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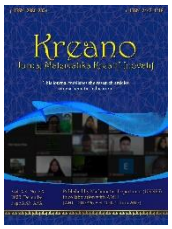

Development of Monokram (Islamic Integrated Mathematics Monopoly) Learning Media on Numbers Material

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Abstract

Learning and understanding mathematical concepts must be done with an engaging and innovative approach. This research aims to develop a creative learning media as an Islamic-integrated mathematical monopoly game to instill character education with Islamic and mathematical concepts. The research and development utilize the ADDIE model: analyze, design, develop, Implement, and Evaluate. To test the product, the researcher involves students from class VII H MTsN 2 Jember. Data collection involves interviews, questionnaires, and tests analyzed for validity, practicality, and effectiveness. The Islamic-Integrated Mathematics Monopoly Learning Media (Monokram) has been validated by experts with an average percentage above 94%, categorized as highly valid. Practicality is affirmed by student questionnaires with an average percentage above 80%, indicating practicality. Pretest and posttest results using N-Gain show an average above 0.3, categorizing the effectiveness of Monokram as moderate/effective. Based on these results, it is hoped that this research and development will motivate the growth of Islamic-integrated mathematics learning media, enhancing students' understanding of mathematical and Islamic concepts.

Keywords: Learning Media; Monokram; Islamic Integrated; Numerical Concepts

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Abstrak

Proses pembelajaran dan pemahaman konsep matematika perlu dilakukan dengan pendekatan yang menarik dan inovatif. Penelitian ini bertujuan untuk mengembangkan media pembelajaran inovatif berupa permainan monopoli matematika terintegrasi Islam, sebagai salah satu cara untuk menamkan pendidikan karakter dengan konsep-konsep Islam dan matematika. Penelitian dan pengembangan ini menggunakan model ADDIE yang terdiri dari Analyze, Desain, Develop, Implementation, dan Evaluation. Kemudian untuk melakukan uji coba produk, peneliti menggunakan siswa-siswi kelas VII H MTsN 2 Jember sebagai subjek penelitian. Selain itu, proses pengumpulan data dilakukan denganmenggunakan wawancara, angket dan tes yang kemudian diolah melalui analisis kevalidan, kepraktisan, dan keefektifan. Media pembelajaran Monopoli Matematika Terintegrasi Islam (Monokram) telah tervalidasi oleh para ahli sebesar rata-rata persentase di atas 94% dengan kategori sangat valid. Sedangkan kepraktisan media didasarkan pada hasil angket siswa yang menunjukkan rata-rata persentase di atas 80% dengan kategori valid yang artinya media pembelajaran monokram berada pada kategori praktis. Dan hasil pretest dan postest melaui uji N-Gain diperoleh rata-rata di atas 0,3 yang artinya efektivitas media pembelajaran monokram berada pada kategori sedang/efektif. Berdasarkan hasil tersebut, diharapkan penelitian dan pengembangan ini dapat memotivasi berkembangnya media pembelajaran matematika terintegrasi Islam sehingga siswa-siswi semakin mengenal tentang konsep-konsep matematika dan Islam.

INTRODUCTION

Learning media is crucial for increasing students' understanding and enriching the mathematics learning process. One exciting innovation is the use of mathematics learning media that is integrated with Islamic values. According to Sudarisman, the importance of integrating Islamic values in science and religion showed a connection between these two fields (Pahrudin et al., 2019). This situation emphasizes the role of teachers as educators who must have creativity and innovation in the learning process.

Several studies showed that low mathematics learning achievement was caused by teachers' lack of innovation and creativity when designing learning. Most still need to apply conventional methods to provide mathematics material (Laja & Hijriani, 2022). Based on the Social Constructivism Theory developed by Lev Semyonovich Vygotsky (1896-1934), allowing students to interact with teachers would make students grow and learn well (Iskandar, 2015). Enjoyable learning will make students feel less bored and bored. Gagne, Briggs, and Wegner argued that learning was a series of activities arranged to transfer knowledge to students (Ariani Hrp et al., 2022). According to (Rahaju & Hartono, 2017), mathematics learning was often carried out by giving teachers monotonous concepts and teaching patterns. In line with this, games in learning were vital because they can be used as a warm-up or refresher and increase student activity (Kirikkaya et al., 2010). This effort is also inseparable from the role of teachers in providing facilities and infrastructure that can make it easier for students to understand abstract mathematical concepts with the help of learning media.

One of the exciting learning media innovations is game-based learning media. Learning media could be interpreted as a teacher's communication tool to convey messages to students that could stimulate students' thoughts, feelings, attention, and interests to achieve effective learning (Farihah, 2021). In line with this, students could understand the subject matter through the learning media provided (Byusa et al., 2022). Using game media could make it easier for students to understand learning than the usual delivery of material during the learning process, especially in mathematics (Priyastuti et al., 2020). Pemahaman konsep materi matematika dapat diimbangi dengan memberikan stimulus yang tepat (Permatasari & Prihatnani, 2021). Therefore, game-based learning media, one of which is monopoly learning media, can

be applied.

Monopoly is a game that uses a square game board. Generally, monopoly games are played to control all the tiles on the board through buying, renting, and exchanging properties in a simplified economic system (Wikipedia, 2023). Monopoly game media was one of the learning media that could make the learning process exciting, and students would feel challenged when playing (Ulfaeni, 2017). Game challenges positively impact learning; even though they do not affect it directly, they could make students enthusiastic during the learning process (Hamari et al., 2016). Learning that uses the game method is believed to increase student motivation and enthusiasm rather than provide punishment, which could make students more reluctant to participate in the learning process (BOLAT, 2023). Apart from that, students can also be introduced to Islamic concepts related to mathematics. Therefore, it is necessary to develop game-based mathematics monopoly learning media integrated with Islam, namely monokram.

Monokram (Islamic Integrated Mathematics Monopoly) is a game-based learning media with Islamic elements. The feature that differentiates it from Monopoly games is that it is shaped like a hexagon. The plots, which are usually filled or depicted with the names of countries, on the monokram contain images of Islamic historical places and Muslim scientists. Apart from that, land cards generally have the land price and are modified in monokram to become identity cards containing history or a short biography and mathematical problems on numbers integrated with Islam. There are also other differences. Namely, the monokram is played using spin, while Monopoly generally uses dice. Apart from that, the characteristic of this learning media is that the pieces are used to form Islamic icons.

The Islamic nuances presented in monokram teachings are often found in everyday life, which aims to instill character education in students. Students can apply real-life examples and descriptions to teach and realize student character education. Recently, students' weak character and morals have been considered something that needs to be addressed in school education (Chang, 2022). Therefore, researchers present innovative game-based learning media integrated with Islam, which contains character education values.

An illustration of the values of character education in the monokram is presented in biographies of Muslim scientists and Islamic historical places. This aims to enable students to emulate the spirit of Muslim scientists in fighting for basic knowledge that still survives today. An optimistic and never-giving spirit is a strong foundation for forming student character in the school environment and the community. Then, it is hoped that the presence of Muslim historical places can open students' insight into history that will never be forgotten as a form of appreciation for the Islamic religious warriors. An accurate description can motivate students to be more enthusiastic about studying. The learning media is packaged in the form of a mathematics monopoly game.

The difference between this research and development and previous relevant research is the need for more availability of monopoly mathematics learning media that is integrated with Islam. Therefore, monokram learning media has an urgency regarding the importance of instilling character education in students to develop religious thinking mathematically and procedurally through integrated Islamic mathematics problems, one of which is number material.

This research aims to build mathematics learning media based on an Islamic integrated monopoly game that meets valid, practical, and effective criteria for achieving good product standards.

Based on this description, researchers feel it is necessary to develop monokram learning media.

METHOD

The research used the Research and Development (RnD) method. The researcher describes the validity, practicality, and effectiveness of the Monokram (Islamic Integrated Mathematics Monopoly) learning media on number material. The research subjects consisted of 26 class VII H MTsN 2 Jember students with different abilities. The data collection instruments used were interviews, questionnaires, and tests. Interviews were conducted with mathematics teachers to analyze the learning process in schools as an initial step in product development. The questionnaire contains questions or statements to measure the validity of the validator and student responses to the product being developed. Meanwhile, the test was carried out during a large group trial with 26 students, using a pretest before product implementation and a posttest after product use, which contained 10 validated multiple-choice questions.

Researchers used the ADDIE model in this development research. The ADDIE model, according to (Rusmayana, 2021) includes five stages: (1) Analyze, (2) Design, (3) Develop, (4) Implementation, and (5) Evaluation. In the analysis stage, interviews were conducted with mathematics teachers, and a survey was conducted on the use of learning media by students at MTsN 2 Jember to meet needs in the field. In the design stage, a draft is carried out, which includes the initial design of the monokram, a description of the use of the monokram, the preparation of the assessment instrument, and the collection of supporting materials. In the development stage, researchers begin to produce Islamic integrated mathematics monopoly learning media, which will be tested by experts so that the improvement process can be carried out. Media experts validate the product design before the learning media continues to the next stage. Media experts validate the product design, and the results indicate that revisions may need to be made based on the suggestions and notes provided by the validator. In the implementation phase, product trials were carried out to obtain feedback regarding the monokram learning media so that the results of the practicality of the learning media were obtained as measured through student questionnaires. The final stage is evaluation, which manages the assessment results and conclusion.

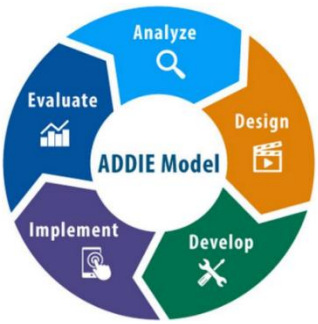

Figure 1: ADDIE Reseaerch Steps

Researchers used a four-choice Likert scale to measure product validity in this study with ratings of very valid (4), valid (3), less valid (2), and invalid (1) (Sugiyono, 2022). The collected data is analyzed quantitatively with the formula:

$$P = \frac{X}{X_i} \times 100\%$$

Description: P = Percentage of each criterion | X = Rate each criterion | X_i = Maximum value for each criterion

The percentage value that has been obtained will be included in the interpretation criteria for the validity test category in the table below:

Table 1. Presentase Kriteria Validasi

No.	Achievement Value (Score)	Category Validity	Description
1	41.00%-55.00%	Invalid	Not allowed to use
2	56.00%-70.00%	Less Valid	Can be used after major revision
3	71.00%-85.00%	Valid	It can be used after minor revisions
4	86.00%-100.00%	Very Valid	Excellent to use

Source: (Zahroh, 2022)

Three data collection instruments are used to determine valid data based on the research subjects: interviews, questionnaires, and tests. Interviews are conducted as an initial analysis of the product to be developed. Then, a questionnaire was conducted to test the validity of the validator and students' responses to the learning media. Meanwhile, the test was carried out on 26 students through a pretest before using learning media and a posttest after using learning media.

Researchers tested the effectiveness of learning media using the N-Gain test. N-Gain test to get the average pretest-posttest carried out before and after using learning media.

RESULTS AND DISCUSSION

Results

This research produces an Islamic integrated mathematics monopoly learning media product with number material. The product is designed using CorelDrawX7 software. This product is the development of Islamic integrated mathematics monopoly learning media for junior high school students in class VII in semester 1.

The development of monokram learning media was then revised according to suggestions from media experts, subject matter experts, religious experts, and language experts. The development of Islamic integrated mathematics monopoly learning media on number material was tested directly with students. The components of the monokram (Islamic integrated mathematics monopoly) are the monopoly board, game guidebook, pawns, identity cards, reward cards, and motivation cards.

(1) The monopoly board is hexagonal; there are 36 boxes containing 20 boxes with pictures of Islamic historical places, ten boxes with images of Muslim scientists, and six other boxes containing stars, rewards, motivation, free parking, return to start, and punishment; (2) The game manual contains the definition of monokram, the game system used, game rules, and what material must be studied when using monokram learning media. Monokram learning media is played in groups, with each group having 4-5 members; (3) There are six game pieces with designs based on Islamic icons.; (4) There are two parts to the identity card. The front of the card contains short biographies of Muslim scientists or brief histories of Islamic historical places. Meanwhile, the back of the card includes questions that students must solve. These questions discuss basic number material, number material integrated with Islam, and several cards that contain questions about character education. At the bottom of the question is a score box with a range of 1-5; (5) The reward card contains basic knowledge questions about Islam with a score range of 6-9; and (6) Motiva-

tional cards contain words of encouragement from one player to another.

Figure 2 is a monokram design. The complete monokram components can be accessed at the following link: https://drive.google.com/drive/folders/1sWkzkgp-KpgIx8g4dTE264guYK8vtguP?usp=sharing

Figure 2: Monokram Learning Media

The first stage begins with conducting analysis, namely field and literature studies. The field study was carried out by interviewing the subject teacher, Mr. Hosnan, S.Pd., M.Pd. Curriculum analysis showed that the curriculum used at MTsN 2 Jember was the 2013 curriculum. Apart from that, subject and syllabus analysis was used to help direct the creation of learning media to suit the objectives. The field study was conducted by interviewing the MTsN 2 Jember Mathematics teacher regarding using learning media such as those used during KBM, namely Mr. Hosnan, S.Pd., M.Pd. Meanwhile, literature studies are carried out to look for research references that are relevant to the research to be conducted.

The second stage is design. The planning stage starts with preparing a draft containing the initial design and description of the monokram use system, preparing assessment instruments, and collecting supporting materials.

The third stage is the development stage, where at this stage, the researcher creates learning media according to the plans that have been made previously. In the development process, the researcher used CorelDraw X7 software and the Canva application to design the monokram board and accompanying cards. The monokram boards created contain images of Muslim scientists and Islamic historical places. The monokram design adopts and adapts from "Development of Mathematical Monopoly Media on Opportunity Material" by Desy Rossa Deviana and Erlina Prihatnani (Deviana & Prihatnani, 2018).

The monokram is designed in a hexagonal shape, and there are three complementary cards, namely, an identity card, a motivation card, and a reward card, as well as six supporting pieces in the form of Islamic icons. After the monokram learning media is completed, it is validated by media experts, subject matter experts, religious experts, and language experts. Media expert validation includes aspects of design, materials used, and accuracy of media size. The results of the feasibility assessment by media experts were a score of 54 and a feasibility percentage of 96.43%, which was included in the "Very Valid" category. Question expert validation includes question feasibility and question presentation. The results obtained were a score of 54 and a feasibility percentage of 97.92%, included in the "Very Valid" category. Validation by religious experts consists of the suitability of Al-Qur'an verses, which are integrated with questions on number material. The results obtained a score of 11 and a feasibility percentage of 91.67%, included in the "Very Valid" category. Meanwhile, linguists cover the suitability of the language presented in the media. The result was a score of 45 and a feasibility percentage of 93.75%.

The fourth stage is the implementation stage. The media has been improved according to expert advice before being tested on students at the implementation stage. There are two stages of

testing, namely small group trials with six students and field trials with 26 students. This provides a positive response from students because the interactive learning concept that focuses on students will make them feel more comfortable and easier to understand (Smith et al., 2023). Trials on students include learning motivation, ease of use, attractive appearance, and media usefulness. The results of the feasibility percentage in the small group trial were 78.85%, which was included in the "Valid" category. The results of the feasibility percentage in the field trial were 88.91%, which was included in the "Very Valid" category. These results indicate that monokram learning media is practical.

The researcher tested the effectiveness of the learning media through pretest-posttest carried out before and after the use of monokram learning media. The achievement of effectiveness in using monokram learning media based on the results of the pretest and posttest through the N-Gain test was obtained on average above 0.3, which means that the effectiveness of monokram learning media is in the medium/effective category.

The fifth stage is the evaluation stage. This stage carries out the management of the assessment results and conclusion. Based on the results of questionnaires from experts and students, it was concluded that the learning media based on the integrated Islamic monopoly game on number material was declared suitable for use.

Discussion

The learning media developed was declared valid based on the validation results at the development stage. The validity of the media is based on the validation results of subject matter experts, media experts, language experts, and religious experts. The validation results of the question, media, language, and spiritual experts show that the average percentage is above 94%, with a very valid category.

Furthermore, the results of students' practicality of learning media at the implementation stage were stated to be practical. The practicality of the media is based on the results of a student questionnaire, which shows an average percentage of above 80% in the valid category, which means that monokram learning media is in the practical category. These results are strengthened by Fatimatuz Zahroh's research, which shows that at the trial stage of use on ten students, an average percentage of 85.12% was obtained with efficient criteria (Zahroh, 2022).

Islamic integrated mathematics monopoly learning media on number material covers the concept of numbers and facilitates students' active participation through this media. This media integrates mathematical concepts with Islamic values, which is important for forming good individuals and characters (Ferayanti et al., 2019). Apart from that, the monokram learning media also presents elements of short biographies of Muslim scientists and brief histories of historical Islamic places to show students that this material is related to the Islamic world and can be applied in everyday life. This is proven by the existence of a number of elements that appear repeatedly in the Al-Qur'an to clarify the content and meaning of the Al-Quran verse itself (Rosmalia, 2021). An example of the existence of several elements in the Al-Qur'an is in the QS. Al-Ankabut verse 14 means, "And indeed, we sent Noah to his people, so he lived with them for a thousand or less fifty years. Then they were hit by a big flood and were unjust people". If you pay attention in detail, this

verse contains the concept of subtraction operations on whole numbers, namely in the sentence ...*then he lived with them for one thousand or fifty years*... which is the concept of subtraction that students often use during the mathematics learning process.

The mathematics learning process when researchers conducted research showed that students responded very enthusiastically to student-centered learning. This opinion was in line with research by (Byusa et al., 2022) which stated that students could learn well when allowed to study together with peers rather than sitting passively listening to the teacher's explanation of the material. The research is also supported by Vygotsky's theory, which highlights the significance of social interaction in the learning process through discussion and collaboration activities with other individuals (Saksono et al., 2023).

The Islamic integrated mathematics monopoly learning media, or monokram, presents questions in essay format related to the Islamic context, which is contained in question cards. There are 30 question cards containing Islamic integrated mathematics questions, which each student and their group will later complete, then be corrected by the accompanying teacher and given a score according to the predetermined answers. One example of a question in the question card is, If the results obtained from the 14th verse of Surah Al-Ankabut are divided by the number of prophets and messengers we must believe in, what is the result? Such questions are presented not only to make students interested but also to deepen students' understanding and abilities when solving questions. This is designed so that students have a high learning experience.

The results of a high learning experience process by students can create a learning atmosphere that is fun and not monotonous. This is shown in the pretest and posttest scores obtained through the N-Gain test, which were brought on average above 0.3, which means that the effectiveness of monokram learning media is in the medium/effective category. Thus, this research provides evidence that involving students during the learning process can provide opportunities for them to use the knowledge and skills they have acquired, ultimately increasing learning motivation.

In general, the advantages of the monokram learning media that have been developed are (1) an attractive and interactive media display design with Islamic nuances, (2) the media is equipped with Islamic integrated mathematics questions so that students get new experiences in learning, (3) students can interact directly with learning media so that students are active in using the media, (4) monokram learning media can arouse students' interest and motivation to learn, (5) monokram learning media is packaged in a rectangular box made of plywood so it is light and easy to carry. However, the media provides material that is presented in a limited way, with only several materials for class VII.

Implication of Research

This research has significant implications. It is hoped that future researchers can explore further the development of methods or strategies for integrating Islamic elements in mathematics learning media. Educators in mathematics can benefit from this research to increase student engagement and broaden their understanding of mathematics in an Islamic context. For administrators, considering the application of game-based interactive learning media in the curricu-

lum can be a step to advance education oriented towards integrating Islamic values.

Limitation

The study has several limitations that need to be acknowledged. First, the reference sources in this research need to be more representative, especially in the context of Islamic integration. Thus, it can affect the generalization of the findings in this research. Second, the number of research subjects may be representative because this research was only conducted in one class with 26 students. Third, this monokram learning media is limited to several materials in class VII MTs only. This needs to be acknowledged as an obstacle in using monokram learning media. Fourth, an Islamic context that can explain character education values still needs to be improved. So that further research can develop research studies that are much more perfect. Thus, it is essential to remember that every study has certain limitations. Therefore, these limitations can help future researchers and readers interpret the results more wisely.

CONCLUSION

The development of Islamic integrated mathematics monopoly learning media or monokram was declared valid, practical, and effective for use in learning. This is shown based on 1) the validation results of experts with an average percentage above 94% with a very valid category, 2) the practicality of the media is based on the results of student questionnaires, which show an average percentage above 80% with a valid category, which means the media monokram learning is in the practical category, 3) the pretest and posttest results using the N-Gain test obtained an average of above 0.3, which means the effectiveness of monokram learning media is in the medium/effective category. Developing this learning media also positively impacts students' understanding of mathematical concepts. Integrating Islamic values in the content presented in the media provides new experiences for students while increasing student interest and participation.

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