, the final step involves assessing its practicality and effectiveness.

This research procedure uses the research and development approach by reducing and combining three development models, namely ADDIE, 4D, and Borg & Gall. The learning design development process in this study focuses on four main stages, namely the needs analysis stage, the design stage, and the development and evaluation stage.

1. *Research, Information Collection, and Analysis*

The stages of analysis carried out by the author include three things, namely needs analysis, curriculum analysis, and student character analysis. In general, the stages of analysis carried out by the author are as follows.

a. Needs analysis

The needs analysis is carried out first by analyzing the state of flipbook media as the main source of learning, as well as providing the availability of media that supports the teaching and learning process. At this stage, the specified media needs to be developed to facilitate students in learning.

b. Curriculum Analysis

We carry out the curriculum analysis by paying attention to the characteristics of the current school curriculum. Such analysis is done so that the design carried out can be in accordance with the demands of the applicable curriculum. Then the researcher examines the learning objectives in the material on creating three-dimensional applied artworks. Analysis of the learning curriculum is carried out to determine indicators of learning achievement based on material analysis and curriculum analysis.

c. Student Character Analysis

We conduct this analysis to understand students' attitudes towards learning arts and culture. Based on the results of the analysis, it was revealed that most students tend to use gadgets not only for learning purposes but also for playing games and accessing TikTok. In addition, students are often late in submitting assignments for various reasons, including losing student worksheets (LKS) given by the teacher. We carry out an analysis of student characteristics by considering their characteristics, abilities, and experiences, both as a group and individually.

2. *Planning and Designing*

The second stage is the planning and design stage. At this stage, the initial drafting, media selection, format selection, and initial plan of learning media on the material of three-dimensional applied art creation based on flipbooks that will be developed are carried out. Furthermore, the design stage involves identifying and determining the important elements needed in the development of the learning media according to the initial analysis that has been carried out. In this initial step, it is important to identify the learning media that will be designed so that the learning media can meet the expected learning objectives.

3. *Development*

Development, or the 4D model development stage, is the product that has been designed according to the material, design, and needs of students in the previous stage. After that, the flipbook will be validated by media experts and material experts. This is done to obtain the validity value of the flipbook. after going through various revisions based on suggestions from media and material experts. This process includes several steps, including

a. Product Trial

Schools designated for research conduct limited product trials. Teachers use the developed flipbook media to facilitate learning. Researchers act as observers and record everything on observation sheets for media improvements using flipbooks. Students take a test using prepared questions after the learning process is complete. We arrange these questions based on competency achievement indicators to assess the effectiveness of developing the flipbook media. In addition, teachers and students are also asked to provide comments as a reference for the second revision, according to the responses of teachers and students.

b. Finished Product

If the product has been declared valid, practical, and effective, then the development of learning media for creating three-dimensional applied artworks based on flipbooks that have been developed is considered ready to be implemented in the designated schools.

4. *Evaluation*

This stage involves a critical review of the impact of learning. The process involves measuring the achievement of product development objectives. Measuring what has been achieved by the target. Searching for any information that can make students achieve good results, and final revisions are made to the product, which aims to ensure that the product developed is truly in accordance with the needs of teachers and students and can be used by schools more widely.

5. *Dissemination Stage*

The last stage is the dissemination stage, where the innovation or product that has been developed will be introduced and disseminated to teachers, students, and related

parties in the learning context. The main activities in this stage are promoting, training, and supporting the use of the flipbook-based applied art creation learning media model.

3. RESULTS AND DISCUSSION

Results

This research is a type of development known as research and development, which aims to produce learning media on art and culture subjects based on flipbooks. The results of this study include the development of learning media focused on creating three-dimensional applied art works, which are based on flipbooks designed with the professional Flip PDF application. Before implementation, media and material experts validate the developed learning media to ensure its feasibility. Experts assess the developed media to ensure its validity, practicality, and effectiveness before implementation. The development model used in this study is a combination of 3 development models: ADDIE, 4D, and Borg & Gall. The first stage needs analysis, which is carried out by combining the Research and Information Collection stage (research and data collection) in the Borg and Gall model with the Analyze stage in the ADDIE model. We carry out this stage by collecting data on student needs through observation and analysis. Furthermore, the 4D model combines the planning stage from the Borg and Gall model with the initial design of the product. In the 4D model's development activity stage, media and material experts will validate the previously designed product before testing it. The next stage is the evaluation of the ADDIE model. After the product is declared valid and has gone through the trial, the final stage is an evaluation to determine the level of practicality and effectiveness. Dissemination follows the declaration of the product as valid, practical, and effective.

Research and Information Collection and Analysis Stage

The initial stage in this study is research and information collection and analysis, namely research and data collection through direct observation at public high school 6 Bantaeng, Bantaeng Regency. This observation aims to identify needs in learning and collect relevant data as a basis for developing flipbook-based learning media. Several things will be analyzed at this stage, namely:

a. Curriculum Analysis

Curriculum analysis was the initial stage in developing flipbook-based learning media for the arts and culture subject at public high school 6 Bantaeng. This school implements an independent curriculum that focuses on flexibility and strengthening students' learning interests. This analysis includes a review of the curriculum, such as learning outcomes and learning objective flow.

b. Student Analysis

An analysis of students is the first step in developing flipbook-based learning media to suit their characteristics. In addition, interviews with the school and art and culture subject teachers obtained several explanations regarding the characteristics of students, as follows:

1) Students use gadgets more often than when they open their books.

2) Students have different levels of understanding, so learning media must be designed with a flexible approach and easily accessible to all students.
3) Lack of interest and motivation of students to learn; therefore, interactive learning is designed. Flipbooks can be equipped with interactive elements such as images, videos, animations, or external links for further exploration.
4) Students are often late submitting assignments.

Planning and Design Stage

After determining learning objectives that are in accordance with the needs of students, researchers began to design learning media. This initial stage resulted in a prototype design of flipbook-based learning media for arts and culture subjects. This prototype then went through several important stages, such as validation to adjust its suitability, revision to improve the content and appearance, and limited trials to measure its effectiveness in supporting learning. In this design, we considered aspects of readability and ease of access for students to ensure that the developed learning media would be more captivating and user-friendly. Thus, the learning media developed were not only informative but also able to increase student involvement in understanding the material.

The design of flipbook-based learning media began with the creation of a cover that was adapted to the material presented to function as a representation of the contents of the material being taught, providing a visual image to students. In addition to the cover, the flipbook also consists of a table of contents, introduction, material map, elements and sub-elements of achievement, learning objectives, core material, and practice questions. The following are the products produced in this research, as presented in Figure 1 and Figure 2.

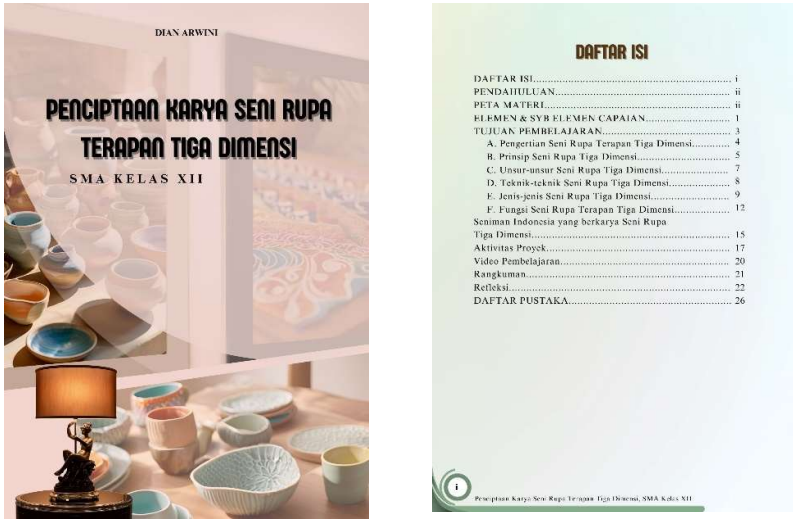

Figure 1. Flipbook-Based Learning Media (Cover)

Figure 1. Flipbook-Based Learning Media (Conten)

Development Stage

An expert validator assesses the validity of the learning media, considering both the media and material. This validation aims to ensure the quality of the learning media develops.

a. Validity Level

The first validation process involves media validation, which evaluates the flipbook-based learning media's presentation. The assessment by the media expert validator covers several aspects, such as design, appearance, ease of use, and effectiveness of its use, to ensure that the learning media developed is not only captivating but also able to motivate students in learning.

An expert conducts media validation to assess the presentation of the developed flipbook-based learning media, covering several aspects such as design, appearance,

ease of use, and effectiveness; this assessment uses a 5-point Likert scale for calculation. Therefore, we will convert the average assessment score from quantitative to qualitative data using the provisions outlined in Table 1. Based on the results of the assessment by media experts, all aspects obtained an average value of 4.3, which indicates that the results of the media expert validation are categorized as excellent or very valid.

Table 1. 5-Point Likert Scale for Calculation

Criteria	Information
$X \leq 1.79$	Very Lacking
$1.79 < X \leq 2.60$	Not Good
$2.60 \leq X \leq 3.40$	Sufficient
$3.40 < X \leq 4.21$	Good
$X > 4.21$	Very Good

An expert validated the material and provided the results. The assessment includes aspects related to the material, completeness of content, and the accuracy and meaningfulness of the information. We will then convert the average assessment score from quantitative to qualitative data using the provisions outlined in Table 1. The expert material validator assessment yielded an average score of 4.9, placing it in the highly valid category.

So, based on the results of the validation of media and material experts, the development of flipbook-based learning media that was developed has the criteria of being eligible to be implemented or tested in arts and culture learning by teachers and students individually or in groups.

b. Trial

The learning media, refined through various stages, began to be applied directly to students for creating three-dimensional applied artworks based on flipbooks. The implementation or trial stage for students is to find out the students' responses to flipbook-based learning media. One art and culture subject teacher and 25 grade XII students participated in the implementation stage. The art and culture teacher explained the material on creating three-dimensional applied artworks using flipbook-based learning media and provided opportunities for students to learn and use flipbook-based learning media.

Evaluation Stage

The fifth stage is the evaluation. After the development stage is carried out, the next step is the assessment of the flipbook-based learning media that has been applied to teachers and students. At this stage, we assess the effectiveness of the flipbook-based learning media based on the students' post-test scores. Filling out the teacher and student response questionnaires reveals the level of practicality.

Level of Practicality

Teachers and students who use the flipbook-based three-dimensional applied art creation learning medium provide feedback that evaluates its practicality. We then

converted the average scores from numerical values to descriptive data, as illustrated in Table 1. Table 1 presents the conversion of the average assessment results from quantitative to qualitative data. The results of the assessment of the responses of the art and culture subject teacher to the practicality aspect obtained an average score of 4.8, categorized as very good. The assessment of student responses from 25 class XII students at public high school 6 Bantaeng, who responded to flipbook-based learning media, yielded an average score of 4.4 in the excellent or very practical category.

Effectiveness Level

We evaluate the efficacy of the flipbook-based learning media in producing three-dimensional applied art pieces by examining the students' learning outcomes, as indicated by their pre-test and post-test scores. The next step is to calculate using the gain score formula, the results of which are then analyzed based on certain criteria to be interpreted, as presented in Table 2.

Table 2. Interpretation of N-gain

N-Gain	Information
g > 0.70	High
0.30 <g ≤ 0, 70	Moderate
g ≤ 0.30	Low

After calculating the gain score, a score of 0.41 was obtained, which means that the learning media for creating three-dimensional applied art works based on flipbooks is in the moderate category. Therefore, it can be concluded that the learning media for creating three-dimensional applied art works based on flipbooks at public high school 6 Bantaeng is in the moderate and effective category. After learning the media model for creating three-dimensional applied artworks based on flipbooks is declared valid, practical, and effective, the last stage is disseminating it to teachers and students.

Dissemination Stage

The last stage is the dissemination stage, where the innovation or product that has been developed, namely the flipbook-based three-dimensional applied art creation learning media model, is disseminated to teachers, students, and related parties in the learning context. The main activity in this stage is to promote, train, and support the use of the flipbook-based three-dimensional applied art creation learning media model, hoping that it becomes well-known and helps improve the quality of arts and culture learning, especially in creating flipbook-based three-dimensional applied art.

4. CONCLUSION

Development of a learning media model for creating three-dimensional applied artworks based on flipbooks meets the criteria of being valid, practical, and effective. The validation results included the very valid in-media validation and in-material validation, which are placed in the very valid category. The score also shows that this media is relevant to the learning objectives and has the potential to contribute to the effectiveness of the student learning process. Level of practicality by results of the responses of teachers and students

obtained an average score of 4.8, including the excellent or very practical category, and results of the assessment by students obtained an average score of 4.4, which was also categorized as very practical. Based on the gain score results, the effectiveness test yielded a score of 0.41, placing it in the moderate category. Thus, it can be concluded that this media is effective in improving student learning outcomes, although it still has room for further development to achieve a higher level of effectiveness.

We recommend implementing flipbook-based learning media in other schools. Flipbook media is considered suitable for use in the learning process because it can help students learn independently both at school and at home. This medium will motivate students to study at home and school, making learning more engaging. Further research suggests developing more interactive media with a wider range of material.

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