DEVELOPMENT OF EDUCATIONAL GAME MEDIA WITH AN ETHNOMATHEMATICS APPROACH BASED ON BANYUMAS CULTURE AND SCIENCE

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ABSTRAK

Kemampuan numerasi, literasi sains, dan sosial budaya adalah kompetensi yang harus dimiliki siswa untuk menyelesaikan masalah humanis dan berbasis saintifik. Untuk meningkatkannya, dapat dilakukan salah satunya menggunakan pembelajaran berupa *game* edukasi. Oleh karena itu, tujuan dari penelitian ini adalah mengembangkan media pembelajaran *game* edukasi dengan pendekatan etnomatematika berbasis budaya Banyumas terintegrasi Sains. Jenis penelitian yang digunakan adalah penelitian R&D atau Research and Development. Hasil dari penelitian ini menunjukan bahwa media pembelajaran *game* edukasi dengan pendekatan etnomatematika berbasis budaya Banyumas terintegrasi Sains valid dan layak digunakan sesuai dengan hasil validasi ahli materi dan konteks Matematika sebesar 80% dengan kategori "valid", validasi ahli materi IPA sebesar 98,45% dengan kategori "sangat valid", validasi ahli media sebesar 86,25% dengan kategori "sangat valid". Hal ini semakin didukung dengan hasil angket guru matematika sebesar 90,15% dengan kategori "sangat menarik", angket guru IPA sebesar 90,46% dengan kategori "sangat menarik", dan uji coba kelompok kecil sebesar 83,28% dengan kategori "menarik sekali".

Kata Kunci: Etnomatematika, game edukasi, media pembelajaran.

ABSTRACT

Numeracy skills, scientific literacy, and sociocultural awareness are essential competencies that students must possess to solve humanistic and science-based problems. One way to enhance these skills is through educational game-based learning. Therefore, this study aims to develop educational game media with an ethnomathematics approach based on Banyumas culture integrated with science. The research method used is Research and Development (R&D). The results of this study show that the educational game media with an ethnomathematics approach based on Banyumas culture integrated with science is valid and feasible for use. Validation results include material and mathematics context expert validation at 80%, categorized as "valid"; science content expert validation at 98.45%, categorized as "very valid"; and media expert validation at 86.25%, categorized as "very valid". This is further supported by the results of the mathematics teacher questionnaire of 90.15% with the category "very interesting", the science teacher questionnaire of 90.46% with the category "very interesting", and small group trials of 83.28% with the category "very interesting".

Keywords: Ethnomathematics, educational games, learning media.

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INTRODUCTION

The education system and learning management in schools must adapt to the rapid and often unpredictable developments in various aspects of life. This has an impact on the learning process, which needs to equip students with comprehensive knowledge across different disciplines. Numeracy skills, scientific literacy, and socio-cultural understanding are essential competencies that students must possess to solve humanistic and scientifically-based problems.

Numeracy is the ability to think using mathematical concepts, procedures, facts, and tools to solve everyday problems in various situations that are relevant to individuals as citizens of Indonesia and the world. Scientific literacy is the ability to use scientific knowledge to explain, design scientific investigations, and interpret data and evidence scientifically. Socio-cultural literacy is the ability to understand, accept, and appreciate diverse cultural and social realities, think critically and wisely, and use these skills to acquire knowledge and actively participate in community life (Hidayat, 2023).

The numeracy and literacy skills of Indonesian students are periodically measured through the Computer-Based National Assessment (ANBK) for schools and the Indonesian Madrasah Competency Assessment (AKMI) for madrasahs. The results show that the numeracy and literacy skills of Indonesian students are still in the "moderate" category. As stated in the 2023 Indonesian National Education Report, 40.63% of students have numeracy competencies above the minimum level, while 59.00% have literacy skills above the minimum level (Kemdikbud, 2023). It was further mentioned that one of the efforts to improve student competencies is by encouraging them to apply various mathematical principles to solve everyday problems in the family, school, and community environments.

In addition to national assessments, the competencies of Indonesian students are also evaluated through the Program for International Student Assessment (PISA), conducted by the Organization for Economic Co-operation and Development (OECD). Various factors influence a student's abilities, including external factors such as the learning environment at school and home, teaching methods, the availability of learning facilities, and others. These factors were also investigated in PISA 2018 through student and school surveys, which examined the responses of school principals and students' perceptions regarding these factors (OECD, 2018). Based on these external factors, one of the proposed solutions to address low numeracy literacy, scientific literacy, and socio-cultural literacy is the

implementation of learning using technology-based instructional media. Instructional media encompass all forms and means of delivering information used to stimulate students' attention, thinking, motivation, and emotions. It is aligned with learning theories and serves as a tool to achieve learning objectives, acting as a channel for messages to facilitate an effective learning process (Suryani et al., 2019).

There are various technologies that can be used to help students understand concepts in learning (Huang et al., 2019). However, the use of educational games as a learning medium is still quite rare (Pratama et al., 2019). Educational games help children improve their thinking skills and enhance problem-solving abilities and concentration. The benefits of educational games include practicing subject matter skills, improving concentration, developing motor skills, and understanding cause-and-effect concepts (Handriyantini, 2009).

Furthermore, educational games can be utilized as learning media and as a strategy for incorporating technology into Science (IPA) education. Previous studies have shown that both teachers and students in Junior High Schools (SMP) in Banyumas Regency have a positive perception of educational games in Math and Science. Teachers believe that games featuring evaluation questions and simulations are the most important. Additionally, students tend to prefer adventure-based games. Educational games need to consider aspects such as design, content, and accessibility, while also being challenging and engaging for students (Putri et al., 2023). The perceptions of Science teachers and students towards educational games are positive and enthusiastic (Sekarini, 2019). Students' interest in learning Science can be significantly enhanced by using educational games, as this approach makes the learning process more enjoyable (Fayanto et al., 2023).

The integration of mathematics and culture has become increasingly important, not only to help students understand mathematical concepts but also to preserve cultural heritage. In the era of globalization, the shift towards a more modern lifestyle has led people to prefer foreign cultures over local traditions. As a result, foreign cultures are often more celebrated, while local cultures begin to fade (Nahak, 2019). Integrating mathematics education with cultural elements allows mathematics educators to contribute to cultural preservation. This study of mathematics within cultural contexts is known as ethnomathematics.

D’Ambrosio, a Brazilian mathematician, was the first to introduce

the term ethnomathematics (Pathuddin & Raehana, 2019). Ethnomathematics serves as a bridge between mathematics and culture, facilitating student understanding by incorporating local cultural traditions into mathematics lessons (Putri, 2017). Furthermore, integrating Science (IPA) with culture can be an innovative approach to enhancing the quality of education and instilling values of local wisdom (Wardhani et al., 2022). The integration of Science with local culture helps preserve regional traditions and contributes to the character development of students (Rahayu et al., 2022). This approach can improve both cognitive learning outcomes and students' patriotic character, as it increases their awareness of the natural wealth of their homeland (Sutarja et al., 2023).

This study, conducted by Fulana & Kumala (Fulana & Kumala, 2024), demonstrates that the use of culture-based educational game media effectively improves students' mathematical understanding skills. The N-Gain value of the experimental group is 0.83, which falls into the high category, while the N-Gain value of the control group is 0.37, which falls into the moderate category. Therefore, it can be concluded that culture-based educational game media is effective as a learning medium for mathematics material. This research is highly significant as there has not been a study specifically focused on the development of an educational game that applies an ethnomathematics approach based on Banyumas culture, integrating science to enhance students' numeracy, scientific, and socio-cultural literacy. The researcher will conduct a study titled "Development of Educational Game Media with an Etnomathematics Approach Based on Banyumas Culture and Science".

The research problem in this study is formulated as follows, 1) How is the development of educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science?, 2) What is the validity of educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science?. The objectives of this study are, 1) To describe how the development of educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science, is carried out. 2) To describe the validity of educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science. The benefits of this research are as follows, This study contributes to the development of knowledge related to educational media, specifically educational games, where these games are linked to ethnomathematics based on Banyumas culture and integrated with Science. The

aim is to achieve student learning objectives in the topics of geometry, simple machines, sound and the process of hearing, as well as additive substances.

METHOD

The Research and Development (R&D) methodology is used in the research, aiming to investigate, design, and produce a product as well as test its validity and effectiveness (Sugiyono, 2020). The development process will result in a new product in the form of an educational learning media, specifically an ethnomathematics-based educational game rooted in Banyumas culture, focusing on the geometry topic for 7th-grade students. This game will be available as an Android application (.apk) and a computer application (.exe). The steps (procedures) for developing the ethnomathematics-based educational game integrated with science follow the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) (Cahyadi, 2019).

This research was conducted at junior high schools (SMP) and Islamic junior high schools (MTs) in the Banyumas Regency area, namely:

1. MTs Ma'arif NU 1 Sokaraja
2. PPKS Al Hidayah Karangsuci Purwokerto
3. SMP Muhammadiyah 1 Purwokerto
4. MTs Ma'arif NU 1 Karanglewas
5. SMP Muhammadiyah Boarding School Zam-Zam Cilongok

The limited product trial will be carried out during the first semester of the 2024/2025 academic year, specifically from July to August 2024. The population in this research consists of all students in Phase D (junior high school level/SMP/MTs) from 5 schools, namely: a) MTs Ma'arif NU 1 Sokaraja, b) PPKS Al Hidayah Karangsuci, c) SMP Muhammadiyah 1 Purwokerto, d) MTs Ma'arif NU 1 Karanglewas, e) SMP MBS Zam-Zam Cilongok.

The sample for this research will be selected randomly using a lottery method, where student names are written on pieces of paper. From the population, 15 students will be chosen from each school, resulting in a total sample size of 75 students.

This research utilizes two types of data: quantitative and qualitative data. Quantitative data are obtained from student assessment questionnaires, while qualitative data are gathered from feedback provided by validators, teachers, and students.

Interviews were conducted with mathematics and science teachers, as well as students at 5 schools/madrasahs, to gather information about the use of mathematics and science learning media. Questionnaires are a common data

collection technique that allows researchers to gather information through a series of questions directed at several respondents (Sugiyono, 2020). In this study, validation and attractiveness questionnaires will be used. Validation Questionnaire, Administered to expert lecturers in media and content (Mathematics and Science) to obtain data on the validity of the media. Attractiveness Questionnaire, Distributed to Mathematics and Science teachers, as well as students from 5 junior high schools (SMP/MTs) in Banyumas Regency, to assess the appeal of the educational media.

Research Instruments

1. Interview Sheet

The interview sheet contains questions that will be asked during interviews with teachers and students.

2. Validation Questionnaire

The product's validity is measured using a validation questionnaire. This questionnaire is given to experts in mathematics, science, and the ethnomathematics context, as well as media experts. The statements in the validation questionnaire include different scoring options.

3. Attractiveness Questionnaire

The attractiveness questionnaire is used to assess the level of interest in the product during trials involving students and mathematics and science teachers.

Data Analysis Techniques

1. Expert Validation Data Analysis

The quantitative data obtained from the validation questionnaires filled out by experts in mathematics, science, ethnomathematics, and media are analyzed using a percentage formula based on the responses provided. Meanwhile, the qualitative data are analyzed to draw conclusions and identify suggestions for improving the educational game media (Lestari & Yudhanegara, 2017).

2. Attractiveness Questionnaire Data Analysis

The attractiveness questionnaire is given to mathematics and science teachers, as well as all students. The results are converted into percentages using formula (3) to assess the appeal of the educational game media developed by the researcher.

RESULT AND DISCUSSION

Development of an Ethnomathematics-Based Educational Game Integrated with Banyumas Culture and Science

The development of this educational game product uses the ADDIE model based on Cahyadi's approach but is limited to the stages of analysis, design, development, product revision after successful development, and implementation in a small group.

1. Analysis Stage (Analysis)

Analysis was conducted by interviewing Mathematics and Science teachers for 8th-grade students at five schools in Banyumas Regency, namely Wiko Sari, S.Pd., a Mathematics teacher, and Catur Indah Erawati, S.Pd., a Science teacher at MTs Ma'arif NU 1 Sokaraja; Asri Maghfirotul Fauziah, S.Pd., a Mathematics teacher, and Tulis Krismiatun, S.Pd., a Science teacher at PKPPS Al Hidayah Karangsuci Purwokerto; Wildan Abadi, S.Pd., a Mathematics teacher, and Tri Wulandari, S.Pd., a Science teacher at SMP Muhammadiyah 1 Purwokerto; Laeli Asih Setiyani, S.Pd., a Mathematics teacher, and Yuli Fitrianingsih, S.Pd., a Science teacher at MTs Ma'arif NU 1 Karanglewas; and Nurmalasari Azizah, S.Pd., a Mathematics teacher, and Avinda Elsadiani Setia, S.Pd., a Science teacher at SMP Muhammadiyah Boarding School Zam-Zam Cilongok.

Based on the interview results, it can be concluded that during the learning process, students still face difficulties in understanding the material and solving problems in Mathematics and Science. To address this issue, an educational game media was developed using an ethnomathematics approach based on Banyumas culture, integrated with Science. The educational game plays a crucial role in assisting students in the learning process. The content linked to this educational game is expected to create a new atmosphere and enhance students' numeracy, scientific, and socio-cultural literacy skills.

2. Planning Stage (Design)

In the design phase, based on the analysis conducted previously, the researcher then focuses on creating a blueprint for the educational game media product using an ethnomathematics approach based on Banyumas culture integrated with Science. There are several steps that need to be taken, which are as follows.

a. First, the researcher designed the structure of the educational game media using an ethnomathematics approach based on Banyumas culture integrated with science. The structural framework includes the name of the educational game, theme design, background music, symbols related to the material, fonts used, animations, and menus available in the media.
b. Second, the researcher determined the content, described the developed game, provided the developer's identity, instructions, presentation of materials (covering geometry, simple machines, sound and hearing, and food additives), and practice questions.
c. Third, the researcher compiled the materials on geometry (plane figures and solid figures), simple machines,

sound and hearing, and food additives that will be explained. According to the analysis results, the materials were arranged as attractively and clearly as possible to help students improve their literacy in numeracy, science, and socio-cultural aspects.

d. The references used for the Mathematics material include the Grade VII Mathematics textbook from the Ministry of Education and Culture, first edition, published in 2021, as well as several previous research studies. Meanwhile, the references for the Science material include "Glencoe Science Level Green" written by Alton Biggs, "Conceptual Integrated Science" written by Paul G. Hewitt and colleagues, and an article titled "Spektrum Bunyi Alat Musik Kentong Berdasarkan Variasi Jumlah Lubang" (The Sound Spectrum of Kentong Musical Instruments Based on Hole Variation) by Siti Sarah.
e. Fourth, in addition to organizing the materials, the researcher developed educational games related to geometry, simple machines, sound and hearing, and food additives, which are integrated with Banyumas culture to enhance students' literacy.
f. Fifth, the researcher created a storyboard for the educational game media with an ethnomathematics approach based on Banyumas culture integrated with science. The storyboard is needed to illustrate the appearance and sequence of the educational game more clearly. The storyboard was created using PowerPoint.

3. Development Stage (Development)

The product was developed using "Adobe Flash Professional CC 2015". The storyboard that was created serves as the foundation for the development process, ensuring that the educational game media aligns with the storyboard design. This educational game media, using an ethnomathematics approach based on Banyumas culture integrated with science, features three main components: the game feature, the content feature, and the practice exercises feature. The game feature includes problems that are integrated with Banyumas culture, requiring students to solve them. At the end of this game feature, students receive a score based on their performance.

The second feature, the content feature, presents Mathematics materials, which include topics on plane figures (basic properties of plane figures and geometric transformations) and solid figures (properties of solid figures and measurements of solid figures), as well as Science materials, covering simple machines, sound and hearing, and food additives. The third feature is the practice exercises, which consist of multiple-choice

questions that students can complete, with a score displayed at the end of the exercise. The developed educational game media is available in two output formats: an Android application (.apk) and a computer application (.exe), making it easier for students to use this learning media.

a. Menu Display

Figure 1. Educational Game Menu Display Design

b. Display Instructions for Use

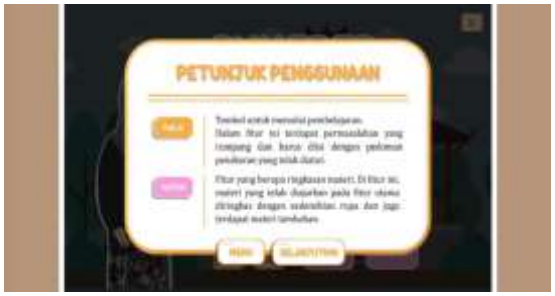


Figure 2. Display Design of Instructions for Using Educational Games

c. Information Display

The Information Display includes an explanation of the SUMEREP application (Sinau Matematika bareng IPA or Learning Mathematics with Science), the learning objectives, and the developer's profile.

Figure 3. SUMEREP Information Design

Figure 4. Design of Learning Objectives for Flat Building Materials

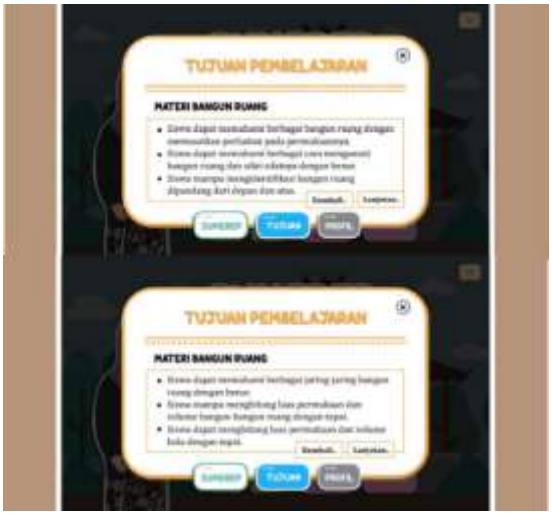


Figure 5. Design of Learning Objectives for Building Space Materials

Figure 6. Design of Learning Objectives for Simple Airplane Material

Figure 7. Educational Game Developer Profile Design

d. Display of educational game features

Figure 8. Design of Educational Game Features

e. Material Feature Display

Figure 9. Material Feature Design

f. Display Practice Questions

Figure 10. Design of the Practice Question Display

4. Implementation Stage

The educational game using an ethnomathematics approach based on Banyumas culture integrated with science was implemented in a limited scope for Mathematics and Science learning in Grade VIII at five schools in Banyumas Regency. These schools are MTs Ma'arif NU 1 Sokaraja, PKPPS Al Hidayah Karangsuci Purwokerto, SMP Muhammadiyah 1 Purwokerto, MTs Ma'arif NU 1 Karanglewas, and SMP Muhammadiyah Boarding School Zam-Zam Cilongok. The implemented materials included geometry (plane figures and solid figures), simple machines, sound and hearing, and food additives. Before the implementation, the game underwent testing by subject matter experts in ethnomathematics, Science experts, and media experts. Additionally, attractiveness questionnaires were distributed to Mathematics and Science teachers at the five schools. The attractiveness questionnaire was also given to a small group of 15 randomly selected Grade VIII students from these schools. A broader field implementation of the educational game is planned for 2025.

5. Evaluation Stage

The evaluation phase will be conducted in the 2025 research study, focusing on assessing the effectiveness of the SUMEREP educational media developed in this project.

The Validity of Educational Game Media Using an Ethnomathematics Approach Based on Banyumas Culture Integrated with Science

1. Material Expert Test and Ethnomathematics Context

The expert validation of subject matter and ethnomathematics context was conducted by Dr. Maria Ulpah, S.Si., M.Si., a lecturer in Mathematics Education at UIN Prof. K.H. Saifuddin Zuhri Purwokerto. This evaluation aimed to assess the feasibility of the geometry content and ethnomathematics context within the educational game media using an ethnomathematics approach based on Banyumas culture integrated with science before it was tested on students. The summary of the results from the expert validation of the subject matter and ethnomathematics context for this educational game media is as follows.

Table 1. Material Expert Test Results and Ethnomathematics Context of Educational Games

No	Rated aspect	Score	Percentage (%)	Category
1	Eligibility of content	28	80,00	Valid
2	Feasibility of presentation	12	80,00	Valid
3	Feasibility of presentation	24	80,00	Valid
4	Ethnomathematics based on Banyumas culture	20	80,00	Valid
Average Percentage Score for All Aspects			80,00	Valid

Based on Table 1 it can be seen that the score for the content feasibility aspect has an average percentage score of 80.00%, which falls into the "Valid" category. Based on these results, it can be concluded that the material and ethnomathematics context in the educational game using an ethnomathematics approach based on Banyumas culture integrated with science are suitable for use and testing with students, with revisions made according to the validator's suggestions. The revisions made are as follows.

a. Addition of Ethnomathematics in the Line and Angle Material

Before Revision	After Revision
There is no ethnomathematics regarding the material features of lines and angles	There is ethnomathematics in the material features of lines and angles

Figure 11. Revised Results Addition of Ethnomathematics in the Line and Angle Material

b. Addition of Ethnomathematics in the Square Material

Before Revision	After Revision
There is no ethnomathematics on square material features yet	There is ethnomathematics in square material features

Figure 12. Revised Results Addition of Ethnomathematics in the Square Material

c. Addition Ethnomathematics in the Rectangular Material

Before Revision	After Revision
There is no ethnomathematics on rectangular material features yet	There is ethnomathematics in rectangular material features

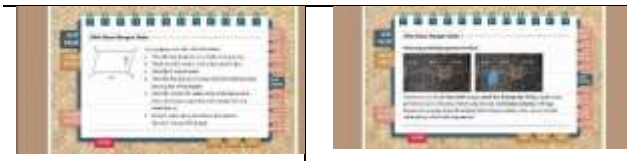
Figure 13. Revised Results Addition of Ethnomathematics in the Rectangular Material

d. Addition of Ethnomathematics in the Triangle Material

Before Revision	After Revision
There is no ethnomathematics on triangular material features yet	There is ethnomathematics in the material features of triangles

Figure 14. Revised Results Addition of Ethnomathematics in the Triangle Material

e. Addition of Ethnomathematics in the Parallelogram Material



Before Revision	After Revision
There is no ethnomathematics in the material features of parallelograms	There is ethnomathematics in the material features of parallelograms

Figure 15. Revised Results Addition of Ethnomathematics in the Parallelogram Material

f. Addition of Ethnomathematics in the Trapezoid Material

Before Revision	After Revision
There is no ethnomathematics on trapezoidal material features yet	There is ethnomathematics in trapezoidal material features

Figure 16. Revised Results Addition of Ethnomathematics in the Trapezoid Material

g. Addition of Ethnomathematics in the Rhombus Material

Before Revision	After Revision
There is no ethnomathematics yet on the material features of rhombuses	There is ethnomathematics in the material features of rhombuses

Figure 17. Revised Results Addition of Ethnomathematics in the Rhombus Material

h. Addition of Ethnomathematics in the Kite Material


Before Revision	After Revision
There is no ethnomathematics in the material features of kites	There is ethnomathematics in the material features of kites

Figure 18. Revised Results Addition of Ethnomathematics in the Kite Material

i. Addition of Ethnomathematics in the Circle Material


Before Revision	After Revision
There is no ethnomathematics in the material features of circles yet	There is ethnomathematics in the material features of circles

Figure 19. Revised Results Addition of Ethnomathematics in the Circle Material

j. Addition of Ethnomathematics in the Translational Material


Before Revision	After Revision
There is no ethnomathematics in the translation material features yet	There is ethnomathematics in the features of translation material

Figure 20. Revised Results Addition of Ethnomathematics in the Translational Material

k. Addition of Ethnomathematics in the Rotation Material


Before Revision	After Revision
There is no ethnomathematics on rotational material features yet	There is ethnomathematics in the material feature of rotation

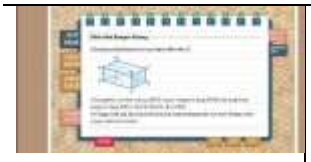
Figure 21. Revised Results Addition of Ethnomathematics in the Rotation Material

l. Addition of Ethnomathematics in the Reflection Material


Before Revision	After Revision
There is no ethnomathematics in the reflection material features	There is ethnomathematics in the reflection material features

Figure 22. Revised Results Addition of Ethnomathematics in the Reflection Material

m. Addition Ethnomathematics in the Block Material




Before Revision	After Revision
There is no ethnomathematics in the block material features yet	There is ethnomathematics in the material features of blocks

Figure 23. Revised Results Addition of Ethnomathematics in the Block Material

n. Addition of Ethnomathematics in the Limas Material


Before Revision	After Revision
There is no ethnomathematics in the pyramid material features yet	There is ethnomathematics in the pyramid material features

Figure 24. Revised Results Addition of Ethnomathematics in the Limas Material

o. Addition Ethnomathematics in the Ball Material


Before Revision	After Revision
There is no ethnomathematics on the material features of balls	There is ethnomathematics in the material features of balls

Figure 25. Revised Results Addition of Ethnomathematics in the Ball Material

p. Addition of Ethnomathematics in the Cone Material


Before Revision	After Revision
There is no ethnomathematics on cone material features yet	There is ethnomathematics in the material features of cones

Figure 26. Revised Results Addition of Ethnomathematics in the Cone Material

q. Addition of Ethnomathematics in the Tube Material


Before Revision	After Revision
There is no ethnomathematics on the material features of tubes	There is ethnomathematics in the material features of tubes

Figure 27. Revised Results Addition of Ethnomathematics in the Tube Material

2. Science Material Expert Test

The subject matter expert test for Science was conducted by Maghfira Febriana, M.Pd., who is a lecturer at the Faculty of Tarbiyah and Teacher Training (FTIK) at UIN Prof. K.H. Saifuddin Zuhri Purwokerto. This test aims to assess the feasibility of the Science content, including material on simple machines, sound and the hearing process, as well as additive substances in educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science, before conducting trials with students. The summary of the subject matter expert test results for the educational game media with an ethnomathematics approach based on Banyumas culture integrated with Science is as follows.

Table 2. Results of the Science Subject Matter Expert Test

No	Rated aspect	Score	Percentage (%)	Category
1	Eligibility of content	34	97,14	Very Valid
2	Feasibility of presentation	15	100,00	Very Valid
3	Language assessment	29	96,67	Very Valid
4	Banyumas cultural approach	25	100,00	Very Valid
Average Percentage Score for All Aspects		98,45	Very Valid	

Based on Table 2, it can be seen that the average percentage score for all aspects is 98.45%, which falls into the "Very Valid" category. Based on these results, it can be concluded that the Science content in the educational game with an ethnomathematics approach based on Banyumas culture, integrated with Science, is highly suitable for use and can be trialed with students after revisions based on the validator's suggestions. The revisions that have been made are as follows.

a. Addition of an Image Example of a Lever


Before Revision	After Revision
There is no image of an example of a lever yet	There is a picture of an example of a lever

Figure 28. Revision Results for Addition of Example Images Lever

b. Removal of the Shadow of Previous Answer Choices on the Quiz Exercise Feature


Before Revision	After Revision
There are shadows of answer choices for previous questions in the practice feature	There is no reflection of previous question answer choices in the practice feature

Figure 29. Revision results adding information regarding the concept of tone in Bonang

3. Media Expert Test

The media expert review was conducted by Fajry Subhaan Syah Sinaga, M.A., a lecturer at the Faculty of Tarbiyah and Teacher Training (FTIK) at UIN Prof. K.H. Saifuddin Zuhri Purwokerto. This review aimed to evaluate the feasibility of the educational game product, which integrates ethnomathematics with Banyumas culture and science. The summary of the media expert review results is presented in Table 3 below.

Table 3. Results of the Media Expert Review of the Educational Game

No	Rated Aspect	Percentage (%)	Category
1	Software	90,00	Very Valid
2	Visual Communication	82,50	Very Valid
Average Percentage Score for All Aspects	86,25	Very Valid	

Based on Table 3, it can be seen that the average percentage score for all aspects is 86.25%, which falls under the "Highly Valid" category. Based on these results, it can be concluded that the educational game product, which incorporates an ethnomathematical approach based on Banyumas culture and integrated with science, is highly feasible and can be tested with students, with the following revisions.

a. Changing the Font of Conversations to Make Them More Attractive

Before Revision	After Revision
Times New Roman conversational font	Comic Sans MS conversation font

Figure 30. Revised Results of Conversation Font Changes

b. Thickening the Background in the Game

Before Revision	After Revision
The background in the game is not thick enough	The background in the game has been bolded to make it easier to read

Figure 31. Revision Results for Background Thickening Games

4. Mathematics Teacher Trial Test

The trial with Mathematics teachers was conducted by testing the developed product with five Mathematics teachers in Banyumas Regency. The teachers involved were Wiko Sari, S.Pd., a Mathematics teacher at MTs Ma'arif NU 1 Sokaraja; Asri Maghfirotul Fauziah, S.Pd., a Mathematics teacher at PKPPS Al Hidayah Karangsuci Purwokerto; Wildan Abadi, S.Pd., a Mathematics teacher at SMP Muhammadiyah 1 Purwokerto; Laeli Asih Setiyani, S.Pd., a Mathematics teacher at MTs Ma'arif NU 1 Karanglewas; and Nurmalasari Azizah, S.Pd., a Mathematics teacher at SMP Muhammadiyah Boarding School Zam-Zam Cilongok. The purpose of this trial was to assess the attractiveness of the educational game as a learning medium, which applies an ethnomathematical approach based on Banyumas culture and is integrated with science, according to Mathematics teachers.

The average percentage score obtained from all aspects by the five Mathematics teachers is 90.15%, which falls into the "very attractive" category. Based on these results, the educational game media, which applies an ethnomathematical approach based on Banyumas culture and is integrated with science, is considered very attractive and suitable for testing with students.

5. Science Teacher Trial

The trial with Science teachers was conducted by testing the developed product with five Science teachers in Banyumas

Regency. The teachers involved were Catur Indah Erawati, S.Pd., a Science teacher at MTs Ma'arif NU 1 Sokaraja; Tulis Krismiatun, S.Pd., a Science teacher at PKPPS Al Hidayah Karangsuci Purwokerto; Tri Wulandari, S.Pd., a Science teacher at SMP Muhammadiyah 1 Purwokerto; Yuli Fitrianingsih, S.Pd., a Science teacher at MTs Ma'arif NU 1 Karanglewas; and Avinda Elsadiani Setia, S.Pd., a Science teacher at SMP Muhammadiyah Boarding School Zam-Zam Cilongok. The purpose of this trial was to assess the attractiveness of the educational game as a learning medium, which applies an ethnomathematical approach based on Banyumas culture and is integrated with science, according to Science teachers.

The average percentage score obtained from all aspects by the five Science teachers is 90.46%, which falls into the "very attractive" category. Based on these results, the educational game media, which applies an ethnomathematical approach based on Banyumas culture and is integrated with science, is considered very attractive and suitable for testing with students.

6. Small Group Trials

The small group trial aimed to assess the level of attractiveness of the product before it was tested on a larger group of subjects. This trial was conducted with students from five schools in Banyumas Regency: MTs Ma'arif NU 1 Sokaraja, PKPPS Al Hidayah Karangsuci Purwokerto, SMP Muhammadiyah 1 Purwokerto, MTs Ma'arif NU 1 Karanglewas, and SMP Muhammadiyah Boarding School Zam-Zam Cilongok, with 15 students from each school. First, the students participated in an integrated Mathematics and Science lesson covering geometry, simple planes, sound and the hearing process, as well as additives, using the educational game media based on an ethnomathematical approach rooted in Banyumas culture and integrated with science. Afterward, the students were given a questionnaire to assess the attractiveness of the product. The questionnaire was completed based on the students' experience during the learning process using the educational game media with the ethnomathematical approach based on Banyumas culture and integrated with science.

The average percentage score obtained from all aspects by the total of seventy-five students is 83.28%, which falls into the "very attractive" category. Based on these results, the educational game media, which applies an ethnomathematical approach based on Banyumas culture and is integrated with science, is considered very attractive and suitable for use in field testing.

Discussion

1. Discussion on the Development of an Educational Game Media with an Ethnomathematical Approach Based on Banyumas Culture Integrated with Science

The researcher conducted a development study on educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science on the topics of geometry (solid and plane figures), simple machines, sound and the process of hearing, as well as additives. The development model used in this study is ADDIE. This model consists of five stages: Analysis, Design, Development, Implementation, and Evaluation.

In the first stage, the researcher analyzed the existing issues by conducting a preliminary observation at five schools in Banyumas Regency, namely MTs Ma'arif NU 1 Sokaraja, PKPPS Al Hidayah Karangsuci Purwokerto, SMP Muhammadiyah 1 Purwokerto, MTs Ma'arif NU 1 Karanglewas, and SMP Muhammadiyah Boarding School Zam-Zam Cilongok. The researcher interviewed Mathematics and Science teachers from these five schools.

From the results of the interviews with the teachers, it was found that students' understanding abilities in Mathematics and Science were still low. Teachers were still using conventional teaching methods to present the Mathematics material and rarely used digital learning media, which made it difficult for students to understand the material and solve problems in Mathematics and Science. The learning resources that were used were still limited, with the primary resources being textbooks and worksheets. To improve students' understanding in Mathematics and Science, the use of appropriate and engaging learning media can be applied. Based on the existing issues, the suitable learning media is educational game media. Educational games are games designed to stimulate children's thinking abilities, enhancing concentration and problem-solving skills. The benefits of educational games include training the students' knowledge of the subject matter, concentration, motor skills, and understanding of cause and effect concepts (Handriyantini, 2009). Furthermore, have proven that educational games provide a fresh atmosphere in learning and increase children's interest in learning to count (Yunus et al., 2015).

Empowering students through the integration of Mathematics material with culture, tailored to their life experiences, enriches the context of Mathematics, enabling students to succeed in learning Mathematics (Wulandari & Puspadewi, 2016). In addition, Science learning

integrated with culture can improve learning outcomes (Damayanti et al., 2017; Kusumawati, 2022) and enhance students' creative thinking abilities (Damayanti et al., 2017). Therefore, the researcher developed educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science.

The researcher designed the structure of the educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science. The structure framework includes the name of the educational game, theme design, background sound, symbols related to the material, font style, animations, and menus within the media. Next, the researcher determined the material, described the developed game, the developer's identity, instructions, presentation of geometry material, and practice questions. The researcher organized the geometry material (plane and solid figures) as well as material on simple machines, sound and the hearing process, and additives. Subsequently, the researcher designed a game related to geometry material (plane and solid figures), simple machines, sound and the hearing process, and additives, all connected to Banyumas culture.

The researcher then developed the product according to the previously designed storyboard. The product was developed using Adobe Flash Professional CC 2015 and PowerPoint. The storyboard that had been created served as the basis for development, ensuring that the educational game media would align with the plans outlined in the storyboard.

The educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science, developed in this study, consists of three main features: the game feature, the material feature, and the practice question feature. The validity testing of the educational game included expert evaluations in the areas of subject matter and ethnomathematics context, Science subject matter, media, as well as trials with Mathematics teachers, Science teachers, and small group testing.

2. Discussion on the Validity of the Educational Game Media with an Ethnomathematical Approach Based on Banyumas Culture Integrated with Science

The validation of the subject matter and ethnomathematics context was conducted by Dr. Maria Ulpah, S.Si., M.Si., a lecturer from the Department of Mathematics Education at UIN Prof. K.H. Saifuddin Zuhri Purwokerto. This test aimed to determine the validity and feasibility of the subject matter and ethnomathematics context in the educational game. Each aspect received the

same percentage score, which was 80%. The results of the four aspects fell into the "valid" category, with an average percentage score of 80%. It can be concluded that the subject matter and ethnomathematics context presented in the educational game with the ethnomathematics approach based on Banyumas culture are valid and suitable for use in learning. This is consistent with research (Febriani et al., 2023; Nurdiana & Asmah, 2022; Syadafi et al., 2021; Winarto et al., 2021; Yuliana et al., 2022) which also produced educational games with valid material for use.

The validation of the Science subject matter was conducted by Maghfira Febriana, M.Pd., a lecturer at the Faculty of Tarbiyah and Teacher Training (FTIK) UIN Prof. K.H. Saifuddin Zuhri Purwokerto. This test aimed to determine the validity and feasibility of the Science material in the educational game. The content feasibility aspect received a score of 97.14%, categorized as "very valid." The presentation feasibility aspect scored 100%, also categorized as "very valid." The language assessment aspect scored 96.67%, categorized as "very valid," and the Banyumas culture approach aspect scored 100%, categorized as "very valid." The results of these four aspects fall into the "very valid" category, with an average percentage score of 98.45%. It can be concluded that the Science material presented in the educational game with an ethnomathematics approach based on Banyumas culture integrated with Science is valid and suitable for use in learning. This is consistent with research (Febriani et al., 2023; Nurdiana & Asmah, 2022; Syadafi et al., 2021; Winarto et al., 2021; Yuliana et al., 2022), which also produced educational games with valid material for use.

The media validation was conducted by Fajry Subhaan Syah Sinaga, M.Pd., a lecturer at the Faculty of Tarbiyah and Teacher Training (FTIK) UIN Prof. K.H. Saifuddin Zuhri Purwokerto. This test aimed to determine the validity and feasibility of the educational game media. The software aspect received a score of 90%, and the visual communication aspect received a score of 82.5%. The results of these two aspects fall into the "Very Valid" category, with an average percentage score of 86.25%. It can be concluded that the educational game with an ethnomathematics approach based on Banyumas culture, integrated with Science, is deemed very valid and highly suitable for use in learning. This aligns with research conducted by (Febriani et al., 2023; Nurdiana & Asmah, 2022; Syadafi et al., 2021; Yuliana et al., 2022), which also produced valid educational game media products.

The Mathematics teacher trial was conducted by testing the developed product with five Mathematics teachers in Banyumas Regency: Wiko Sari, S.Pd., a Mathematics teacher at MTs Ma'arif NU 1 Sokaraja; Asri Maghfirotul Fauziah, S.Pd., a Mathematics teacher at PKPPS Al Hidayah Karangsuci Purwokerto; Wildan Abadi, S.Pd., a Mathematics teacher at SMP Muhammadiyah 1 Purwokerto; Laeli Asih Setiyani, S.Pd., a Mathematics teacher at MTs Ma'arif NU 1 Karanglewas; and Nurmalasari Azizah, S.Pd., a Mathematics teacher at SMP Muhammadiyah Boarding School Zam-Zam Cilongok. The purpose of this trial was to assess the attractiveness of the educational game media with an ethnomathematics approach based on Banyumas culture, developed by the researcher, from the perspective of the Mathematics teachers. The average percentage score from the trial conducted with all five teachers across all aspects was 90.15%, categorized as "extremely attractive." Based on these results, the Mathematics teachers found the educational game media with an ethnomathematics approach based on Banyumas culture integrated with Science to be highly attractive for student trials. This is in line with research (Yuliana et al., 2022), which also conducted a trial of an educational game product with Mathematics teachers, yielding a very attractive result.

The Science teacher trial was conducted by testing the developed product with five Science teachers in Banyumas Regency: Catur Indah Erawati, S.Pd., a Science teacher at MTs Ma'arif NU 1 Sokaraja; Tulis Krismiatun, S.Pd., a Science teacher at PKPPS Al Hidayah Karangsuci Purwokerto; Tri Wulandari, S.Pd., a Science teacher at SMP Muhammadiyah 1 Purwokerto; Yuli Fitrianingsih, S.Pd., a Science teacher at MTs Ma'arif NU 1 Karanglewas; and Avinda Elsadiani Setia, S.Pd., a Science teacher at SMP Muhammadiyah Boarding School Zam-Zam Cilongok. The purpose of this trial was to assess the attractiveness of the educational game media with an ethnomathematics approach based on Banyumas culture, developed by the researcher, from the perspective of Science teachers. The average percentage score from the trial conducted with all five Science teachers across all aspects was 90.46%, categorized as "extremely attractive." Based on these results, the Science teachers found the educational game media with an ethnomathematics approach based on Banyumas culture integrated with Science to be highly attractive for student trials. This is in line with research (Yuliana et al., 2022), which also conducted a trial of an educational

game product with Mathematics teachers, yielding a very attractive result.

The small group trial aimed to assess the level of attractiveness of the product before it was tested with a larger group of subjects. This trial was conducted with 15 students from each of five schools, totaling 75 students. The average percentage score across all aspects from the total score of the 75 students was 83.28%, categorized as "extremely attractive." Based on these results, the educational game media with an ethnomathematics approach based on Banyumas culture, integrated with Science, was found to be highly attractive and suitable for field testing.

In the small group trial, the students were very excited and enthusiastic about using the educational game, as most of them had never played an educational game before. The students were highly active in exploring every feature of the game, making learning more enjoyable. This is consistent with the research by (Waridah;, 2021), which found that the use of educational games in learning can enhance student engagement in Science subjects. The results of this study align with research by (Putri et al., 2023) and (Satrio, 2020), which also produced educational games that are valid and suitable for use, suggesting that the educational tool developed in this study can be applied in teaching activities and ease the process for both teachers and students. Furthermore, this research is in line with previous studies that also produced educational games suitable for learning Biology (Danika et al., 2022) and Science (Delvytra & Hidayati, 2023).

CONCLUSION

The educational game learning media with an ethnomathematics approach based on Banyumas culture integrated with science was developed using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) according to Cahyadi. In this study, the development is limited to the implementation phase in small groups at five schools in Banyumas Regency, namely: MTs Ma'arif NU 1 Sokaraja, PKPPS Al Hidayah Karangsuci Purwokerto, SMP Muhammadiyah 1 Purwokerto, MTs Ma'arif NU 1 Karanglewas, and SMP Muhammadiyah Boarding School Zam-Zam Cilongok.

The educational game learning media with an ethnomathematics approach based on Banyumas culture integrated with science is valid based on the validation results. The material and mathematics context expert validation achieved an average percentage of 80%, categorized as "valid"; the science material expert validation obtained an average percentage of 98.45%, categorized as "very valid"; and

the media expert validation achieved an average percentage of 86.25%, categorized as "very valid." These results are further supported by the mathematics teacher questionnaire, which received an average percentage of 90.15%, categorized as "extremely interesting"; the science teacher questionnaire, which received an average percentage of 90.46%, categorized as "extremely interesting"; and the small group trial, which obtained an average percentage score of 83.28%, categorized as "extremely interesting."

REFERENCES

Cahyadi, R. A. H. (2019). Pengembangan Bahan Ajar Berbasis ADDIE Model. *Halaqa: Islamic Education Journal*, *3*(1), 35–42. https://doi.org/10.21070/halaqa.v3i1.2124

Damayanti, C., Rusilowati, A., & Linuwih, S. (2017). Pengembangan Model Pembelajaran IPA Terintegrasi Etnosains untuk Meningkatkan Hasil Belajar dan Kemampuan Berpikir Kreatif. *Journal of Innovative Science Education*, *6*(1). https://doi.org/10.15294/jise.v6i1.17071

Danika, F. C., Kilat, H., Risna, M., & Novianti, P. (2022). Pengembangan Game Edukasi pada Mata Pelajaran Biologi untuk Siswa SMP di Kabupaten Kubu Raya. *Jurnal Inovasi Pendidikan dan Pengajaran*, *1*(3), 154–165. https://doi.org/10.31571/jipp.v1i3.4835

Delvytra, L. & Hidayati, A. (2023). Pengembangan Game Edukasi pada Mata Pelajaran IPA Tentang Sistem Pencernaan pada Manusia Kelas VIII SMP. *Jurnal Pendidikan Tambusai*, *7*(2), 23865–23873. https://doi.org/10.31004/jptam.v7i2.10403

Fayanto, S., Erniwati, & Sabilu, M. (2023). Analysis of the Inquiry Learning Model with ICT Support for Science Learning: A Literature Review. *Proceedings Series of Educational Studies*, 144–152. https://doi.org/10.37438/jimp.v6i1.348

Febriani, S. W., Sandie;, & Darma, Y. (2023). Game Edukasi Matematika Berbantuan RPG Maker MV Materi Bangun Datar terhadap Kemampuan Pemecahan Masalah Matematis. *Teorema: Teori dan Riset Matematika*, *8*(1), 172–180. https://doi.org/10.25157/teorema.v8i1.9936

Fulana, D. & Kumala, F. Z. (2024). Enhancing 8th Grade Students' Mathematical Understanding: A Quasi-Experimental Study on Game-Based Learning Media. *Union: Jurnal Ilmiah Pendidikan Matematika*, *12*(1), 134–144. https://doi.org/10.30738/union.v12i1.15657

Handriyantini, E. (2009). Permainan Edukatif (Educational Games) Berbasis Komputer untuk Siswa Sekolah Dasar. *Konferensi dan Temu Nasional Teknologi Informasi dan Komunikasi untuk Indonesia*. Bandung: 24-25 Juni.

Hidayat, R. (2023). Kebijakan Asesmen Kompetensi Madrasah Indonesia (AKMI) pada Satuan Madrasah Ibtidaiyah. *INTISABI*, *1*(1). https://doi.org/10.61580/itsb.v1i1.1

Huang, B., Hew, K. F., & Lo, C. K. (2019). Investigating the effects of gamification-enhanced flipped learning on undergraduate students' behavioral and cognitive engagement. *Interactive Learning Environments*, *27*(8), 1106–1126. https://doi.org/10.1080/10494820.2018.1495653

Kemdikbud. (2023). *Rapor Pendidikan Indonesia Tahun 2023*. Belajar. Diakses dari: https://bpmpkaltara.kemdikbud.go.id/wp-content/uploads/2023/10/RAPOR-PENDIDIKAN-INDONESIA-2023.pdf. [15 Januari 2025].

Kusumawati, E. R. (2022). Efektivitas Media Game Berbasis Scratch pada Pembelajaran IPA di Sekolah Dasar.

Jurnal Basicedu, *6*(2), 1500–1507. https://doi.org/10.31004/basicedu.v6i2.2220

Lestari, K. E. & Yudhanegara, M. R. (2017). *Penelitian Pendidikan Matematika (Panduan Praktis Menyusun Skripsi, Tesis, Dan Laporan Penelitian Dengan Pendekatan Kuantitatif, Kualitatif, Dan Kombinasi Disertasi Dengan Model Pembelajaran Dan Kemampuan Matematis*. Bandung: PT. Refika Aditama

Nahak, H. M. (2019). Upaya Melestarikan Budaya Indonesia di Era Globalisasi. *Jurnal Sosiologi Nusantara*, *5*(1), 65–76. https://doi.org/10.33369/jsn.5.1.65-76

Nurdiana, R. & Asmah, S. N. (2022). Game Edukasi Matematika "Tang Mane Bakoel Saprahan" dengan Konteks Kearifan Lokal Melayu Kalimantan Barat. *Jurnal Pendidikan Matematika Indonesia*, *7*(1), 1–6. https://doi.org/10.26737/jpmi.v7i1.2695

OECD. (2018). *Education at a Glance 2018: OECD Indicators*. Diakses dari: https://www.oecd.org/content/dam/oecd/en/publications/reports/2018/09/education-at-a-glance-2018_g1g921ab/eag-2018-en.pdf. [25 Januari 2025].

Pathuddin, H. & Raehana, S. (2019). Etnomatematika: Makanan Tradisional Bugis sebagai Sumber Belajar Matematika. *MaPan: Jurnal Matematika dan Pembelajaran*, *7*(2), 307–327. https://doi.org/10.24252/mapan.2019v7n2a10

Pratama, L. D., Lestari, W., & Bahauddin, A. (2019). Game Edukasi: Apakah Membuat Belajar Lebih Menarik?. *At-Ta'lim : Jurnal Pendidikan*, *5*(1), 39–50. https://doi.org/10.36835/attalim.v5i1.64

Putri, E. L., Derta, S., Musril, H. A., & Okra, R. (2023). Perancangan Media Pembelajaran IPA Kelas VII Berbentuk Game Edukasi Menggunakan Aplikasi Construct 2 di SMPN 7 Bukittinggi. *Information Management for Educators and Professionals*, *7*(2), 194–203. https://doi.org/10.51211/imbi.v7i2.2218

Putri, L. I. (2017). Eksplorasi Etnomatematika Kesenian Rebana sebagai Sumber Pembelajaran Matematika pada Jenjang MI. *Jurnal Ilmiah: PENDIDIKAN DASAR*, *4*(1), 21–31. https://doi.org/10.30659/pendas.4.1.%25p

Rahayu, G., Khoiri, A., & Firdaus. (2022). Integrasi Budaya Lokal (Bundengan) pada Pembelajaran Gelombang dan Bunyi untuk Meningkatkan Sikap Cinta Tanah Air dan Literasi Sains Siswa. *Jurnal Ilmiah Pendidikan Fisika*, *6*(1), 117-125. https://doi.org/10.20527/jipf.v6i1.3295

Satrio, R. W. (2020). Pengembangan Game Edukasi "Math Kingdom" Berbasis Android Untuk Meningkatkan Pemahaman Konsep Materi Pangkat Dan Akar Eksponen Siswa Sekolah Menengah Pertama. *Jurnal Pendidikan MIPA*, *3*(2), 137–147. https://journal.lppmunindra.ac.id/index.php/alfarisi/article/view/6059/4565

Sekarini, A. P. (2019). Persepsi Peserta Didik dan Guru IPA terhadap Penggunaan Game Edukasi. *EduSains: Jurnal Pendidikan Sains Dan Matematika*, *7*(1), 35–40. https://doi.org/10.23971/eds.v7i1.1033

Sugiyono. (2020). *Metode Penelitian Manajemen*. Bandung: Alfabeta.

Suryani, N., Setiawan, A., & Putria, A. (2019). *Media Pembelajaran Inovatif dan Pengembangannya*. (P. Latifah, Ed.). Bandung: Remaja Rosdakarya.

Sutarja, M. C., Tamam, B., Alifiyah, F. L., & Rahmah, F. (2023). Api Tak Kunjung Padam: Potensinya sebagai Sumber Belajar IPA untuk Meningkatkan Hasil Belajar Siswa. *Titian Ilmu: Jurnal Ilmiah Multi Sciences*, *15*(2), 131–140. https://doi.org/10.30599/jti.v15i2.2114

Syadafi, F., Izzati, N., & Febrian. (2021). Game Edukasi Matematika Materi Lingkaran Kelas VIII SMP. *Student Online Journal*, *2*(1), 682–689. http://repositori.umrah.ac.id/id/eprint/1661

Wardhani, D. P., Setyaningsih, E., & Widyaningrum, P. W. (2022). Pengolahan Limbah Minyak Jelantah

Menjadi Sabun pada Karang Taruna Bakti Manunggal. Jurnal *ABDIMASA Pengabdian Masyarakat*, *5*(1), 94–99. https://core.ac.uk/reader/524922990

Waridah; (2021). Upaya Meningkatkan Keaktifan Siswa dalam Pembelajaran Daring Melalui Media Game Edukasi Quizziz pada Muatan Pelajaran IPA Materi Siklus Hidup Kelas IV A MIN 1 Yogyakarta Tahun Pelajaran 2020/2021. *ELEMENTARY: Jurnal Inovasi Pendidikan Dasar*, *1*(2), 6–11. https://doi.org/10.51878/elementary.v1i2.116

Winarto, Nabyla, F., & Kristyaningrum, D. H. (2021). Perancangan Game Edukasi untuk Siswa Sekolah Dasar dengan Memanfaatkan Kearifan Lokal. *Dialektika Jurnal Pendidikan*, *5*(2), 60–67. https://doi.org/10.58436/dfkip.v5i2.900

Wulandari, I. A. P. A. & Puspadewi, K. R. (2016). Budaya dan Implikasinya Terhadap Pembelajaran Matematika yang Kreatif. *Jurnal Santiaji Pendidikan*, *6*(1), 31–37. https://doi.org/10.26486/jm.v2i2.295

Yuliana, R., Firdaus, M., & Oktaviana, D. (2022). Pengembangan Game Edukasi Matematika Berbasis Android Menggunakan Software Construct 2 terhadap Kemampuan Pemahaman Matematis. *Jurnal Riset Rumpun Matematika dan Ilmu Pengetahuan Alam*, *1*(1), 82-90. https://doi.org/10.55606/jurrimipa.v1i1.281

Yunus, M., Astuti, I. F., & Khairina, D. M. (2015). Game Edukasi Matematika Untuk Sekolah Dasar. *Informatika Mulawarman: Jurnal Ilmiah Ilmu Komputer*, *10*(2), 59-64. https://doi.org/10.30872/jim.v10i2.192