QR Code Based Scrapbook Learning Media to Improve Class IV Student Learning Outcomes

Dewa Gede Rai Mahendra[1*], I Gusti Ayu Tri Agustiana[2] (iD)

[1,2] Pendidikan Guru Sekolah Dasar, Universitas Pendidikan Ganesha, Singaraja, Indonesia

A B S T R A K

Motivasi belajar siswa yang rendah berakibat pada hasil belajar yang rendah. Hal ini diakibatkan oleh guru yang kurang memanfaatkan media pembelajaran yang dapat mengajak partisipasi siswa. Berdasarkan hal tersebut dilaksanakan penelitian yang bertujuan untuk menganalisis efektivitas media pembelajaran scrapbook berbasis Qr code untuk meningkatkan hasil belajar siswa kelas IV. Subjek penelitian ini yakni siswa kelas IV sebanyak 28 siswa. Model pengembangan yang digunakan yakni model ADDIE. Metode pengumpulan data yakni observasi, wawancara, angket/kuesioner, dan metode test. Instrument pengumpulan data yaitu penilaian skala, lembar penilaian, dan lembar tes. Teknik analisis data menggunakan analisis kualitatif dan kuantitatif. Hasil pengujian kelayakan media mendapat kualifikasi sangat layak. Uji efektivitas media memperoleh hasil H0 ditolak dan H1 diterima, maka dapat disimpulkan bahwa media scrapbook berbasis Qr code efektif digunakan untuk meningkatkan hasil belajar siswa kelas IV. Implikasi penelitian ini yakni mampu menjadikan referensi guru dalam menghadirkan media pembelajaran yang menarik dan sesuai dengan karakteristik siswa.

A B S T R A C T

Low student learning motivation results in low learning outcomes. This is caused by teachers not utilizing learning media that can encourage student participation. Based on this, research was carried out which aimed to analyze the effectiveness of QR code-based scrapbook learning media to improve the learning outcomes of class IV students. The subjects of this research were 28 class IV students. The development model used is the ADDIE model. Data collection methods are observation, interviews, questionnaires, and test methods. Data collection instruments are assessment scales, assessment sheets, and test sheets. Data analysis techniques use qualitative and quantitative analysis. The results of the media feasibility test received a very decent qualification. Testing the effectiveness of the media obtained the results that H0 was rejected and H1 was accepted, so it can be concluded that the QR code-based scrapbook media is effectively used to improve the learning outcomes of class IV students. The implication of this research is that it can be used as a reference for teachers in presenting learning media that is interesting and appropriate to student characteristics.

1. INTRODUCTION

Learning Media is a learning instrument created by a teacher and is considered to be able to determine and improve student learning outcomes (Aulia & Perdana, 2023; Zaini, 2019). But in reality, there are still many teachers in certain schools who do not use learning media when explaining learning materials so that learning is less interesting. Teachers consider the use of learning media to be troublesome and the limitations of the media available at the school (Ramdani et al., 2021; Santoso et al., 2024). Therefore, most teachers prefer the lecture method rather than using learning media. Teachers consider the lecture method more practical because it can use oral media so that it does not require complicated preparation and does not require expensive costs (Hascan & Saidah, 2022; Mahmudah, 2016). But the negative effects of applying the lecture method continuously will make students quickly bored and uninterested in following the learning process. Student learning outcomes are very low influenced by the lack of student learning motivation because learning is still centered on the teacher (teacher centered) (Hijjayati et al., 2022; Pamungkas & D, 2021; Pratiwi et al., 2023). In addition, low student learning outcomes are influenced by the failure to create a pleasant learning atmosphere, where teachers have not been able to create interesting learning strategies or models (Devi et al., 2023; Ma'ruf &

Corresponding author
*E-mail addresses: rai.mahendra@undiksha.ac.id (Dewa Gede Rai Mahendra)

Syaifin, 2021). Therefore, it is expected that teachers can create or design learning media according to student characteristics so that it will affect student learning outcomes.

Based on the fourth-grade student book on the Natural Sciences (IPA) learning content, especially on the topic of energy sources, it was found that almost all the material available in the book was very little and lacked variety. This is supported by the results of interviews with the homeroom teacher of grade IV for the 2023/2024 academic year at SD Negeri 1 Baktiseraga, which showed that the homeroom teacher said that the materials written in the science-based books were still incomplete, and only consisted of a few sentences, thus confusing students. In addition, the lack of interesting pictures regarding the explanation of the material in the book is also the main factor in students being lazy to study. The homeroom teacher also said that it was necessary to develop more material in the science-based books so that they could be completer and more interesting.

In addition to the above problems, the results of observations through interviews found that most students who are lazy to study are caused by the lack or low motivation of the students to study. The use of creative and interesting learning media is still very rarely applied by teachers so that it greatly affects students' interest and motivation in learning. Motivation in learning is a very important aspect because motivation can encourage individuals so that they can foster a sense of enthusiasm in learnin(Aulia & Perdana, 2023; Kilis & Yildirim, 2019)But in reality, there are still many teachers who do not pay much attention to student motivation, which gives the impression that teachers only prioritize material and assume that students are able to receive learning materials. In fact, this is clearly very disadvantageous for students because it will greatly affect the learning outcomes of students which are less than optimal.

The research innovation was conducted by developing and testing the effectiveness of QR code-based scrapbook learning media to improve student learning outcomes, especially in Energy Sources material in grade IV of elementary school. Different from previous studies that focused more on conventional learning media or lecture methods, this study introduces an innovation that combines digital technology with physical media in the form of scrapbooks. The use of QR codes in learning media provides easy access for students to access additional interactive and interesting content, which can increase their motivation and interest in learning. In addition, this study answers real needs in the field, where learning materials are often considered incomplete and less varied, and interesting learning media are still rarely used.

The importance of using interesting learning media is very necessary during learning. According to research conducted, scrapbook learning media is very effective and worthy of being applied to learning because it is very motivating for students to learn so that they can improve their learning outcomes (Fitriyah & Rizki Putri Wardani, 2022; Ristiyah et al., 2023). In addition, according to other research, it states that the application of scrapbook learning media has been proven to be able to attract students' enthusiasm in learning because the media is considered very enjoyable (Manalu et al., 2022). Therefore, the application of learning media such as Qr code-based scrapbooks is very necessary in the learning process. Qr code-based scrapbook learning media is very easy and simple to use because it already contains instructions for use. In addition, Qr code-based scrapbook learning media presents good and interesting animated images to increase student learning motivation. The learning material does not make students bored quickly because it is combined with Qr code (Hartawan et al., 2024; Hu & Lee, 2022; Sinaga et al., 2022). In this way, students' motivation and interest in learning will increase and affect students' learning outcomes.

Based on the explanation of the problems above, a development research was conducted which aims to analyze the effectiveness of Scrapbook Learning Media Based on Qr code to improve Student Learning Outcomes in Energy Source Material for Grade IV Elementary School. This is done to help students understand and comprehend the material, especially in science material on the topic of energy sources.

2. METHOD

This research is a research and development. The guidelines used in developing the product in this study are using the ADDIE model. There are five steps in this model, namely analysis, design, development, implementation, and evaluation (Cahyadi, 2019; Gamal, 2022).

The subject of development in this study is a QR code-based scrapbook media on the energy source material for grade IV elementary school, and the object of development in this study is the validity, practicality, and effectiveness of the media developed. While the subjects of this study are experts, students and teachers and the object of this study is student learning outcomes. The number of student subjects is 28 students. The research design used is a one group pretest-posttest design. The one group pretest-posttest design is that before the learning activity is carried out using the help of QR code-based scrapbook learning media, pretest questions will first be given. While at the end of the learning activity, students will be given posttest questions.

The types of data used in this study are quantitative and qualitative data. In the development of this QR code-based scrapbook learning media, quantitative data was collected through a scale assessment, namely the results of the assessment of content experts, learning media experts, student responses and teacher responses, and effectiveness tests. Meanwhile, qualitative data was obtained from input, criticism and suggestions from experts. There are four research methods used, namely observation, interview, questionnaire, and test methods. The data collection instruments used in the research on the development of QR code-based scrapbook learning media are scale assessments, assessment sheets, and test sheets. Before the instrument can be used, an instrument grid is first made, the aim is that the instrument is prepared in accordance with the guidelines. The instrument grid in this study is presented in Table 1, Table 2, Table 3, and Table 4.

Table 1. The Material Expert Instrument Grid

No	Aspect	Dimensions
1.	Eligibility	The material presented in the QR code-based scrapbook learning media includes material contained in the basic competencies (KD).
		The material presented in the QR code-based scrapbook learning media is in accordance with the competency achievement indicators (IPK).
		The material in the QR code-based scrapbook learning media is able to make students more active in learning.
		The material in the QR code-based scrapbook learning media is presented correctly and accurately.
		The material presented in the QR code-based scrapbook learning media is clear.
		The material presented in the QR code-based scrapbook learning media is precise.
2.	Contents	The material presented in the QR code-based scrapbook learning media is very important for students to learn.
		The material presented in the QR code-based scrapbook learning media is easy for students to understand.
		The material presented in the QR code-based scrapbook learning media can attract students' interest in learning.
		The material presented in the QR code-based scrapbook learning media can be clearly understood by students.
		The material presented in the QR code-based scrapbook learning media is in accordance with student characteristics.
		The material presented in the QR code-based scrapbook learning media is relevant to students' lives.
3.	Language	The language used in the QR code-based scrapbook learning media does not use double meanings and confuse students.
		The language presented in the QR code-based scrapbook learning media is very precise and clear.
		The language used in the QR code-based scrapbook learning media is very easy for students to understand.

Table 2. The Media Expert Instrument Grid

No	Aspect	Dimensions
1.	Ease of Use	QR code-based scrapbook learning media is easy to use during learning.
		Practical and simple QR code-based scrapbook learning media applied to the learning process.
		QR code-based scrapbook learning media attracts students' interest and enthusiasm for learning.
		QR code-based scrapbook learning media is very helpful for students during the learning process.
		QR code-based scrapbook learning media is not confusing because it contains instructions for use.
		QR code-based scrapbook learning media is very easy for students to carry anywhere.
		Scrapbook learning media based on QR codes is appropriate for the learning theme.
		QR code-based scrapbook learning media provides an opportunity for students to learn about energy sources.

No	Aspect	Dimensions
2.	Appearance Attractiveness	Qr code-based scrapbook learning media is very interesting (colors, graphics and shapes).
		The selection of images used in the QR code-based scrapbook learning media is appropriate.
		The layout of the QR code-based scrapbook learning media is precise and appropriate.
3.	Language and Readability	The language used in the QR code-based scrapbook learning media is clear and not convoluted.
		The use of language in QR code-based scrapbook learning media is in accordance with language rules.
		The language used in the QR code-based scrapbook learning media is easy for students to understand.
		The material listed in the QR code-based scrapbook learning media is easy for students to read.

Table 3. The Student Response Instrument Grid

No	Aspect	Dimensions
1.	Implementation of Learning	By using QR code-based scrapbook learning media, learning becomes interesting and fun.
		The use of QR code-based scrapbook learning media ensures that students do not get bored while participating in learning.
		QR code-based scrapbook learning media really helps students in the learning process.
		QR code-based scrapbook media helps students understand learning materials.
		The material contained in the QR code-based scrapbook media does not make things difficult or confusing for students.
		The material contained in the QR code-based scrapbook media is very clear.
		The material contained in the QR code-based scrapbook media is clearly written.
2.	Understanding the Material	The material contained in the QR code-based scrapbook media is very appropriate.
		The material contained in the QR code-based scrapbook media can attract students' interest.
		The material contained in the QR code-based scrapbook media is in accordance with student characteristics.
		The material contained in the QR code-based scrapbook media is able to make students active in learning.
3.	Use of Media	Scrapbook learning media based on QR codes is easy for students to use.
		Scrapbook learning media based on QR codes can stimulate students' motivation and enthusiasm for learning.
		The use of QR code-based scrapbook learning media is practical and simple so it does not confuse students.
		The use of QR code-based scrapbook learning media is very helpful for students in learning.

Table 4. The Practicality Instrument Grid

No	Aspect	Dimensions
1	Media Functions	By using QR code-based scrapbook learning media, learning becomes more interesting.
		The use of QR code-based scrapbook learning media ensures that students do not get bored while participating in learning.
		QR code-based scrapbook learning media really helps students in learning.
		The QR code-based scrapbook media really helps students understand the learning material.
2	Learning materials	The material contained in the QR code-based scrapbook learning media does not make things difficult or confusing for students.
		The material contained in the QR code-based scrapbook media is very clear.
		The material contained in the QR code-based scrapbook media is clearly written.

No	Aspect	Dimensions
3	Media View	The material contained in the QR code-based scrapbook media is very appropriate.
		The material contained in the QR code-based scrapbook media can attract students' interest.
		The design of the display of the QR code-based scrapbook learning media is very interesting
		The selection of color combinations with the images contained in the QR code-based scrapbook learning media is very unique and very appropriate.
		QR code-based scrapbook learning media keeps students from getting bored in learning.
		The QR code-based scrapbook learning media is very simple so it is easy for students to use.
		Scrapbook learning media based on QR codes is appropriate for the learning theme.
		The QR code-based scrapbook learning media already contains instructions for use so that it does not confuse students when using it.

After the test instrument is completed, the instrument test is carried out. The instrument test carried out is the validity of the test items, reliability, discrimination power and level of test difficulty. The data analysis used is qualitative and quantitative data analysis. The instrument validity analysis is carried out using the Gregory formula. Later, the results of expert research can be entered into a 2 x 2 cross tabulation in columns A, B, C, D. Analysis of the effectiveness of Qr code-based scrapbook learning media on student learning outcomes is tested using the correlated t-test formula. That way, data is collected through the pretest and posttest process to target group students. Before the hypothesis testing process is carried out, the first step that needs to be done is the prerequisite test which includes normality and homogeneity tests.

The correlated t-test analysis technique is used in testing this hypothesis. The use of this correlated t-test technique is to use two different treatments for one sample. In the study of Qr code-based scrapbook learning media, the effectiveness of science learning outcomes for one group will be tested. The results of the trial were compared with the t table with a significance level of 5% to determine the effectiveness of using Qr code-based scrapbook learning media. In the one group pretest-posttest design study, the N-gain score test can be used if there is a significant difference between the pretest and posttest values.

3. RESULT AND DISCUSSION

Result

Prototype which is designed is a learning media in the form of a scrapbook media based on Qr code on the science material of energy sources. This learning media is intended for students in grade VI of Elementary School. This media is made of a book containing interesting pictures about energy sources and contains a barcode to access the material and learning videos. This Qr code-based scrapbook is used to help students understand the material of energy sources. To use the media, students must first understand the material of energy sources and if students do not understand the material, students can scan the barcode that has been provided to see the material and learning videos in full. In the research on the development of learning media scrapbooks based on Qr codes using the ADDIE development model. The activities that have been carried out by researchers are in accordance with the stages of the ADDIE model, namely.

The first stage is analysis, at this analysis stage the researcher carried out learning needs analysis, media analysis, and material analysis. This analysis stage aims to obtain the right solution in developing Qr code-based scrapbook learning media. The analysis was carried out based on the problems experienced by students and teachers at SD Negeri 1 Baktiseraga, namely related to the lack of use of learning media so that teachers still tend to use learning methods, namely lecture methods that only focus on teachers. With the problems above, a Qr code-based scrapbook learning media will be developed that combines several media elements such as text, images, and learning videos about energy sources with the aim of attracting students' interest and enthusiasm for learning so that it has an effect on improving cognitive learning outcomes. The development of this Qr code-based scrapbook learning media is also supported by the completeness of facilities and infrastructure such as cellphones and computers available at the research location so that the development of this media is considered appropriate and suitable to be carried out.

Next is the design stage, the initial design of the QR code-based scrapbook learning media is carried out by determining the shape and materials that will be used in making QR code-based scrapbook media so that the media is attractive, easy to carry and easy to use. At this design stage, the design of the research instrument is also carried out which will be used to test the validity, practicality, and effectiveness of the media to be made, then continued to the development stage. The third stage is development, at the development stage, namely the stage of realizing the media design that has been made by gluing, cutting, and uniting the materials that have been selected at the design stage to form QR code-based scrapbook media. At this development stage, the testing stage of the research instrument is also carried out through the validity test of the instrument content and the trial of the test instrument. Meanwhile, testing was also carried out on the media that had been made through the product validity test, as well as individual and teacher trials which aimed to determine the practicality of the ecosystem component box media, then the implementation stage. The appearance of the media that has been developed can be seen in Figure 1.

Figure 1. The Final View of the QR Code-Based Scrapbook Media

The next stage is the implementation stage. After the QR code-based scrapbook learning media is declared valid, then the QR code-based scrapbook learning media is applied in classroom learning. The implementation of QR code-based scrapbook learning media is carried out using a learning implementation plan (RPP) that has been prepared so that learning becomes more systematic and focused. The implementation stage is carried out to collect data on the effectiveness of QR code-based scrapbook learning media. The effectiveness test of interactive multimedia is carried out by giving tests in the form of pretests and posttests to determine differences in student learning outcomes. A recapitulation of the results of the feasibility test and student responses is presented in Table 7.

Table 7. The Percentage of Media Suitability Test Results

No	Test Subject	Validity Results (%)	Percentage Qualification
1	Expert Test of Learning Material Content	93.33%	Very Worth It
2	Learning Media Expert Test	95.83%	Very Worth It
3	Practicality Test by Teacher	100%	Very Worth It
4	Practicality Test by Students	98.89%	Very Worth It

Effectiveness test using one sample t-test by obtaining the difference in pre-test and post-test scores of student learning outcomes, before conducting the t-test, first conduct the analysis prerequisite test, namely the normality and homogeneity test. The results of the analysis prerequisite test, namely, the results of the Kolmogorov-Smirnov and Shapiro-Wilk post-test and pre-test significance values are greater <0.05, which means that the data is normally distributed. Then for the homogeneity test, based on the Levene test, the significance value based on the mean is 0.48> 0.05, the significance value based on the mean is greater, therefore the data can be declared homogeneous. After the prerequisite test is carried out, it is continued with the effectiveness test.

The effectiveness test was conducted using a one-sample t-test and analyzed using SPSS-22 using a one-sample t-test. Based on the results of the one-sample t-test, the t-count value was 29.75 with df 55 t-table 2.00, which means tcount 29.75> 2.00, and the two-sided significance test obtained 0.001 <0.05, it can be stated that H0 is rejected and H1 is accepted. So, it can be concluded that there is a significant difference in the learning outcomes of science in the cognitive aspect between before and after using the Qr code-based scrapbook learning media on the topic of energy sources for class IV of SD Negeri 1 Baktiseraga. The interpretation value of the Gain-score percentage was obtained from the calculation of the N-gain percentage, namely 63.5%, which means that the Qr code-based scrapbook learning media on the topic of energy sources is in the category of being quite effective in improving student learning outcomes.

At the final stage is the evaluation stage, namely at this stage do formative evaluation and summative evaluation. Formative evaluation is analyzing the validity data that has been collected from

expert validation, so that the media created can be improved according to the expert's assessment. While summative evaluation is analyzing the practicality and effectiveness data that has been collected, to determine the practicality and effectiveness of the Qr code-based scrapbook media that has been developed.

Discussion

The research conducted stated that the use of QR code-based scrapbook media is feasible and has a good effect in the science learning process on energy source material for grade IV students. This proves that the use of learning media during learning greatly influences students' interest in learning which will also affect the learning outcomes that are increasingly maximized. When compared to previous learning, students tend to be passive in participating in learning. Without learning media, students have difficulty understanding the material.

The use of learning media can activate student learning activities in the classroom. Media is a component of learning resources or physical facilities that contain instructional materials in the student environment that can stimulate students to learn (Gulo, 2022; Vartiainen et al., 2016; Yulhavisda et al., 2023). Media is very important in helping teachers teach in class, in addition, with the presence of media also helps students in understanding the material delivered by the teacher. With the presence of media, students are usually interested in following lessons, in addition to students, media also greatly helps teachers in delivering lessons because basically early childhood children are still less interested in learning (Kuntari, 2023; Yuanta, 2020).One of the media that can be used to overcome these problems is the Image media packaged in a scrapbook. Scrapbook itself is an art of decorating using leftover materials. Scrapbook or scrapbook, comes from English, "scrap" which means leftover, scrap, cutting, or piece. While "book" itself means book. Scrapbook or scrapbook is a creative and innovative work in the form of an album in which there are various photos decorated in such a way that they can leave a special visual impression (Hutapea, 2019; Mahmudi et al., 2022).

There are many learning media that can be used in the learning process, especially science, including scrapbook media. Scrapbook media is a learning media in the form of a book that contains information or explanations related to the material presented with pictures accompanied by decorations to attract students' attention and make it easier for students to understand science learning materials in elementary school. Scrapbook media contains pictures accompanied by explanations below, using illustrations, colors, and arranging letters/writing according to student preferences. In accordance with research conducted at SD Negeri 1 Baktiseraga, it was proven that Qr code-based scrapbook media is very popular with students because it can trigger students' motivation and enthusiasm for learning. This is supported by the enthusiasm of students in observing and using the media where initially students did not understand the material on energy sources but after using the Qr code-based scrapbook learning media, students were able to quickly understand and comprehend the material. In addition, the Qr code-based scrapbook media is different from the scrapbook media that has been developed by other researchers. Where usually scrapbook media is only in the form of a book and the material is directly listed in the scrapbook. Meanwhile, QR code-based scrapbook media combines technology with book media, so this is what differentiates QR code-based scrapbooks from scrapbooks developed by other researchers.

Code.Qr code is an abbreviation of Quick Response code, which is very easy to read by digital devices. In the development of education today, the use of Qr codes as a supporting tool for learning media is widely used, such as examples of Qr code-based scrapbook media. Qr codes are considered to facilitate inputting materials so that learning materials that will be shown on the learning media can be inputted into Qr codes.(Sinaga et al., 2022). The use of Qr code in scrapbook learning media is done to combine concrete learning media with digital technology. Therefore, in scrapbook learning media, only animated images about the material presented will be shown and the material will be entered into the Qr code. That way, students will scan the Qr code to see the material.

The advantages of the QR code-based scrapbook media are that it is very easy to use because it is very simple and the appearance is very attractive which contains animated images about energy source material and materials made in the form of QR codes. In addition to being simple and attractive, QR code-based scrapbook media is also very easy to use because the material can be accessed via students' cellphones or laptops, only requiring an internet signal. The novelty of the development of QR code-based scrapbook media has proven to be very interesting for students in learning. Therefore, scrapbook media is one of the alternative media that can attract students' attention (Aulia & Perdana, 2023; Yulhavisda et al., 2023). The development of scrapbook media is worthy of use and is in a very valid category, and the results are included in the very practical category (Dewi & Yuliana, 2018; Rosihah & Pamungkas, 2018). Learning that takes place with Scrapbook causes students to be very interested so that it can increase motivation, interest, and learning outcomes during learning activities. Scrapbook media learning media can improve student learning outcomes (Kriswanto & Fauzi, 2023; Qolbiyah et al., 2022).

The research conducted has limitations in the development of this media. The limitation is that the use of this media requires a device such as a sophisticated cellphone so that it can be used to access the internet web. The need for an internet package and a stable signal that aims to access the materials that are already in the QR code. This causes this media to only be accessible if students or teachers have adequate devices. It is hoped that further research can develop electronic media that can be accessed offline.

The implication of this study is that with the existence of QR code-based scrapbooks, students can build their imagination to be able to think critically when paying attention to the media, students can see it using the QR code, then animated media can have an impact on increasing students' enthusiasm for learning because students get learning media in printed form and can be viewed digitally with QR codes. Teachers as facilitators in learning experience convenience in the teaching and learning process because teachers are no longer lecturers in learning activities, teachers can ask students about the contents of the material contained in the QR code-based scrapbook.

4. CONCLUSION

Based on the research conducted, it can be concluded that the use of QR code-based scrapbook learning media has a positive influence on students' interest and learning outcomes, especially in science learning on energy source material for grade IV students. This media not only attracts students' attention but also increases their motivation and understanding of the material presented. By combining visual elements and digital technology, QR code-based scrapbooks offer an innovative and practical way to overcome learning challenges in the classroom, especially in making materials more interesting and accessible. However, the use of this media has limitations, especially related to the need for adequate technological devices and stable internet access. Therefore, it is important to consider further development so that this media can be accessed more widely and effectively, including the possibility of developing media that can be accessed offline. Overall, QR code-based scrapbook media is a feasible and valid alternative to improve the effectiveness of learning in elementary schools.

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