Al'adzkiya International of Education and Sossial (AIoEs) Journal
Vol. 5, No. 1, Mei 2024, pp. 1-11
ISSN: 2721-8716, DOI: 10.55311/aioes.v5i1.277 

# Development of Jumanji Mathematics Cultural Diversity-Based Board Game Learning Media

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**ABSTRACT**

This research is a study on the development of culturally diverse-based learning media. The purpose of this research is to understand how the development of Jumanji Mathematics board game learning media based on cultural diversity is carried out. Additionally, it aims to assess the suitability of culturally diverse-based learning media and to gauge student responses in terms of their interest in the developed learning media. The development model used in this research is the ADDIE development model, which consists of five stages: analysis, design, development, implementation, and evaluation. During the implementation stage, the researcher conducted product testing in one class, specifically class VII-B, with a total of 21 students. The results of this research show that the Jumanji Mathematics board game learning media developed based on cultural diversity has a validity level of 3.07 as assessed by media experts. The assessment of the content received a score of 4, indicating it is highly valid. The practicality level falls into the category of very practical, with an average score of 3.62.

**Keywords: Cultural Diversity-based Learning Media, Jumanji, Mathematics Board Game, ADDIE Development Model**



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## 1. INTRODUCTION

Indonesia is a nation known for its cultural diversity. There are at least 470 different ethnic groups in Indonesia, 19 different customary law zones, and more than 300 local languages used by the Indonesian people. Due to the varying civilizations in Indonesia, the country is divided into different cultural regions. Indonesia's diversity should be considered its greatest asset and a source of gratitude. Culture is an ongoing process that sometimes passes on highly important and integrated value components (Faqih et al., 2021). Indonesia is also the world's largest archipelagic state, known for its rich culture and heterogeneous population. Cultural acculturation enriches Indonesia's cultural diversity without erasing distinct characteristics, and it is a strength that contributes to its development (Listyani, 2018).

Cultures are gradually fading as the hallmark of a nation in the current era of globalization because Western culture dominates over local culture. Many children are unaware of the diversity of their own culture. For example, traditional games that were often played by children in the 1990s and beyond are now rare due to the prevalence of online activities. This phenomenon clearly indicates that cultural values are diminishing. Education and culture go hand in hand because culture encompasses everything within a society, and education is a fundamental need for every member of that society. Education and culture significantly impact the development of our nation's noble values, which, in turn, shape character development based on these noble cultural values.

The integration of mathematics and culture demonstrates how mathematics is a part of culture with realistic and contextual mathematical meanings. To make mathematics learning engaging and not boring, culture-based mathematics education can be a solution (Faqih et al., 2021). Mathematics education is crucial for developing and enhancing students' problem-solving abilities. Challenging learning experiences for students can be a solution for improving their problem-solving abilities in daily life. Providing real-life story problems can be used as a challenging learning approach (Nur'Afifah, 2022).

Mathematics is known as an abstract subject. Many teachers still use learning materials like textbooks and worksheets, and PowerPoint presentations that mainly contain content, formulas, and

problems that are not closely related to real-life implementation. The use of learning media is still underutilized, especially in mathematics education. Students become bored and less interested in learning due to the lack of learning media in the teaching process. Therefore, innovation in learning media is needed.

According to Nurseto, as cited in Sufri Mashuri (2019), the word "medium" is a plural form of "media" and is literally translated as "intermediary" or "conduit." According to Sanakay, learning media is an instrument that can be used as a teaching aid or mediator in the learning process to improve effectiveness and efficiency in achieving learning objectives. According to Sudjana and Rivai, learning media can enhance students' learning experiences in the classroom, which should lead to improved learning outcomes (Hasanah et al., 2021).

Board games are an educational medium that can be created to support the learning process. According to Perdana and Susanti (2018), board games can be used as a group learning tool or medium. According to Sadiman, as cited in Putri and Setyadi (2022), board games have other components in the classroom that may impact learning, such as knowledge dissemination and strengthening the learning process.

Board games can be made as engaging as possible to capture students' attention and enhance learning activities, as well as to improve student communication. Several researchers, including Fransiska and Kurniasari (2019), Kurniawan Surya Prayoga (2019), and ZUHRIYAH (2019), have created Jumanji board games. Research conducted by these mentioned researchers found that a visually appealing Jumanji board game can improve learning outcomes in terms of knowledge and allows students to respond quickly to questions (Putri & Setyadi, 2022).

Board games created by various researchers, however, still have certain shortcomings. For example, the challenges used are not shown, and the learning in the Jumanji board game still uses a different learning approach. The content in the Jumanji board game has also been adapted into other learning versions. The factors mentioned above motivated the researcher to create the first Jumanji board game focused on ethnic diversity in mathematics education.

The culture of North Sumatra is one of the cultures that can be introduced to students. Culture can be defined as the identity of a specific community group. As residents of North Sumatra, it is our responsibility to preserve the local culture's existence and educate ourselves about other cultures. To preserve the cultural diversity of North Sumatra and ensure that students do not forget their own culture, the cultural nuances offered are not only used to link learning concepts but also to gain new knowledge.

## 2. RESEARCH METHOD

One way to uncover the truth through the scientific method is by conducting research, which involves formulating a problem, reviewing relevant literature, examining theories or research findings from the past that are pertinent to the issue being studied, formulating assumptions or hypotheses as needed, collecting data, processing data, and drawing conclusions (Karunia Eka Lestari & Mokhammad Ridwan Yudhanegara, 2015).

This research was conducted by the researchers in the academic year 2022/2023 and took place at SMP Muhammadiyah 57 Medan, specifically in class VII-B, to assess the suitability of the Jumanji Mathematics board game learning media based on cultural diversity.

The research and development (R&D) approach is one of the research methods to be used. According to Sugiyono (2013), the research and development method is a process used to produce a specific product while evaluating its feasibility and effectiveness. The ADDIE model is the research and development model used in this study. The ADDIE learning model provides a framework for creating a learning experience based on an effective and efficient system approach, an interactive process, and a situation where the evaluation results of each stage can help advance learning to the next stage. The research and development procedure uses a model developed by Robert Maribe Branch, based on the educational philosophy foundation of applying ADDIE, which should be student-centered, innovative, authentic, and inspirational. The stages in the ADDIE model include Analysis, Design, Development, Implementation, and Evaluation.

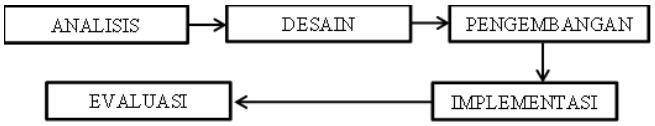


Fig 1. The Average Value of Concept Understanding Ability

The research instrument is used for a specific research purpose that cannot be utilized by other researchers, so the researcher must design their own instrument to be used in the research. According to Purwanto, as cited in (Sukendra, 2020), the use of research instruments is essential for data collection in research. For this study, the instruments applied by the researcher are questionnaires, used to assess the media's suitability by validators and the practicality of the media through student responses. The following are the questionnaire instruments that will be used in the research: a) Media expert validation instrument b) Subject matter expert instrument c) Student response instrument. To obtain or collect data to fulfill the research objectives, the researcher employs research instruments. The validation sheets and student response questionnaires are the instruments used to assess the validity and practicality of the Jumanji Mathematics board game learning media. After obtaining the necessary data, the next step is to analyze it. Data analysis is conducted to determine whether the culturally diverse-based Jumanji Mathematics board game meets the criteria for validity and practicality.

Table 1. Criteria for Validity Level

| Assessment | Scale Values |
|---|---|
| $3{,}5 \leq M \leq 4$ | Very Valid |
| $2{,}5 \leq M \leq 3{,}5$ | Valid |
| $1{,}5 \leq M \leq 2{,}5$ | Acceptably Valid |
| $M \leq 1{,}5$ | Not Valid |

Source: Iswandi, 2021

Note:
$M = (Ki)^{-}$ seeks the validity of each criterion
M = (Ai) seeks the validity of each aspect

Obtaining an average score of $1.5 \leq M \leq 2.5$, with the criterion of being reasonably valid, is used to assess the validity level of the media. If the desired average score has not been achieved, adjustments will be made based on the validator's suggestions, with a focus on the identified shortcomings. Then, a revalidation is performed for reanalysis until the minimum M score falls within the reasonably valid criterion.

Table 2. Categories of Practicality Level

| Score | Criteria |
|---|---|
| $3{,}5 \leq X_i \leq 4$ | Very Practical |
| $2{,}5 \leq X_i \leq 3{,}5$ | Practical |
| $2{,}5 \leq X_i \leq 2{,}5$ | Adequately Practical |
| $2{,}5 \leq X_i \leq 1$ | Not Practical |

Source: Iswandi, 2021

Note: Xi = Average Respondent Score

Attaining an average score of $2.5 \leq Xi \leq 2.5$, with the criterion of being highly practical, is used to assess whether the media has an adequate level of practicality. If the assessment cannot reach the specified average score, adjustments should be made based on student feedback, or the aspects considered lacking should be reevaluated. Once the assessment achieves a minimum score within the reasonably practical category.

## 3. RESULTS AND DISCUSSION

This study is a development research that uses the ADDIE model. The product developed is the Jumanji Mathematics Board Game learning media. Based on the completed research and development, the researcher obtained the following research results:

**A. Analysis**

This phase represents the initial step that needs to be conducted before designing the Jumanji Mathematics Board Game learning media based on cultural diversity. In this stage, the researcher gathers information or data as support for product development. The information collected by the researcher includes an analysis of the curriculum and an analysis of the needs for the use of learning media at SMP Muhammadiyah 57 Medan. This facilitates the development of culture-based learning media for mathematics education. The results of the analysis obtained by the researcher include:

a. Curriculum Analysis

The curriculum used at SMP Muhammadiyah 57 Medan is the 2013 curriculum. The analyzed aspects of this curriculum pertain to core competencies, basic competencies, and achievement indicators. The 2013 curriculum is designed to encourage active student participation in learning.

b. Needs Analysis

Competencies that students need to acquire to enhance their learning interest are determined by the researcher using a needs analysis. In this stage, the researcher reviews several Jumanji Mathematics Board Game learning media created by the researcher earlier and analyzes these media to identify any deficiencies in the Jumanji board game media. The needs analysis conducted by the researcher, including open interviews with mathematics teachers, revealed that the learning media used in schools are textbooks and worksheets. It is not uncommon for teachers to frequently use PowerPoint presentations as well.

**B. Design**

The design phase is carried out in several stages prepared by the researcher, which are as follows:

a. Data Collection

In this stage, the researcher collects data regarding the materials to be created, namely, quadrilateral and triangle materials. Then, the determination of cultural diversity to be associated with these materials, which will be incorporated into the challenge question cards. Afterward, designing the colors and arrangement of questions on the challenge cards to be used in the Jumanji Mathematics board game.

b. Learning Media Design

After data collection, the researcher designs the Jumanji Mathematics Board Game learning media based on cultural diversity with the following flow: (a) creating the Jumanji Mathematics game board, (b) creating challenge question cards, (c) determining the questions on the Jumanji Mathematics board game's challenge cards, (d) creating instruction cards in the game, (e) creating answer key cards for the challenge question cards and bomb cards, and (f) selecting the colors to be used in designing the learning media.

c. Research Instrument Design

In addition to the Jumanji Mathematics Board Game learning media, research instruments are also designed in line with the Jumanji Mathematics Board Game learning media. The purpose is to obtain data on the development results of the Jumanji Mathematics Board Game media, whether the developed learning media meets the criteria for validity or not.

The designed instruments consist of two types: validity instruments and student response instruments.

- Validity Instrument Design

The validity instruments are created according to the researcher's needs. The validation sheets are designed to consist of two types:

[1] Expert media validation instrument sheet, which evaluates six components: appearance, quadrilateral and triangle materials, contemporary relevance, scale, technical quality, and size, with a total of 15 points.

[2] Expert subject matter validation instrument sheet, which evaluates four components: appearance, quadrilateral and triangle materials, contemporary relevance, scale, technical quality, and size, with a total of 14 points.

- Student Response Instrument Design

This instrument is created to assess the level of practicality of the learning media. The student response sheet consists of 14 points in line with the criteria for the Jumanji Mathematics board game media.

**C. Development**

The Jumanji Mathematics Board Game media is printed in accordance with the design in the development phase. Validators will inspect the media after printing. The purpose of validation is to determine whether the Jumanji Mathematics Board Game media is suitable for use as a student learning medium.

The results of the development phase are as follows:

a. Product Design Development

The product designed by the researcher is the Jumanji Mathematics Board Game learning media based on cultural diversity, which is designed using Coreldraw X6 application.

1) Appearance of the Jumanji Mathematics Game Board

In the Jumanji Mathematics board game, the game board is the most essential component. The game's course is determined by the game board. The game board consists of 28 colored squares, with a total of 112 squares. The game board has dimensions of 42 cm in length and 32 cm in width, and it is made of 260gsm art paper.


Fig 2. Front and Back of the Game Board

2) Challenge Cards

Each challenge card has a different level of difficulty. There are a total of 40 challenge cards in the Jumanji Mathematics board game. These challenge cards are printed on 260gsm art paper, with dimensions of 9 cm in length and 6 cm in width.


Fig 3. Front and Back of the Challenge Cards

3) Bomb Cards

Bomb cards are also referred to as penalty cards. Penalty cards are given to players by the guard if a player cannot answer the questions on the challenge cards. These penalty cards are printed on 260gsm art paper and have dimensions of 9 cm in length and 6 cm in width.


Fig 4. Front and Back of the Bomb Cards

4) Instruction Cards (Game Rules)

Each group consisting of three to four students plays the Jumanji Mathematics board game as a team. The goal is for students to interact with each other within their group. Explanations about the key answer guard's tasks and instructions for playing the Jumanji Mathematics board game can be found on the instruction cards (game rules).

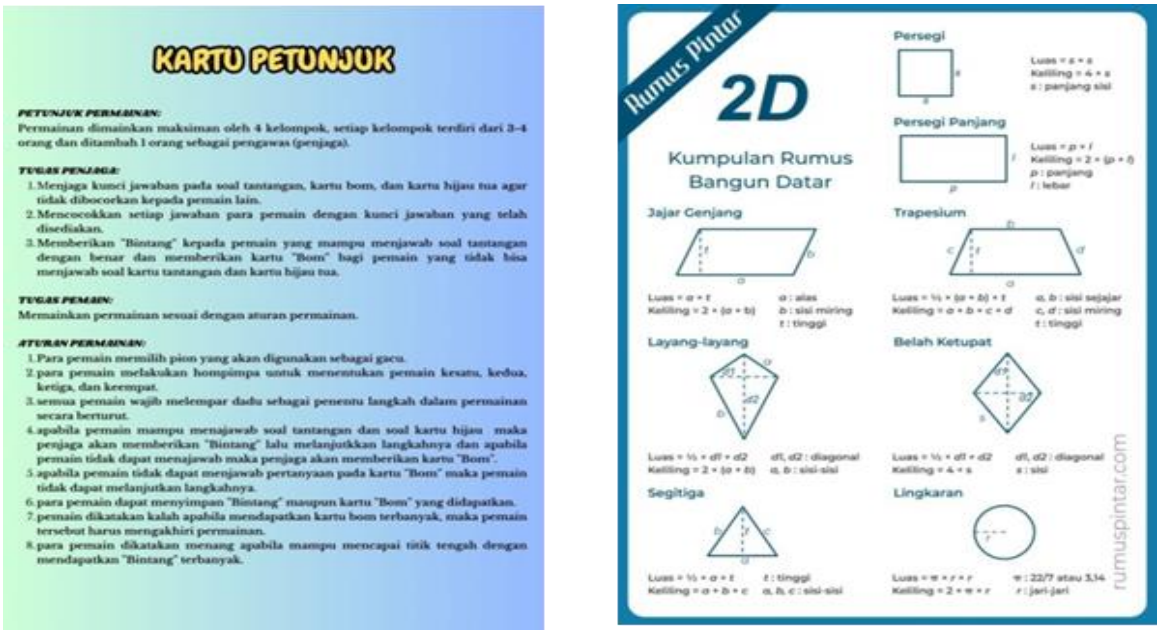


Fig 5. Game Instruction Card

5) Answers Key Cards

The answer key cards contain all the answers found on the challenge cards and bomb cards. These answer keys are used to check students' answers. The material for the answer key cards is 260gsm art paper.


Fig 6. Front and Back of the Answer Key Cards

b. Product Validation

In addition to providing validation scores, the expert team also offered suggestions and feedback, which were used as input for product revisions to make it even better. Here are the results of the validation and revision suggestions provided by the expert team for the Jumanji Mathematics board game learning media.

1) Validation Results by Media Experts

Media validation was conducted by two lecturers, Putri Maisyarah Ammy, S.Pd.I., M. Pd, a mathematics education lecturer as validator 1, and Sri Wahyuni, S.Pd., M. Pd, a mathematics education lecturer as validator 2. Here are the validation results for the Jumanji Mathematics board game media.

Table 3. Average Media Expert Validation Results

| Assessment Aspects | Assessment Results | Category |
|---|---|---|
| Appearance | 3,6 | Very Valid |
| Material | 2,75 | Valid |
| Contemporary Relevanc | 3 | Valid |
| Scale | 3 | Valid |
| Technical Quality | 2,84 | Valid |
| Size | 3,25 | Valid |
| Average | 3,07 | Valid |

Based on the data above, the average assessment by the validators for the developed Jumanji Mathematics Board Game learning media falls into the 'valid' category, with a score of 3.07. It is ready for use with minor revisions and is suitable for implementation in learning.

To visualize the differences in the assessment results of the learning media evaluated by media experts, the researcher also presents the assessment results in the form of a bar chart. Here is the chart displaying the assessment results from Table 3.

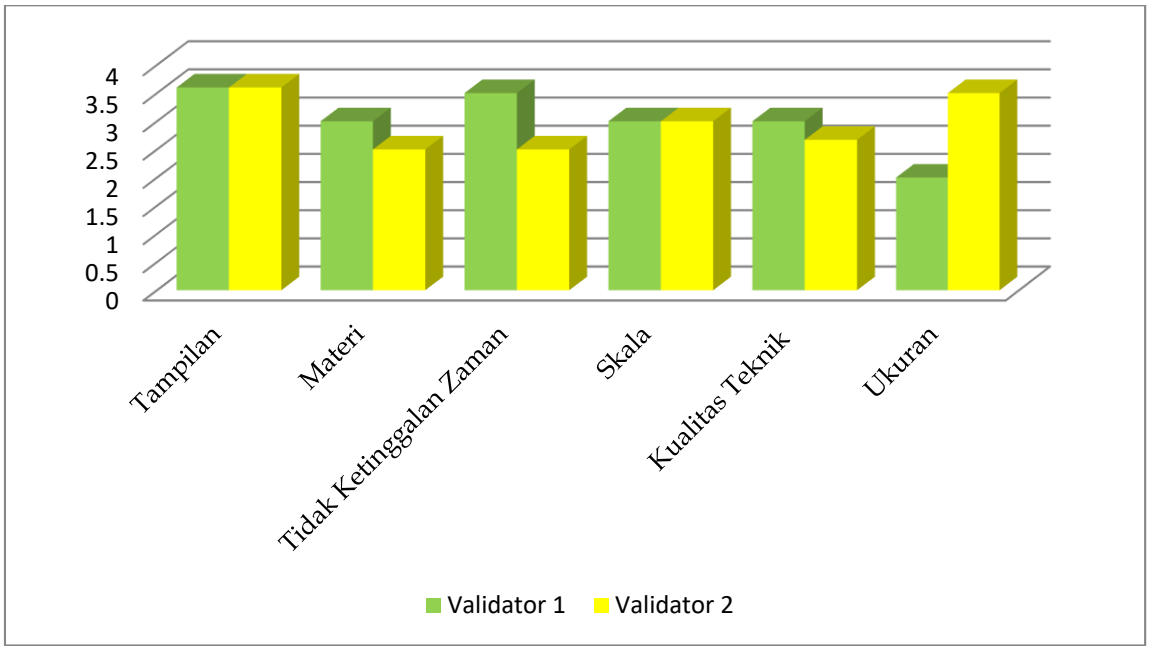


Fig 7. Bar Chart of Media Expert Validation Results

2) Results of Validation by Material Experts

Material validation was carried out by two individuals, Winda Rahma Ningrum, S.Pd., M.Si, a mathematics teacher at SMP Muhammadiyah 57 Medan as validator 1, and Fitri Wahyuni Siregar, S.Pd, a mathematics teacher at SMP Muhammadiyah 57 Medan as validator 2. Here are the results of the validation of the Jumanji Mathematics board game material.

Table 4. Average Material Expert Validation Results

| Assessment Aspects | Assessment Results | Category |
|---|---|---|
| Appearance | 4 | Very Valid |
| Content Suitability | 4 | Very Valid |
| Language | 4 | Very Valid |
| Relevance of Questions to Material | 4 | Very Valid |
| Average | 4 | Very Valid |

Based on the data above, the average assessment by the material experts for the material in the Jumanji Mathematics Board Game learning media falls into the 'very valid' category, with a score of 4. It is ready for use with minor revisions and is suitable for implementation in learning.

In addition to the tabular format, the results of the assessment by the material expert team for each component are also presented in the form of a bar chart. Here is the chart displaying the assessment results from Table 4.

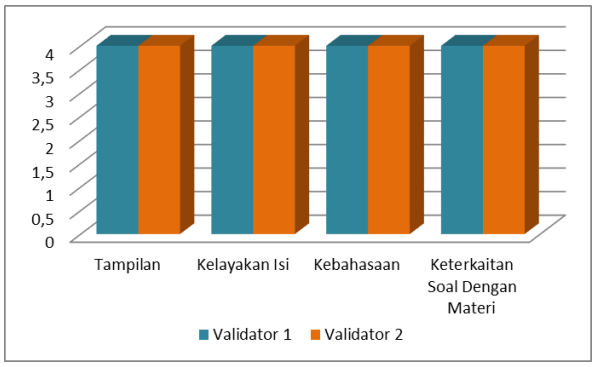


Fig 8. Bar Chart of Material Expert Validation Results

c. Revision


Fig 9. Before Revision


Fig 10. After Revision


Fig 11. Before Revision


Fig 12. After Revision

**Implementation**

After the product has been validated by the expert team and necessary revisions have been made, the next stage is implementation. In this phase, the implementation is carried out through a trial in class VII-B at SMP Muhammadiyah 57 Medan, involving 21 students. The purpose of this implementation is to assess the practicality of the Jumanji Mathematics Board Game. During this phase, the researcher explains the use of the Jumanji Mathematics Board Game, its advantages, and conducts a brief learning session using the media. Subsequently, the researcher distributes student response questionnaires to gather feedback from the students regarding the Jumanji Mathematics Board Game.

Table 5. Student Response Results

| Type of Research | Average |
|---|---|
| Student Response | 3,62 |
| Assessment Category | Very Practical |

By examining the results in the table above as a guideline, it can be determined that the evaluation of the Jumanji Mathematics Board Game receives a rating of very practical, which is 3.62, based on the student response questionnaire. Thus, the Jumanji Mathematics Board Game meets the criteria for practicality.

**Evaluation**

The final phase of development is evaluation. This evaluation stage occurs after the trial in class VII-B at SMP Muhammadiyah 57 Medan and gathers responses from students. If there are any issues raised by students or according to their feedback while using the Jumanji Mathematics Board Game, the developed product will be improved. However, in the previous phase, students responded very positively, and they understood how to use the Jumanji Mathematics Board Game effectively. It can be concluded that in this evaluation stage, there were no final improvements required for the product that has already been developed. The product falls into the 'very practical' category.

The strengths and weaknesses of the Jumanji Mathematics Board Game teaching media are as follows: 1) The strengths of the newly created product include the full-color display of the culturally diverse Jumanji Mathematics Board Game, which keeps students engaged and enhances their interest in the learning process. The Jumanji Mathematics Board Game also features images of traditional houses from North Sumatra. The teaching media is supplemented with challenging and appealing question cards. Its lightweight material makes the Jumanji Mathematics Board Game easy to carry and usable both inside and outside the classroom. The combination of playing and learning elements in the learning process will undoubtedly create a pleasant learning experience. 2) The weakness of the Jumanji Mathematics Board Game teaching media based on cultural diversity is that it cannot be folded.

Based on the explanations above, this research received a validation score of 3.07 from media experts with the category 'Valid,' a validation score of 4 from subject matter experts with the category 'Very Valid,' and a student response score for the practicality level of the developed teaching media of 3.62 with the category 'Very Practical.' This indicates that the researcher has succeeded in developing the Jumanji Mathematics Board Game teaching media for junior high school mathematics, especially for class VII, and students are highly interested in using the culturally diverse Jumanji Mathematics Board Game teaching media.

## 4. CONCLUSION

Based on the research and development, the following conclusions can be drawn: 1) The Jumanji Mathematics Board Game teaching media developed using the ADDIE model consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. 2) The development of culturally diverse Jumanji Mathematics Board Game teaching media for junior high school underwent evaluation by a team of media expert validators, achieving a "Valid" rating with a total score of 3.07, indicating its suitability for use. 3) The level of content validity assessed by subject matter expert validators for the Jumanji Mathematics Board Game teaching media based on cultural diversity met the "Very Valid" criteria, receiving a score of 4, making it suitable for use. 4) The practicality of the culturally diverse Jumanji Mathematics Board Game teaching media reached the "Very Practical" level, as evidenced by the average score from the response of 21 students in class VII-B at SMP Muhammadiyah 57 Medan, totaling

3.62. This indicates that the culturally diverse Jumanji Mathematics Board Game teaching media is highly practical for use in the teaching and learning process.

Recommendations to consider include: 1) For teachers, the Jumanji Mathematics Board Game teaching media should be used as a teaching aid specifically for teaching topics related to quadrilaterals and triangles. 2) For students, the Jumanji Mathematics Board Game teaching media can serve as a flexible learning resource that can be utilized anytime without time constraints. 3) For future researchers, it is encouraged to conduct similar research using different subjects and materials to develop high-quality teaching media. Also, further enhancement of the Jumanji Mathematics Board Game to make it more interactive and engaging is suggested.

**ACKNOWLEDGEMENTS**

The author would like to express gratitude to SMP Muhammadiyah 57 Medan for granting permission to conduct research at the school, and to the University of Muhammadiyah Sumatera Utara for their full support during this research.

**REFERENCES**

[1] Faqih, A., Nurdiawan, O., & Setiawan, A. (2021). Pengembangan Media pembelajaran Multimedia Interaktif Alat Masak Tradisional Berbasis Etnomatematika. Mosharafa: Jurnal Pendidikan Matematika, 10(2), 301–310. https://doi.org/10.31980/mosharafa.v10i2.876

[2] Fransiska, T., & Kurniasari, K. (2019). Pengembangan Media Pembelajaran Fisika Berbasis Papan Permainan "Journey of Physics" Pada Pokok Bahasan Momentum Dan Impuls Untuk Meningkatkan Hasil Belajar Peserta Didik Kelas X Ipa 1 Dan X Ipa 2 Sma Hang Tuah 4 Surabaya. VIII, SNF2019-PE-207–216. https://doi.org/10.21009/03.snf2019.01.pe.26

[3] Hasanah, U., Safitri, I., Rukiah, R., & Nasution, M. (2021). Menganalisis Perkembangan Media Pembelajaran Matematika Terhadap Hasil Belajar Berbasis Game. Indonesian Journal of Intellectual Publication, 1(3), 204–211. https://doi.org/10.51577/ijipublication.v1i3.125

[4] Iswandi. (2021). Pengembangan Media Labirin Board Games Pada Pembelajaran Biologi Materi Sistem Pencernaan Siswa Kelas XI IPA SMAN 9 Maros. 3(2), 6.

[5] Karunia Eka Lestari, M. P., & Mokhammad Ridwan Yudhanegara, M. P. (2015). Penelitian Pendidikan Matematika (Anna (ed.)). PT Refika Aditama.

[6] Kurniawan Surya Prayoga. (2019). Pengembangan Media Permainan Jumanji Untuk Pembelajaran Tematik Kelas V Sdn Sukolilo 01 Kecamatan Wajak. 3(November), 229–237.

[7] Listyani, A. (2018). Pengembangan Board Game Ular Tangga Berbasis. Jurnal Pendidikan Guru Sekolah Dasar, 593–604.

[8] Nur'Afifah, N. A. (2022). Penerapan Pendekatan Metakognitif untuk Meningkatkan Kemampuan Siswa Kelas V SD dalam Memodelkan Soal Cerita Matematika. Journal on Education, 05(01), 1356–1371. https://www.jonedu.org/index.php/joe/article/view/761%0Ahttps://www.jonedu.org/index.php/joe/article/download/761/583

[9] Perdana, R. A., & Susanti. (2018). PENGEMBANGAN MEDIA PENGAYAAN BERBASIS BOARD GAME BERUPA TICKET TO RIDE ACCOUNTING PADA MATERI POKOK BAHASAN AKUNTANSI PIUTANG PADA SMK NEGERI SURABAYA Rista Ayu Perdana Susanti Abstrak. Jurnal Pendidikan Akuntansi, 06(03), 219–225.

[10] Putri, A. M., & Setyadi, D. (2022). Pengembangan Media Board Game Jumanji Matematika pada Materi Bilangan Kelas VII SMP. Jurnal Cendekia : Jurnal Pendidikan Matematika, 6(2), 2086–2098. https://doi.org/10.31004/cendekia.v6i2.840

[11] Sufri Mashuri. (2019). MEDIA PEMBELAJARAN MATEMATIKA (Digital). Deepublish.

[12] Sugiyono. (2013). METODE PENELITIAN KUANTITATIF KUALITATIF FAN R&D (Saku). Alfabeta.

[13] Sukendra, I. K. I. K. S. A. (2020). Instrumen Penelitian. In Journal Academia.

[14] ZUHRIYAH, R. (2019). Pengembangan Game Jumanji Tiruan Sebagai Media Pembelajaran Ppkn Pada Materi Kewenangan Lembaga-Lembaga Negara Menurut Uud Nri Tahun 1945 Bagi Peserta Didik Kelas X Di Ma Al Falah Bangilan Tuban. Kajian Moral Dan Kewarganegaraan, 7(2), 481–495.