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DEVELOPMENT OF CHEERFUL BOX MEDIA USING QR CODE TECHNOLOGY TO EMBED GEOMETRY CONCEPTS IN ELEMENTARY SCHOOLS

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Abstract

This research aims to produce a learning media product, the Cheerful Box, with QR Code technology to instill the concept of geometry in elementary schools. This research uses the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation). The subjects of this research were class II students at MIM Krakitan, Bayat. The research data were obtained from observation, interviews, expert validation, pretest-posttest questions, and student response questionnaires to the developed media products. The data analysis techniques used are qualitative and quantitative. Qualitative data analysis techniques used interactive analysis at the product development stage and content analysis at the product appraisal stage, while quantitative data analysis techniques used expert validation tests at the product trial stage and testing with a paired sample t-test at the product assessment stage. The results showed that the learning media of the Cheerful Box with the QR Code technology that was developed was worth it and very valid, with an average score of 90% for material expert validation and 89% for media expert validation. This learning medium is also declared effective for instilling the concept of geometric shapes and shapes in elementary schools, as the results of the paired sample t-test show a significance value (2-tailed) of 0.000 < 0.05, so there is a significant difference between the average pretest-posttest results, and there is a significant effect of the use of the Cheerful Box learning media with QR Code technology on the results of students' understanding of geometric shapes and geometric shapes in elementary schools.

Keywords: Cheerful Box, QR Code Technology, Geometry, Elementary Schools

Abstrak

Penelitian ini bertujuan untuk menghasilkan produk media pembelajaran Kotak Ceria dengan teknologi QR Code untuk menanamkan konsep geometri di sekolah dasar. Penelitian ini menggunakan model pengembangan ADDIE (Analysis, Design, Development, Implementation, dan Evaluation). Subjek penelitian ini adalah peserta didik kelas II di MIM Krakitan, Bayat. Data penelitian diperoleh dari observasi, wawancara, validasi ahli, soal pretest-posttest, dan angket respon peserta didik terhadap produk media yang dikembangkan. Teknik analisis data yang digunakan yaitu kualitatif dan kuantitatif. Teknik analisis data kualitatif menggunakan analisis interaktif pada tahap pengembangan produk dan analisis konten pada tahap penilaian produk, sedangkan teknik analisis data kuantitatif menggunakan uji validasi ahli pada tahap uji coba produk dan uji paired sample t-test pada tahap penilaian produk. Hasil penelitian menunjukkan bahwa media pembelajaran Kotak Ceria dengan teknologi QR Code yang dikembangkan layak dan sangat valid dengan rata-rata skor dari validasi ahli materi sebesar 90% dan validasi ahli media sebesar 89%. Media pembelajaran ini juga dinyatakan efektif untuk menanamkan konsep geometri bangun datar dan bangun ruang di sekolah dasar, sebagaimana hasil uji paired sample t-test menunjukkan nilai signifikansi (2-tailed) 0,000 < 0,05 sehingga menunjukkan adanya perbedaan yang signifikan antara rata-rata hasil pretest-posttest serta terdapat pengaruh yang bermakna dengan adanya penggunaan media pembelajaran Kotak Ceria dengan teknologi QR Code terhadap hasil pemahaman peserta didik tentang geometri bangun datar dan bangun ruang di sekolah dasar.

Kata kunci: Kotak Ceria, Teknologi QR Code, Geometri, Sekolah Dasar

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INTRODUCTION

Education plays an important role in human life. Education makes it easier for humans to keep up with the development of an increasingly modern era. Education can also be used as a means to advance the nation and improve the quality of its human resources.

In the era of the XXI century, Indonesia is faced with many global challenges, one of which is in the world of education. Based on the results of a survey of student abilities released by the Programme for International Student Assessment (PISA) in December 2019 in Paris, it shows that education in Indonesia is ranked 72nd out of 77 countries. In addition, Hasan Chabibie, Head of the Centre for Data and Information (Pusdatin) of the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) in August 2022, said that the quality of education in Indonesia had not made much progress. He revealed that there has been no significant progress in the world of education for the past 10 or even 20 years. Based on these facts, it shows that the quality of education in Indonesia is quite concerning and is still not good (Putra, 2022).

Education should be used as an effort to face global challenges. However, the fact is that education in Indonesia is felt to be incapable of facing global challenges, so the quality of education in Indonesia is an important thing that must be repaired and improved again, and the ability of education stakeholders is also felt to still need to be developed.

In line with the explanation above, educational innovation is something that might be needed to help improve the quality of education and human resources in Indonesia. One form of educational innovation is the development of learning media. Learning media is considered an educational tool needed to support and optimise the learning process in schools, especially elementary schools. This is because elementary school is an educational level that is a milestone for instilling concepts in students, so it is felt that there is a need for learning media.

In fact, there are many learning resources available to students, but their utilisation has not been optimal. There are still many teachers in Indonesia who teach only based on books. So that teachers tend to only use books as the only source of learning. Even though there are still many learning resources that are actually more effective for instilling concepts and increasing students' understanding, such as the use of more interesting learning media, However, in Indonesia the utilisation of concrete and technology-based learning media in learning in schools can be said to be still low. Meanwhile, the current education system

demands that the learning process be adapted to the times and the needs of society. Therefore, new innovations are needed in the world of education.

Previous studies conducted in public primary schools (Lubis & Dasopang, 2020) revealed that both teachers and students encountered difficulties in mathematics learning. Teachers acknowledged that utilizing instructional media was a viable solution and a necessary step to address these challenges. However, time constraints and perceived innovation limitations hindered teachers from developing the necessary media.

Apart from that, the results of research conducted by Muhardini (2020), entitled "Development of Box Nusantara Learning Media to Form the Ability to Understand Thematic Concepts in Elementary School Students," also show that the product resulting from the development of learning media is able to influence the ability to understand thematic concepts of participant educators. Therefore, the use of learning media in elementary schools is considered very important and has an influence on students' learning processes and outcomes.

The same thing was also shown in the results of observations by researchers at MIM Krakitan, Bayat, Klaten found that, on average, students liked subject matter that contained mathematics, but sometimes they had difficulty understanding existing concepts. This causes some students to be less interested in learning material that contains mathematics. So in this study, researchers tried to develop concrete learning media by combining a few elements of QR Code technology to help students understand the right concepts about geometric shapes and shapes easily and fun. By learning through concrete media, it will be easier for students to understand existing concepts.

In this case, in order to be able to develop appropriate learning media, teachers must consider several criteria for selecting learning media, namely, learning media must be developed in accordance with the objectives to be achieved, existing conditions and limitations taking into account the capabilities and characteristics of the media concerned, as well as the selection of media should not be separated from its context, that media is a component of the overall instructional system (Chotib, 2018).

Thus, more and more innovations in the field of education and the development of learning media in Indonesia will show that many movers in the education sector feel that there

are various benefits from the use of learning media that can help improve the quality of education and human resources in Indonesia.

METHODS

This type of research is called research and development (R&D). According to Sugiyono (2017), R&D is a research technique that is used to create specific items and evaluate their effective. While the model used in the development of the Cheerful Box media is the ADDIE model developed by Dick and Carry (1996), which has five stages in its development process.

The subjects of this research, were class II students at MIM Krakitan, Bayat. The research data were obtained from observation, interviews, expert validation, pretest-posttest questions, and student response questionnaires to the developed learning media products. The data analysis techniques used are qualitative and quantitative. Qualitative data analysis techniques used interactive analysis techniques at the product development stage and content analysis techniques at the product appraisal stage, while quantitative data analysis techniques used expert validation tests at the product trial stage and hypothesis testing with a paired sample t-test at the product assessment stage.

RESULTS AND DISCUSSION

One prevalent issue observed in the field of mathematics education in Indonesia is to the diminished level of student engagement and enthusiasm in mathematics, thereby resulting in suboptimal academic performance in the subject. According to Nuraeni and Rusnilawati (2022), learning outcomes encompass not only the acquisition of mathematical information, but also the development of attitudes towards mathematics. One of the primary goals outlined in the current Indonesian mathematics curriculum is to foster students' comprehension of mathematical concepts, their ability to elucidate the connections between these concepts, and their proficiency in employing said concepts or algorithms in a versatile, accurate, efficient, and meticulous manner to solve problems through logical reasoning. (Faatin & Rusnilawati, 2022).

This research produces a learning media product in the form of a box named "Cheers Box," which is equipped with QR Code technology. The Cheerful Box learning media with QR Code technology contains math lessons about geometry, which include flat shapes and geometric shapes, and is intended for students in elementary schools, especially in grade II.

The purpose of having the Cheerful Box learning media with QR Code technology is so that students can learn the subject matter in a fun way, especially in the mathematics lesson content about geometric shapes.

According to Wulandari S., (2017), geometry is a discipline within the field of mathematics that necessitates thorough investigation and study. The significance of geometric theory is attributed to its frequent occurrence and practical use in everyday life, hence establishing its status as a highly regarded field of study. Geometry is a mathematical discipline concerned with the examination and analysis of the interconnections and correlations among points, lines, angles, planes, and various geometric figures (Ulum et al., 2018). In this study, the geometry material is about flat shapes and geometric shapes. A flat shape is a term for a two-dimensional shape that has length and width but does not have height or thickness and is bounded by straight or curved lines. Examples of flat shapes are triangles, squares, rectangles, parallelograms, rhombuses, kites, trapezoids, and circles (Unaenah et al., 2020). Meanwhile, a geometric shape is a term for a three-dimensional shape that has space or volume and sides that limit it. Spatial shapes can be divided into two types: flat side shapes, for example, cubes, beams, prisms, and pyramids; and curved side shapes, for example, tubes, cones, and balls (Academy, 2022). The concept of flat and spatial geometric shapes is abstract but can be shown in real terms or through a concrete object.

Mathematics subjects are considered to have abstract characteristics, meaning the ability to think and solve problems, and most of the material is conceptual but very helpful to humans in everyday life (Ramdan & Atiaturrahmaniah, 2019). Thus, the process of learning mathematics must be carried out in an interactive, fun, innovative, and motivating way for students. To create active learning in mathematics, teachers should be assisted by using interesting learning media so students don't feel afraid and bored in class. The presence of teacher creativity plays a crucial role in the development and utilization of various learning media, which serve as informative tools to enhance students' comprehension of concepts.

Stern et al., (2018), Propose a definition of conceptual comprehension, specifically referring to the acquisition of knowledge through factual information or illustrative instances, in order to comprehend the interconnections among information, ideas, values, and generalizations. The instruction of mathematical concepts should commence at the earliest stages of a kid's mathematical knowledge in order to cultivate a positive initial perception of

mathematics. This approach aims to prevent the child from developing an adversarial attitude towards mathematics in the future. Therefore, mathematics material about geometric shapes and shapes that are most common at the elementary school level is one of the prerequisites that students must have to move on to the next topic of learning mathematics.

The elementary school level is considered the first foundation that needs to be built firmly through the inculcation of correct mathematical concepts and skills for students. The primary objective of mathematics education in elementary schools is to facilitate efficient and effective learning that aligns with the prescribed curriculum and caters to the cognitive abilities of students. This approach aims to equip children with the necessary skills to confidently tackle mathematical problems that are relevant to their daily lives. This is in accordance with the aim of today's education, which is to provide students with the means to function effectively in the technological age. In addition, technology is one manifestation of the results of the development of science. Therefore, it is appropriate for the development and improvement of knowledge in education to also utilise technology as a support in the learning process (Lestari, 2018).

In this era, the development of technology, information, and communication seems to require educators to be able to keep up with developments in increasingly modern times (Faatin & Rusnilawati, 2022). A teacher must further develop new ideas or innovations, such as implementing advances in technology, information, and communication as learning media innovations in the classroom.

The use of instructional media is very important, especially in teaching elementary school students, who are on average 7–12 years old. At that age, the child enters the concrete operational stage, that is, has the ability to think logically but with the help of objects that are concrete or real, meaning that in learning activities, students need real objects that can make it easier for them to think. Real objects in learning activities can be in the form of learning media that can assist teachers in conveying material so that learning objectives can be optimally achieved.

According to Zaki & Yusri, (2020), Learning media refers to any form of communication that is capable of transmitting messages and inciting cognitive, affective, and volitional responses in students. Its purpose is to foster students' engagement and enthusiasm towards the learning process. The utilization of instructional media facilitates students' comprehension

of mathematical concepts as it allows for the creation of engaging and enjoyable learning experiences. By incorporating media into the learning process, students are less likely to experience boredom and are more likely to be motivated and stimulated, fostering a genuine enthusiasm for learning. Consequently, this approach promotes the effective and efficient attainment of learning objectives, yielding satisfactory learning outcomes. Learning media, besides helping in the learning process, also makes it easier for students to form real concepts. In addition, the existence of learning media will make students more active. The activeness of students can be seen in the way they follow every instruction asked by the teacher properly and appropriately.

In general, elementary school teachers only teach mathematics in a conventional way, not making much use of media in their learning. Teachers only use reference books as sources and media. The use of books alone is not effective if it is not balanced with other learning media. The use of media that is less effective will result in students being less active in learning, so that they are less enthusiastic about participating in lessons and tend to carry out activities that are detrimental to themselves. Mathematics learning is carried out as if only expecting that the existing material is quickly completed according to the syllabus and the results are good grades, but the meaningfulness of students towards learning becomes something that is still lacking attention. This will also have an impact on student learning outcomes.

Based on the results of a needs analysis conducted at MIM Krakitan, Bayat, and Klaten, it was found that the average grade II student liked subject matter that contained mathematics, but sometimes they had difficulty understanding existing concepts. This causes some students to be less interested in learning material that contains mathematics. While the results of interviews related to needs analysis show that students' interest and motivation in learning in class are still low because learning often seems monotonous and only relies on printed books, there is still a lack of use of concrete learning media in elementary schools, which can function as companions for participants. didi. In addition, there is no development of learning media that is applied to geometry subject matter, so innovation is needed to make it easier for teachers to instill geometric and geometric material in students. Therefore, the use of concrete learning media by combining elements of QR Code technology is considered to be more effective for instilling the concept of geometric shapes in elementary schools, and incorporating technological elements is also considered appropriate to be applied in learning

to keep up with the times.

Fundamentally, the realm inhabited by children is characterized by the act of engaging in play. The game serves as a relevant problem situation designed for youngsters, so serving as an effective tool to initiate the learning process and facilitate the acquisition of mathematical concepts. This has the same relation to learning in class II students, who are still considered small children and tend to prefer games and colourful and interesting pictures. In low-grade learning, teachers must use real and concrete media to help students understand the material being taught, especially in learning mathematics about geometric shapes and shapes in elementary schools, which are closely related to everyday life.

In practise in elementary schools, low grade levels require teachers to use instructional media that attract students' attention so that they are centred on learning activities because lower grades still really need concrete media to learn and understand material. It is no different from the low class; even the high class still needs learning media. Even though the high school class is able to think abstractly, the use of learning media will make it easier to understand the material. Thus, both in the low grades and in the high grades of elementary schools, teachers need instructional media as a means of transferring material to students easily and attracting their attention so that their attention is centred on learning activities.

One of the innovations to solve this problem requires learning media that are suitable for use in low grades, especially in class II, namely the Cheerful Box learning media with QR Code technology. The media is transformed into educational media that incorporates enjoyable games as a means of supporting learning, thereby facilitating students' comprehension of the instructional content provided by the instructor. Lower-class students prefer to play while learning; for this reason, researchers create learning innovations through the development of the Cheerful Box media with QR Code technology as a support for learning in elementary schools. This is in line with the opinion of Chotib (2018), who revealed that media selection criteria should be developed according to their objectives, conditions, and limitations, taking into account the capabilities and characteristics of the media.

The specialty of this learning medium is the incorporation of QR Code technological elements into concrete media. According to Irawan & Adriantantri, (2018), a QR code, or the abbreviation of Quick Response Code, is a technique that can convert data into 2-dimensional codes, which are usually printed on a more concise medium and can be intended to translate

the contents quickly. The QR Code can be scanned to display an animated video containing an explanation of the material. In addition, the pictures contained in this medium are in accordance with the material that can be taught at the second grade elementary school level, so the colour selection for the medium and the contents in it are also made colourful to make it more attractive to children.

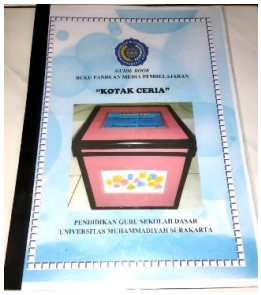
In designing media as a product, it is focused on choosing materials and making designs and forms of media based on the needs and characteristics of students. Researchers carry out development by assembling and compiling all the components that have been prepared in the previous stages into one unit of learning media. The researcher also prepared and compiled research instruments, which included interview questionnaires with teachers, media validation sheets for material experts and media experts, pretest-posttest question paper sheets, and student response questionnaire sheets for the media being developed.

The results of the developed learning media design are in the form of boxes, and the design of the contents in them is based on concepts of flat shapes and colourful spatial shapes and packaged in a game to make it look interesting. In addition, this medium also incorporates a few technological elements in the form of a QR Code. When the QR Code is scanned, a learning video about flat and spatial shapes that the researcher has made on YouTube will appear. So with this, it is hoped that students will not get bored quickly in learning it until they themselves understand and are able to remember well the concepts in geometry material about flat shapes and geometric shapes so they don't easily forget.

The Cheerful Box learning media product with QR Code technology is also equipped with a Guidebook as a guide for using this media product. This product has also gone through the product trial stage, and revisions and improvements have been made during the research in accordance with suggestions and input that have been given both from material experts, media experts, and other related parties. After going through these stages, this development research produced the final product in the form of a Cheerful Box learning media with QR Code technology, which is said to be feasible and effective for instilling the concept of flat geometry and geometric shapes in elementary schools.

Figure 1. Cheerful Box Media Product Design

Figure 2. Cheerful Box Media Guidebook



After the Cheerful Box learning media product with QR Code technology was successfully created, the researchers tested the research hypothesis about the feasibility of the Cheerful Box product with QR Code technology through an expert validation test. The participants included in this study served as validators and were selected based on their expertise in the field of materials and media. The validators consisted of lecturers and primary school teachers. The validation outcomes determined by the validators are as follows:

Table 1. Material Expert Validation Results

Validator	Earned Score	Max Score	Validation Criteria
Validator 1 (Lecturer)	31	35	88,6%
Validator 2 (Teacher)	32	35	91,4%
Average			**90%**

Table 2. Media Expert Validation Results

Validator	Earned Score	Max Score	Validation Criteria

Validator 1 (Lecturer)	44	50	88%
Validator 2 (Teacher)	45	50	90%
Average			**89%**

Table 3. Product Validation Percentage Data Assessment Criteria

Percentage	Criteria
81% - 100%	Very Valid
61% - 80%	Valid
41% - 60%	Valid Enough
21% - 40%	Not Valid
0% - 20%	Invalid Valid

Based on these data, the results of the validation test on the learning media of the Cheerful Box with QR Code technology in terms of material and media are Very Good and Valid. So that the learning media of the Cheerful Box with QR Code technology can be declared worth it and can be trialled in schools. This product trial was carried out in elementary schools for class II students using instruments in the form of pretest-posttest questions that had previously been tried out and tested for the validity and reliability of the problem items. The trial of the Cheerful Box learning media product with QR Code technology was conducted to determine the level of students' understanding of the material taught through the media both before and after use. In trying out this product, the researcher used a limited trial with 20 samples, which were second-grade elementary school students. Students, as a sample, were given pretest questions first, then tried out the implementation of learning using the Cheerful Box media with QR Code technology. After that, students are given posttest questions to see their understanding of the material being taught after the treatment of using the learning media.From the results of the researchers' observations during the testing of the Cheerful Box learning media with QR Code technology, students were interested in the media presented because the media used was colourful and had pictures and text. In addition, researchers also assessed the learning media products through response questionnaires that were distributed to students. The questionnaire sheet contains indicators and symbols of likes and dislikes that

students can choose, which is a form of their response to the product.The data at each stage, which includes the stages of needs analysis, product development, expert validation, product trials through pretest-posttest, and product assessment through student response questionnaires, is collected and used as material for conducting formative evaluations. Formative evaluation is carried out with the aim of ensuring the completeness of the data as well as the suitability and relevance of the data to one another so that they can be used for product improvement.In order to test the research hypothesis about how well the Cheerful Box works with QR Code technology, the researcher used statistical formulas like the normality test and the paired sample t test to do inferential statistical tests. Thus, the results of the calculations will be used as a guide in determining the effectiveness of the learning media products that are made.

- **Normality Test**

Normality tests are performed to test whether sample data or a particular variable comes from a population that ensue a normal distribution. In addition, this normality test was carried out as a condition for conducting a paired sample t-test. The normality test in this study used the Shapiro-Wilk test, which was processed with SPSS version 19 by calculating the asymptotic value using the Lilliefors Significance Correction approach.

Tabel 4. Pretest-Posttest Normality Test Results

	Shapiro-Wilk		
	Statistic	df	Sig.
Pretest Result	.917	20	.085
Posttest Result	.910	20	.063

a. Lilliefors Significance Correction

Based on the table above, it shows that the significance values of 0.085 (Pretest) and 0.063 (Posttest) are greater than 0.05, so it can be seen that the data of the two test variables are normally distributed. Thus, the paired sample t-test can be continued because it meets the parametric requirements, namely that the data is normally distributed.

- **Paired Sample T-Test**

The paired sample t-test is part of the comparative hypothesis test. The data used in the paired sample t-test is in the form of a ratio scale. The paired sample t-test was carried out to find out whether there is a difference in the mean of two samples that are paired or related.

Table 5. Paired Samples Statistics Pretest-Posttest

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Pretest Result	6.9375	20	1.43241	.32030
Posttest Result	7.9375	20	1.58503	.35442

In the data output of Table 5, a summary of the results of the descriptive statistics was obtained from the two samples studied, namely the results of the pretest and posttest. The average pretest score was 6.9375, and the average posttest score was 7.9375.

Table 6. Paired samples Correlations Pretest-Posttest

	N	Correlation	Sig.
Pair 1 Pretest Result & Posttest Result	20	.766	.000

Table 6 shows the results of the correlation test between the pretest and posttest data. It is known that the correlation coefficient is 0.766, with a significance value of 0.000. With a sig. value of 0.000 and a probability of 0.05, it can be stated that there is a relationship between the pretest and posttest outcome variables.

Table 7. Paired Samples Test Pretest-Posttest

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pretest Result – Posttest Result	-1.00000	1.04189	.23297	-1.48762	-.51238	-4.292	19	.000

Based on the results of data analysis in Table 7, it is known that the significance value (2-tailed) is 0.000 <0.05, indicating that there is a significant difference between the average pretest results, which is the initial variable, and the posttest results, which is the final variable. So, this also shows that there is a significant and meaningful influence of the use of the Cheerful Box learning media with QR Code technology on the results of students' understanding of geometric shapes in elementary schools. Thus, it can be said that the hypothesis is accepted, so that the learning medium of the Cheerful Box with QR Code technology is considered suitable as a learning medium and is effective for instilling the concept of flat geometry and geometric shapes in elementary schools.

In addition, the evaluation of the Cheerful Box learning media product with QR Code technology was carried out through response questionnaires that were distributed to students. The questionnaire sheet contains indicators and symbols of likes and dislikes that students can choose, which is a form of their response to the product. Through the response questionnaire, it was concluded that students liked the Cheerful Box learning media with QR Code technology.

Table 8. Student Response Questionnaire

No.	Statement	🙂	☹
1.	It is easy to understand and memorise the concept of geometric shapes.	95%	5%
2.	Easy to use	100%	100%
3.	Safe to use	100%	100%
4.	Interesting	100%	100%

From the results of the student response questionnaire tabulation, it shows that on average all students' answers to the indicators in the questionnaire are filled with like symbols, which can be seen from the enthusiasm of students when learning and playing using the Cheerful Box learning media with QR Code technology.

The final stage in this research is a summative evaluation, which is carried out at the final stage after the product has been tested to determine its effect. This summative evaluation is carried out by looking at the results of hypothesis testing through expert

validation and a paired sample t-test, which have been carried out to determine the feasibility and effectiveness of the learning media products developed.

CONCLUSION

The diminished interest and motivation of kids in the classroom, along with the limited utilization of tangible learning materials in elementary schools, contribute to reduced effectiveness in the learning process and suboptimal learning results. The significance of the presence of educational media necessitates that each educator possesses the capacity to create instructional materials. The findings of the requirements analysis indicate that there is a perceived need for a comprehensive understanding of the idea of geometric materials pertaining to plane forms and geometric shapes in primary schools.

The findings of this study indicate that the learning media product, the Cheerful Box with QR Code technology, has been validated by material experts and media experts, and is classified as "Very Valid". In the course of conducting trials on the Cheerful Box learning media product, which incorporates QR Code technology, a notable disparity was observed between the mean scores of the pretest and posttest assessments. This difference was determined to be statistically significant, as evidenced by a p-value of 0.000, which is less than the predetermined significance level of 0.05. Based on the evidence presented, it can be inferred that the utilization of the Cheerful Box learning media, using QR Code technology, seems to be efficacious in fostering elementary school pupils' comprehension of flat geometry and geometric shapes. Therefore, it can be argued that the learning media of the Cheerful Box, including QR Code technology, falls within the realm of high-quality media and is well-suited for use due to its adherence to the criteria of validity and effective.

The utilization of learning media in educational settings as a means to address challenges encountered during the learning process presents a noteworthy opportunity for future research and development. Specifically, there is a need to explore the creation of innovative and creative learning media that integrate technological elements in elementary schools, aligning with contemporary advancements. Educators ought to enhance their proficiency in employing and cultivating instructional media to foster a more engaging learning environment and enhance the effective of the teaching and learning process, while preserving the fundamental content of the subject matter being conveyed.

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