Interactive Learning Media: Bilingual Science Flipbook For Solar System

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Abstract: This study aims to develop interactive media flipbook bilingual solar system material, describe the feasibility and effectiveness of interactive media, and familiarize English vocabulary to students. The research method used is the research and development method with the ADDIE development model. The subjects of this research were 6th grade students of SD N Kandri 01 Semarang City conducted from April to May 2024. The methods used in this research are interview, observation, questionnaire, test, and documentation. The instruments used were interview guides, documentation, needs and response questionnaires, pretest and posttest questions, and validation sheets. Data analysis was done with a normality test, t-test, and n-gain test. The results of this study show that bilingual flipbook media is feasible to use with a percentage of feasibility from media validators 96%, material validators 91%, and language validators 95%. The result of the small-scale normality test is 0.068, and the large-scale 0.035 means that the data distribution is normal. The results of the small-scale n-gain test were 0.511, a large scale of 0.549, it included a moderate category. The conclusion of this study is that bilingual flipbook media is feasible and effective to use as a medium for learning science in class.

Keywords: Bilingual; Flipbook; Learning Media; Solar system

Introduction

Quality of education is one of the factors that must be possessed in order to achieve educational success (Setiawati, 2020). There are five factors that affect the quality of education, namely healthy and motivated learners, a healthy and safe environment, a relevant curriculum, teachers using active pedagogy and good governance, and accurate learning outcomes (Patras et al., 2019). In the current learning process, there are also many changes in terms of educational technology (Anggraeny et al., 2020). This raises many challenges that require teachers to teach more creatively and innovatively (Afandi et al., 2019). This form of innovation can be realized by using interactive learning media.

Learning media has an important role in the effectiveness of the learning process (Aristaria et al., 2024). The use of interactive learning media has been proven to help students during the learning process (Suryanti et al., 2021). Technology provides many benefits in today's learning (Rahmawati & Kamaludin, 2024). Based on previous research, technology-based interactive learning media has a positive effect on self-efficacy and student achievement (Fitriyana et al., 2020).

Flipbook is a form of technology-based interactive media that is starting to be recognized and used (Prasetyono & Hariyono, 2020). Flipbook is a digital book that facilitates the learning process, making it simpler, interactive, interesting, and easy for students to understand (Suyasa et al., 2021). The use of interactive learning media based on flipbooks has an important role in learning today (Setiadi et al., 2021). Flipbooks can increase student interest and skills. Starting from critical thinking skills, creativity, communication, and collaboration between students (Brenda et al., 2023). The use of flipbooks in learning also has a positive impact on improving students' cognitive abilities (Humairah & Wahyuni, 2024; Roemintoyo & Budiarto, 2021; Setiadi et al., 2021). The contents of the flipbook itself are quite diverse, not just like digitized printed books. Flipbooks can contain various interesting features, such as: moving

animated images, voice-over, learning videos, images, and links to the sources used (Puspita et al., 2021). This diversity makes flipbooks more attractive than conventional printed books (Maknun et al., 2023).

Science subject content is sometimes difficult if only taught through printed books because the things learned tend to be conceptual and abstract. This abstract concept requires simplification in learning in elementary schools (Wahyu et al., 2020). The science learning process should be interactive, inspiring, and fun to attract students' attention so that students actively participate in learning (Wahyuni, 2022). Science learning must be able to motivate students to develop their creativity ability (Nurafifah et al., 2024). However, according to several previous studies, many students are less active in learning science (Marudut et al., 2020; Putra & Negara, 2021). Other findings also state that the cause of students' lack of interest in science lessons is due to the lack of utilization of digital media (Azizatunnisa et al., 2022; Dwiqi et al., 2020). This means that the use of media in science learning must begin to be used. The development of flipbook media has been developed by Arisandhi et al. (2023) with the title Flipbook: Interactive Learning Media to Improve Cognitive Science of Elementary School Students. This study concluded that flipbook media can improve students' cognitive abilities and are suitable for use in learning activities. The use of flipbooks in science learning needs to be used and developed.

Based on the results of observations and interviews with grade VI teachers at SD N Kandri 01 Semarang City, problems were found related to the lack of use of interactive media in learning, especially in the Solar System material in class VI. The solar system studies space objects that discuss large-scale objects that are difficult to see by the human eye. Therefore, media is needed that allows students to learn this material thoroughly (Kinanthi & Winanto, 2023). When viewed from the initial observation of the learning process carried out at SD N Kandri 01 Semarang City, the use of interactive learning media is still very minimal. Teachers only focus on the lecture method, so the information received by students only lasts for a short time.

In addition, there are also other things found in the observation and interview process, namely the low knowledge of English vocabulary of students. Based on the Decree of the Minister of Education, English in the 2013 curriculum is an optional subject that can be organized based on the readiness of the education unit, so it is not mandatory to be taught to students. This makes English foreign and increasingly difficult for students to understand (Aini & Nohantiya, 2020). Research conducted by Widagdo & Junaedi (2023) entitled Addie Modeling in Curriculum Development 13 in English Language Learning at the Android-Based Elementary School Level argues that understanding of English vocabulary in elementary schools is still minimal and there is a need to use learning media to maximize student understanding. In the process of interviews and observations with grade VI teachers and students directly, it was found that the understanding of grade VI students of SD N Kandri 01 was no more than a brief vocabulary in English. According to several previous studies, efforts are needed to improve students' understanding of English subjects (Elvitaria et al., 2023; Purandina, 2022).

The solution that can be used to overcome these problems is the use of interactive media in the learning process. In addition, students' English language habituation must also be taught from an early age. There needs to be an effort to bridge students' English language skills, namely by implementing bilingual classes (Alindra et al., 2024). The use of bilingual flipbooks can be the answer to students' limited English (Azmi et al., 2024). Based on research developed by (Fauziyah et al., 2023) entitled Development of Physics Learning Media Using Kvisoft Flipbook: Bilingual Digital Books concluded that bilingual flipbook media is one of the media that teachers can use to increase learning effectiveness and increase student interest during learning activities.

From the explanation above, the idea emerged to create flipbook-based interactive media by combining the two main problems, namely the lack of use of interactive media in the solar system material and the lack of understanding of students' English vocabulary. Solar system material related to large objects can be packaged in flipbooks so that it is more interesting and easy for students to understand, habituation of English vocabulary can also be displayed and introduced to the use of this bilingual flipbook. The development of bilingual flipbook media solar system material can motivate and increase student interest during the learning process. The objectives of this study are to develop interactive media flipbook bilingual solar system material, determine the feasibility of interactive media flipbook bilingual solar system material, and determine the effectiveness of interactive media flipbook bilingual solar system material. It is hoped that this bilingual flipbook media will be able to improve students' cognitive understanding of solar system material and familiarize students with English vocabulary.

Method

This research uses the Research and Development (R&D) method. This development research was conducted using the ADDIE model with the stages of

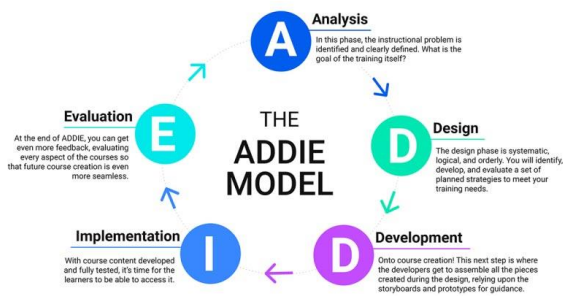analysis, design, development, implementation, and evaluation (Mesra, 2023).

Figure 1. The Five Phase of ADDIE

The research was conducted on grade VI students of SD Negeri Kandri 01 Semarang City from April to May 2024. The methods used in this research are interview, observation, questionnaire, test, and documentation. The interview method was conducted to collect data with the teacher as a resource person, the observation method was carried out in class VI during learning activities with the aim of taking various data from class VI students, and the questionnaire method was used to determine the validity of the product and the responses of teachers and students regarding the developed media, the test method was used to measure the effectiveness of the product.

The instruments used are interview guides, documentation, needs questionnaires, response questionnaires, pretest and posttest questions, and validation sheets conducted by 3 experts, namely material experts, language experts, and media experts. This instrument uses a Likert scale with a score interval of 1-5 (Pranatawijaya et al., 2019) which is calculated with the Formula 1 scoring guidelines and criteria as shown in Table 1.

$$P \frac{R}{SM} x \ 100\% \tag{1}$$

Description:
P = Percentage of Feasibility
R = number of scores
SM = maximum score

The research was conducted on a small scale and a large scale. The small scale amounted to 7 students and the large scale amounted to 21 students. Small-scale test sampling using purposive sampling technique, namely two upper-level students, three middle-level students, and two lower-level students. The independent variable in this study is bilingual flipbook interactive media and the dependent variable is the science learning outcomes of solar system material in grade VI SD Negeri Kandri

01. The data obtained from the question test were then analyzed by validity test, reliability test, difficulty level, and differentiation. The method for analyzing pretest and post-test learning outcomes is the normality test then continued with the t-test and n gain test to determine the increase in student learning outcomes.

Table 1. Eligibility Criteria

Percentage %	Criteria	Information
86 - 100	Very good	Without revision
71 - 85	Feasible	Revision
56 - 70	Moderately feasible	Not feasible
41 - 55	Not feasible	Not feasible
25 - 40	Not very appropriate	Not feasible

Result and Discussion

The results of research on the interactive development of bilingual flipbooks with solar system material include the development of interactive media flipbook bilingual as a medium for learning science material solar system grade VI SD / MI, the feasibility of interactive media flipbook bilingual as a medium for learning science material solar system grade VI SD / MI, the effectiveness of interactive media flipbook bilingual as a medium for learning science material solar system grade VI SD / MI.

Development of Interactive Media Flipbook Bilingual

Researchers in developing interactive learning media flipbook bilingual solar system material grade VI use the ADDIE development design which consists of 5 stages which include analysis, design, development, implementation, and evaluation. The development of this media aims to complement the learning media used in the classroom so that it can improve student learning outcomes. Learning media is a tool used by teachers to further streamline learning activities (Hasan et al., 2021). Currently, there are many types of learning media. The use of technology in education, especially in learning media, has provided opportunities for teachers and students to improve the quality of education so that they can achieve better results (Said, 2023).

The first stage carried out by the author is analysis. There are several things that are analyzed, namely curriculum, teaching materials, students and needs in the classroom (Maulia et al., 2024) . At this stage the researchers conducted interviews and class observations at SD N Kandri 01, the results obtained were the need for new learning media that were interactive and could attract students' attention, especially in science subjects on solar system material and habituation of English vocabulary. The solar system is part of the universe that is very large and cannot be presented directly in front of students. Therefore, it is necessary to have media that

can deliver solar system material and also help increase and familiarize English vocabulary to students.

The second stage is to develop the initial design of learning media. The initial design includes the concept of the bilingual flipbook media created, designing the details of the bilingual flipbook design, compiling the material to be included in the flipbook, compiling the prototype of the media to be developed.

The third stage is development. At this stage the stages carried out by researchers include developing prototypes using the Canva application; making PDF files into flipbooks and adding several features, such as: moving animation features, hyperlink features, and videos using the heyzine.com website; making instruments to measure bilingual flipbook learning media; testing the feasibility of media to 3 expert validators, namely media experts, material experts, linguists; test questions; small group test; large group test. The results of the development of interactive media flipbook bilingual Solar System material can be seen in the Figure 2.

Figure 2. Results of Bilingual Flipbook Media Development

Feasibility of Interactive Media Flipbook Bilingual

The media that has been developed is then validated by media experts, material experts, and linguists who will be assessed and state whether the media is valid and suitable for use in learning. The results of the media expert assessment were 96%, material experts 91%, and linguists 95%. From these results, it can be stated that the flipbook media is very feasible to use in learning. This is also in line with research conducted by Arisandhi et al. (2023) the title Flipbook: Interactive Learning Media to Improve Cognitive Science of Elementary School Students also proves that flipbook media is feasible to use in learning with the acquisition of scores from material experts of 97% and media experts of 92% so that it is in the very feasible category.

The validity of the media is also supported by the results of a response questionnaire conducted by a class teacher of 99% and grade VI students of Kandri 01 State Elementary School in Semarang City of 91% which is included in the very feasible category. During the learning process, researchers also observed students' responses to the bilingual flipbook media. Students look enthusiastic and responsive. These results are in line with research conducted by (Sari & Ahmad, 2021) on the development of digital flipbook learning media in elementary schools, which obtained a student response score of 87.4%, which means it is feasible to use.

Effectiveness of Bilingual Flipbook Media

The fourth stage in the ADDIE model used in this study is the implementation stage. At this stage, the researchers tested the learning media to show whether the media developed was feasible and effective to use as a tool in learning. At the time of learning also uses short English vocabulary then students are also asked to participate in reading and repeating the English vocabulary.

The data used to measure the effectiveness of bilingual flipbook media is the acquisition of student pretest and posttest scores. The pretest was conducted at the beginning before the use of bilingual flipbook media was used in learning. The average pretest result in the small-scale trial was 54.4 and the large-scale was 48.8. The posttest was conducted after students received learning by using bilingual flipbook media, with the acquisition of small-scale average results of 77.5 and large-scale 76.

The fifth stage is evaluation. At this stage, the researcher analyzes the results of the pretest and posttest to find out whether the bilingual flipbook media is effectively used in learning. Arisandhi et al. (2023) stated that the use of flipbook media is valid and feasible to use and helps improve students' cognitive abilities. The process of improving students' cognitive abilities is measured by comparing students' pre-test and post-test scores. The first thing to do is to do a normality test. The normality test is a statistical test used to test whether the data distribution is normally distributed, if the data is not normally distributed then it cannot do the next stage, namely the t-test.

This study used the Shapiro-wilk normality test because the sample used was less than 40 samples (Ahadi & Zain, 2023). The results of the normality test were processed using the SPSS application. In the small-scale test, the pretest obtained 0.267 and the posttest was 0.068 so it was greater than 0.05. In the large-scale test, the pretest obtained 0.120 and the posttest 0.035 which is also greater than 0.05, which means that the data is normally distributed.

The normal distribution of data is then tested through a paired sample test to determine whether there is a significant difference between pretest and posttest data. The paired sample test was conducted with the SPSS application and both the small and large-scale tests

resulted in a Sig (2-tailed) value of 0.000. The significance result (Sig<0.05) indicates that there is a significant difference between the pretest and posttest data.

The next stage is the N-gain test to determine the effectiveness of bilingual flipbook learning media in the learning process. The N-gain value is obtained using the Formula 2 and value categories represented in Table 2.

$$N - gain = \frac{posttest\ score - pretest\ score}{ideal\ score - pretest\ score} \quad (2)$$

Table 2. N-gain Value Categories

N-gain Score	Criteria
g > 0.7	High
0.3 ≤ g ≤ 0.7	Medium
0 < g < 0.3	Low
g ≤ 0	Fail

Source: (Wahab et al., 2021)

The N gain value obtained in the small scale test was 0.511 and the large scale was 0.549. The results of data analysis show that bilingual flipbook media get a medium category, so it can be concluded that bilingual flipbook media is effective to use and can improve student learning outcomes. There are several studies that support that flipbook learning media are feasible and effective to use in science learning (Arisandhi et al., 2023; Asysyura et al., 2023; Brenda et al., 2023).

Conclusion

The conclusion of this study is that bilingual flipbook media is feasible and effective to use as a medium for learning science in class. The validity results from the three validators, class teachers, and students stated that this flipbook is valid. In the small-scale test and large-scale test, there is a significant difference between the pretest and posttest which shows that this media is feasible and effective to use in learning. English vocabulary habituation is also proven to be good, this can be seen during the learning process where students can make presentations by mentioning English vocabulary, and students succeed in doing bilingual items in the posttest well.

Author Contributions

The main author, A. T contributes as a media maker, and research implementer, processes research data, and writes articles. The second author, A. W plays a role in guiding the research process and article writing. Third and fourth parties play a role in reviewing articles.

Conflicts of Interest

The authors declare no conflict of interest.

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