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DEVELOPMENT OF MATHEMATICS LEARNING MEDIA ON GEOMETRY MATERIAL TO INCREASE STUDENTS' INTEREST IN LEARNING

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Abstract

This study departs from the difficulty of students in mastering geometry material and the results of the needs analysis on students who expect the presence of learning media that contain elements of games such as the game congklak This type of research is R & D with the ADDIE development model consisting of 5 stages namely analysis, design, development, implementation, and evaluation. Descriptive analysis is used to describe the results of CoMath media development using ADDIE development stages. The results of the material expert validation showed that the comath media obtained a percentage of 80% which was in the very valid category. While the results of media expert validation obtained a percentage of 74,55% which included the valid category. To assess the practicality of teaching aids seen from the results of the assessment of comath media from teachers and students. The percentage obtained from the teacher's assessment is 84.83% and the percentage of student assessment is 80%, both of which are in the very practical category. To see the effectiveness, it was analyzed from the results of observations during the trial and supported by the results of interviews with two VIII grade students. From the analysis, it can be concluded that the comath media developed is valid, effective, and practical.

Keywords: learning media; comath; congklak; mathematics; geometry

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1. Introduction

Indonesia is a united state with traditions and a variety of nusantara cultures. The nusantara culture can be seen in many ways, from culinary wealth to traditional games. Traditional games are children's playground facilities that focus on physical activity. Traditional games have not only game elements but also ward (Yantoro et al., 2021). But the rapid growth in the age, whether it is technological progress or globalization, has made it seem that the traditional games are rarely played by the nuschildren because they are less attractive. This is a key trigger in the loss of nusantara culture especially the traditional game (Damayanti et al., 2023). One of the traditional games we seldom see today is congklak. In the Javanese, congklak is known as dakon, dhakon or dhakonan. In English, a game of congklak is called the mancala (Siregar et al., 2018). Arrogance is usually played after school with friends. But now most of them prefer to play games at home (Husein MR, 2021). Whereas self-interest is one of the strategic ways to develop imagination and thinking ability while studying (Susila, 2018). The planks of the snout are several holes that are shaped associated with the building of space in geometry.

Geometry is one of the many branches of mathematics. Geometry is taught from the basic ranks of elementary school education to the college ranks. Geometry is a conceptual glue linking fields of mathematics. This suggests that geometry is vital to study (Paradesa, 2019).

The first reason that geometry needs to be taught is that geometry is the only branch of mathematics that can connect mathematics with physical forms in the real world. Second, the only way to visualize a math idea, and the third, can provide a non-singular example of mathematical systems. When learning geometry, students will go through a sequential state of mind. Through learning geometry, students can also become good problem solvers. Contrary to that, the results of interviews with students revealed that geometry tends to be hated by students because it is a material that is difficult to understand by students. This is in accordance with what Adolphus stated, the dreaded mathematical material also found to be difficult for the student in the class to do so. This prevents students from learning geometry (Adolphus, 2011).

Increasing students' interest in studying geometry should be supported by the use of appropriate media. The learning media is an educational tool that can be used not only to support the process of learning teaching but also to increase the student's learning motivation. The learning media refers to everything that can be used as a tool to increase the activity or activity of the learning teaching process (Moto, 2019). With a learning medium the problems of culture and geometry can be overcome.

However, so far many teachers teach mathematics using monotonous methods such as using blackboards, textbooks and verbal explanations. Teachers usually provide explanations of mathematical concepts, model problems, and demonstrate solutions which make students bored and uninterested in ordinary learning (Hada et al., 2021). Mathematics teachers rarely use learning media, including when teaching geometry.

Here the researchers developed a learning medium to help students learn geometry material and preserve traditional Indonesian games which are starting to be left behind. Here researchers provide learning media to help students learn geometry material and choose local wisdom media to preserve traditional Indonesian games which are starting to be left behind (Sari et al., 2019). Researchers prefer geometry because they see students' poor ability to solve geometric problems themselves. This lack of ability causes students' low understanding of geometric concepts and skills. Therefore, a teacher's creativity is needed in the teaching and learning process which places more emphasis on students' abilities in solving problems with geometric material (Masikhah et al., 2021).

Congklak can be used as an alternative solution as a learning medium as well as a game. Congklak has an advantage in geometry material because it trains students' skills through the movement of seeds in holes, helps recognize spatial structures such as triangles, rectangles, circles, etc. and sharpens strategic abilities in planning steps to optimize the number of seeds collected. This makes it an effective tool for introducing and applying geometric concepts to students. As in research conducted by Sari et al. (2019) at that time he created congklak learning media as an innovation to help the learning process. However, congklak which was developed as a learning medium is still limited to number material. Therefore, it is necessary to develop valid, practical and efficient congklak media to increase students' interest in geometry. This aims to enable students to understand geometry material better.

2. Method

This type of research is Research & Development (R & D) with the ADDIE development model. ADDIE development model is a common and useful model in development research. This process is rated sequential and interactive when used in development research (Dewanti Lucky & Yasmita Echa Martha, 2022). Cheung (2016) states that ADDIE is an easily applied and used development model on curriculum that teaches knowledge, skill and also attitude. It can be used for various forms of product development such as media, taught, models, strategies, and methods of learning because this ADDIE development model is rated more rational and also more complete than any other model (Rohaeni, 2020).

There are also five interrelated components systematically structured in ADDIE, which means that applications from stage one through stage one must be systematic and should not be sorted at random. These five stages are very simple in comparison with other models. ADDIE's model development is easily understood and applied because of its simple, structured system (Rosmiati, 2019). The stages in this model of development are analysis, design, development (development), implementation (astution), and astudy (Astuti et al., 2019). The ADDIE stages are as shown in Figure 1 below.

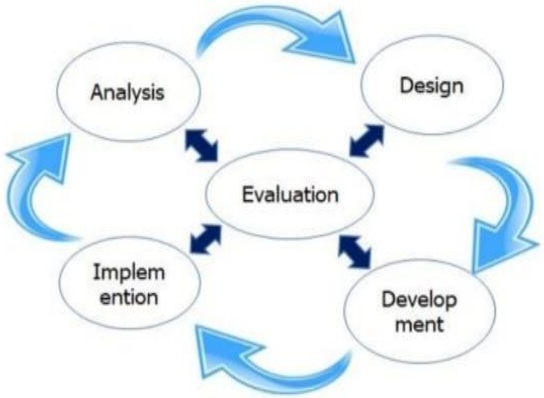


Figure 1. Steps ADDIE.
Source: Dwitiyanti et al. (2020)

The study deals with previous studies that use ADDIE development models in the context of learning media development. For example, previous studies have shown that the use of ADDIE models is effective in designing and implementing the learning media that support active and participative learning. By applying this model to a mathematical systemic learning medium, this study can expand our understanding of how it can be applied specifically in the context of math learning through traditional games (Sugihartini & Yudiana, 2018).

Analysis is the first step in an ADDIE development model at this stage the researcher conducted a survey of problems in learning. Analysis is made to know the need for learning and identify the problem (Kurnia et al., 2019). The second stage of design, this design begins with designing media to be made and devising tools and materials to be used (Puspandari et al., 2019). The next stage of development is in this phase by validation of its existing media before it is produced. Then the implementation stage, which at this stage matches the direction of both media experts and materials. The fifth stage is where an evaluation is performed after a trial and where an analysis is made to look for a deficiency of this later media study.

This study used instruments in the form of media expert assessment sheets, material expert assessment sheets, teacher assessment sheets, and student response sheets. Before being tested, comath media was first tested for validity in learning through an assessment sheet by two material experts and two media experts. Meanwhile, to test the practicality of comath media, it was assessed based on teacher assessment sheets and student responses. Each assessment sheet consists of several statement items and scores. The assessment score uses a Likert scale of 1-5. The formula used to calculate the percentage of the assessment results of the media expert assessment sheet, material expert assessment sheet, teacher assessment sheet, and student response sheet. namely as follows.

$$P(s) = \frac{S}{N} \times 100\%$$

Information:
P(s) = Percentage of sub indicators
S = Total score for each sub-indicator
N = Total maximum score

Then, the validity test results obtained from the calculation of the validation sheets of media experts and material experts are classified based on qualitative assessment criteria as in Table 1 and the practicality test results obtained from the calculation of teacher assessment sheets and student responses are classified based on Table 2.

Table 1. Validity Test Criteria

Interval	Criteria
75% ≤ Score ≤ 100%	Very Valid
50% ≤ Score < 75%	Valid
25% ≤ Score < 50%	Less Valid
0% ≤ Score < 25%	Not Valid

Source: (Chasanah, 2021)

Table 2. Practicality Test Criteria

Interval	Criteria
75% ≤ Score ≤ 100%	Very Practical
50% ≤ Score < 75%	Practical
25% ≤ Score < 50%	Less Practical
0% ≤ Score < 25%	Not Practical

Source: (Chasanah, 2021)

3. Results and Discussion

3.1 Results

3.1.1. Analysis Stage

This first step is done with the purpose of getting into the mathematical learning information how to expect the students and what math materials are difficult for students to understand. This analysis is needed for the media to develop according to students' needs.

The results of the initial survey conducted by researchers stated that students expected learning to be enjoyable. Students also mentioned that it would be interesting if there was an element of games in math. We further explored what games they liked by providing several choices of games. Some of the students chose and explained that they liked the game of congklak. They claimed to have played congklak since elementary school but now it is becoming rare. In addition, when asked about the material, students mentioned that one of the scourges in math is geometry. This is in line with the results of research by Maryanih et al. (2018) that students find it difficult in learning geometry.

The results of the needs analysis and validation with material experts stated that the development of learning media was focused on producing media that could increase students' interest and enthusiasm, especially in learning geometry by involving a game that they enjoyed, namely congklak, so it was decided that the suitable media was comath (mathematical congklak). As a form of innovation, the material expert suggested that the math congklak used as media is a personally designed congklak in accordance with the selected material.

3.1.2. Design of the learning media (design stage)

The second stage is the design stage. In the previous stage, this comath learning media will help in learning geometry material. The main focus of the geometry material raised is flat and spatial shapes. Based on the material expert validation, the design of the congklak board hole will adjust to the material, which is in the form of flat shapes, namely circles and triangles. Meanwhile, the congklak seeds that are usually used are replaced with marbles to match the geometry material, where the marbles have a round shape like a ball.

In the development of congklak media added question cards as a tool to train and improve students' memory of geometry material. On the congklak board, a new rectangular hole is also added as a place for the question cards provided. Based on the analysis and design stage, this media is called comath, congklak mathematics.

Researchers carefully designed the comath's learning media, weighing agreement with material. The typically consisting of 7 pairs of small holes and 2 pairs of large circle holes are converted into 7 pairs of smaller triangular and square holes across, plus 2 pairs of half-circle holes. It also adds 2 pairs of large rectangular holes to hold the problem card. Each triangular and rectangular snout is equipped with numbers 1 to 7. Here is Figure 2 of the comath design that the researcher made.



Figure 2. The Comath Design

This comath learning media is based on a conventional game taken from one of the Indonesian cultures, the congklak game, using the same rules as the congklak game which is then modified. This learning media can be played by two people, if one player stops in a congklak hole that has no marbles in it, then the player is required to take a question card according to the number in the hole. If the hole reads odd numbers then the player is required to take an odd card, as well as for even cards. If all the marbles have been collected in each player's mountain, then the game is declared over. Here in Figure 3 is the cover of the even question card and Figure 4 is the cover of the odd question card and in Figure 5 to Figure 11 are examples of question cards.



Figure 3. Even card cover picture



Figure 4. Odd card cover picture



Figure 5. Odd qustion cards

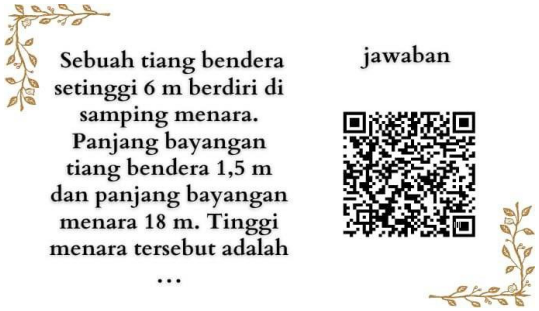


Figure 6. Odd question cards

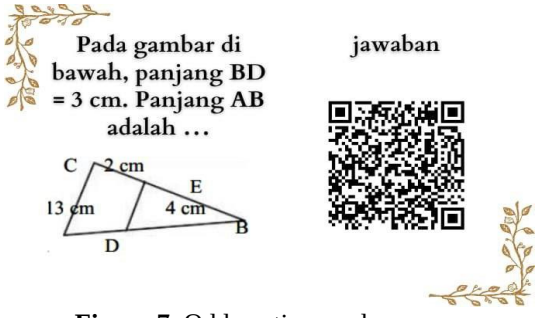


Figure 7. Odd qustion cards

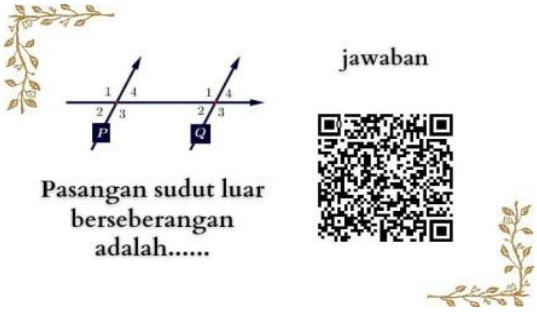


Figure 8. Odd question cards



Figure 9. Even question cards

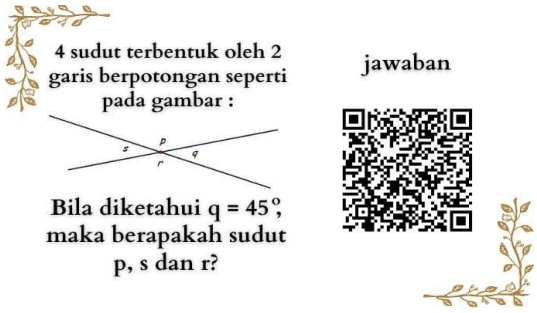


Figure 10. Even question cards



Figure 11. Even qustion cards

3.1.3. Development of the learning media (development stage)

At this stage based on preconceived planning, researchers would create a learning media (Andi Rustandi & Rismayanti, 2021).The completed design, which, in turn, is validated by both media and materials experts, will then be fully implemented and produce a product. After validation has been given to media experts and materials experts, some Suggestions are obtained that, first for the hole shape on the snout board, the geometry can be made to vary from the initial shape of the circles to the modified by researchers

to a few different spatial building shapes such as triangles, rectangles, and half-circles. Then the second, the main material used to make the bold has to be solid, which initially USES styrofoam and is replaced into wood as the main ingredient for solfboard. After validation of idea design, researchers began the production process of the comath learning media. The stage of this production is divided into two, which is:

The first stage

In preparation for the comath learning media, the first step is to prepare the necessary tools and materials. The necessary tools and materials of wood, scissors, marker, jasmine paper, marbles, cutter, sandpaper, wood polish, nails, wood glue, chisels, saws, and drills.

The second stage

At this stage researchers begin applying preconceived designs to create the learning media of the comath. These media initiatives involve the use of prepared tools and materials. Here's the steps:

a. Measure the wood by forming a rectangle, then cutting each end into a half circle that is used as a baseline.
b. Repeat step 1 with a different thickness of wood for then geometric holes. Seven pairs of triangular and rectangular holes, two pairs of semicone holes and two pairs of rectangular holes to place the problem card.
c. Smooth the surface of the molded wood and then press on the bottom and cut the wood into a well - developed snout.
d. Color the snout using wood paint and wait until it dries.
e. Add a number to the seven pairs of triangle holes and rectangles by using the marker.

The results of the comath learning media development can be seen in the following Figure 12 and 13. Figure 12 shows the development of the comath learning media on congklak. Whereas Figure 13 shows the problem card used in this comath.



Figure 12. Results of the development of comath learning media



Figure 13. Even and odd question cards

Comath Media Validation Test

The quality of comath media was reviewed by two material expert validators and two media expert validators. The material expert validation sheet consists of 11 statement items using a Likert scale of 1 to 5. The minimum total score of the material expert validation sheet is 11 and the maximum total score is 55. While the media expert validation sheet consists of 18 statement items using a Likert scale with the minimum total score of the material expert validation sheet is 18 and the maximum total score is 90. From these scores, the percentage is then calculated using the formula mentioned in the method section. To fulfill the category of very valid both from the material expert's point of view and the media expert's point of view, the percentage results of the average score must be in the range of 75% ≤ Score ≤ 100% and the valid category with a range of 50% ≤ Score < 75% (complete as Table 1 above). The results of the material expert assessment of the validity of comath media are attached in Table 3 below. While the results of the media expert's assessment of the validity of comath media are attached in Table 4 below.

Table 3. Results of Comath Media Validity by Material Experts

Validity Rater	**Total Score**
Material Expert 1	42
Material Expert 2	40
Average Score	41
Percentage of Average Score	74,55%
Category of Validity	**Valid**

Table 4. Results of Comath Media Validity by Media Experts

Validity Rater	**Total Score**
Material Expert 1	73
Material Expert 2	71
Average Score	72
Percentage of Average Score	80%
Category of Validity	**Very Valid**

Based on the validation results of media experts and material experts as shown in the table above, it is concluded that comath media is suitable for use. However, there are suggestions for

improvement, such as eliminating certain submaterials and adjusting design to matter. At the revision stage, a number of improvements have been made based on input from validation. These include self-design, "material" changes, adjustments in issues and classes. Media development is adapted to students' needs and suggested to increase teaching effectiveness. Developers are also asked to include a general concept of geometry earlier in the learning media, before exploring specific issues. This is to ensure that materials are presented according to the curriculum and meet students' learning needs.

Overall, the final results of comath media validation showed an excellent level of validity from media experts with a percentage reaching 80% and valid from material experts with a percentage reaching 74,55%. This shows that the development of comath media has successfully met good quality standards in terms of material and media. After completing the media revision stage, the next step is implementation.

3.1.4. Learning media test (implementation stage)

Next is the implementation stage, this stage is done after designing the product (Anafi et al., 2021). Tests are conducted aimed at knowing what these learning media shortages are and whether the learning media created is both practical and effective to use as well as to increase students' interest in mathematical geometry materials.

The trial was conducted in two ways. First, the developed media was presented at a learning media exhibition held by the mathematics education doctoral program at Sriwijaya University during the pi (π) day celebration. From the results of the presentation, the media received a good response, where many enthusiastic people wanted to know more about the rules for using comath media and wanted to try using comath media. From this exhibition, many commented that comath media is interesting to be applied to learning. The documentation of the first implementation is shown in Figure 14 below.



Figure 14. First implementation of Comath

Not only presented at the learning media exhibition, comath was also carried out a small-scale trial by testing the learning media to two VIII grade students who were studying geometry material. At the time of the trial, the first subject, MN, stated that "The impression is that if you play this game, it will be more exciting to learn mathematics" (if math learning at school uses this game, it will be much more exciting). Then the second subject, KRM, stated that "It feels easier to count" (running the calculation is easier).

The practice of comath learning media test can be seen in the video documentation on the following links: https://bit.ly/UjiCobaMediaCoMath. Figure 15 below shows a snippet of the CoMath learning media Trial activity.



Figure 15. Comath Second Implementation (Student Trial)

3.1.5. Learning media evaluation (evaluation stages)

The fifth stage is Evaluation, this stage is carried out to analyze the advantages and disadvantages of the learning media tested. After passing the trial, an evaluation of the props was carried out. Through the results of trials and interviews related to comath media to two junior high school students who became the subject of the study, it can be concluded that the two students felt an increase in understanding of geometry material through the use of comath media. They also claimed to be happy with the use of comath media and hope this media can be used in learning at school.

Effectiveness

The effectiveness aspect is used to determine the achievement of research objectives. Given that the trial is still limited to a small scale, the effectiveness is assessed from the results of observations and interviews. The research team has conducted interviews with the two students who have tested the comath media. From the results of this trial, important information was obtained:

a. The student being tested is learning about mathematical geometry.

b. During the trial process, both students were able to use the learning media according to the game rules.
c. Students were able to understand and answer some of the questions given on the question cards.
d. Students understand the purpose of this learning media
e. Students experience an increase in understanding related to geometry material.

Based on the points above, it can be concluded that both students were able to understand and answer some of the problems given on the problem cards. When there are problems that cannot be solved they are curious about the correct answer. Comath media provides answers to each problem. Students analyze the correct answers to problems that have not been answered correctly before. Through the discussion of the answers to these questions, students feel helped to remember related material and the discussion of these answers provides reinforcement of students' understanding of the material. From the results of interviews, students mentioned that they were happy to play comath media and they claimed to feel helped in strengthening their understanding of related material. Thus, the purpose of developing this media is achieved so that comath media is declared effective.

Practicality Test

Practicality test is used to determine the ease, attractiveness, and time efficiency of using comath media. Assessment for the practicality of comath media is obtained from the results of teacher assessment and student responses to comath media.

a. Teacher Assessment Sheet

Teacher assessment sheet is a teacher sheet to assess comath media. There are 29 statement items using a Likert scale of 1 to 5. The minimum total score of the teacher assessment sheet is 29 and the maximum total score is 145. From the total score, the percentage level will be calculated and the practicality category will be checked by referring to Table 2 mentioned in the method section. From the results of the teacher assessment, a total score of 123 was obtained, which means that the percentage level is 84.83%. This percentage is in the very practical category.

Furthermore, from the results of the teacher's assessment of the comath media, there is teacher input for the development of comath media in the future, namely the need for additional eye-catching colors for junior high school children to increase student interest. One of them might be by aligning with the color of the question card. In addition, it is hoped that the material on comath is expanded to support students to better master the geometry of other topics.

b. Students Assessment Sheet

The student assessment sheet is a student assessment sheet to assess the comath media. Two students gave an assessment after trying to use comath media. In the practical assessment by students there are 10 statement items using a Likert scale of 1 to 5. The minimum total score of the teacher assessment sheet is 10 and the maximum total score is 50. From the total score, the percentage level will be calculated and checked for practicality categories by also guiding Table 2 mentioned in the method section. From the results of the assessment of two students, the average total score is 40 which means that the percentage level is 80%. This percentage is in the very practical category.

Thus, comath media is very practical both from the point of view of teachers and students.

3.2 Discussion

CoMath learning media is said to be interesting because learning media combines games in learning. Where the game in comath is raised from Indonesian culture, namely the traditional game of congklak / dakon so that through comath media, players can learn math while knowing traditional Indonesian culture. This is in line with research conducted by (Febrina et al., 2022) which states that one of the games that attracts students is the congklak game.

Comath can support students' understanding of geometry because comath has a question card that contains a variety of geometry materials in class VIII that can improve students' geometry skills. Through this question card will support students to practice a lot in answering geometry questions while playing. Question discussion feature that can be scanned through the code available on the question card is very helpful for students to remind the geometry material that they have not mastered well. This media also juxtaposes learning with playing congklak that students love so that students can strengthen mastery of geometry material while playing. This also means that comath media remains effective when used independently by students. This also means that comath media supports students, namely active and independent learning, in this comath students learn on their own and demand active learning in play and geometry, so that students can learn through interaction with new media and experiences. As

research conducted by Fitriyati & Munzil (2017) suggests that the media can help students to reconstruct the learning concepts received. So that this congklak learning media is effective for improving student learning outcomes (Nurdiana & Widodo, 2018).

The developed Congklak Matematika (CoMath) can help increase students' interest in learning geometry. This is in line with the results of research by Matulessy & Muhid (2022) and Jannah et al. (2023) which states that using congklak media can improve students' math skills, desire or interest in learning geometry. This shows that comath learning media is effective. In addition, comath learning media can be used by students well without any difficulties which means that comath learning media is practical. The practicality of comath media is also evidenced by the good results of teacher assessment sheets and positive responses from trial students.

We analyzed several points after conducting trials to provide notes for the future development of comath media. First, so that the geometry material on comath also facilitates for other geometry topics, on the congklak board in the future so that it can use the shape of a flat shape or a wider space such as a square, fifth, trapezoid, rhombus with each corner larger. In addition, for the hole where the question card is stored, it can be given a lid so that the card is safer and another hole can be added as a place to store the cards that have been taken by each player so that the player does not take the same card that has been taken before, and uses eye-catching colors for junior high school children. Finally, testing must be carried out repeatedly with a wider test subject to be able to get maximum results so that the learning media developed will be better (Arif et al., 2019). The development of advanced CoMath learning media is expected to encourage greater student interest and strengthen student understanding of geometry material.

4. Conclusion

Conclusions from research conducted show that this media is effective in increasing students' interest and understanding of geometry. Through interactions with self-impact, students not only understand the theoretical concept of geometry but can also apply it in the context of the game and thus create a more attractive and interactive learning environment. Through this medium, students can explore concepts of geometry in real-life situations. Tapping into existing game elements, researchers have succeeded in creating a learning medium that differs from conventional methods. It can provide the basis for more creative and inclusive media learning, especially in the field of geometry.

The comath media developed has been assessed as valid based on the validity results of two media experts and two material experts. The percentage of the results of the media expert validity test is 80% with a very valid category. While the percentage of media experts is 74,55% with the valid category. For the practicality and effectiveness of comath media, it has been analyzed after the implementation of the props trial on two VIII grade students. The results of observations and interviews with students were analyzed to see the effectiveness of comath media. Meanwhile, to see the practicality of teaching aids, practicality assessments were carried out by teachers and students. The percentage of practicality assessment from teachers obtained 84.83% and the percentage of practicality assessment from students obtained 80%. Both are in the very practical category. Thus, it can be concluded that the comath media developed is valid, effective, and practical.

References

Adolphus, T. (2011). Problems of Teaching and Learning of Geometry in Secondary Schools in Rivers State, Nigeria. *International Journal of Emerging Sciences*, *1*(2), 143–152.

Anafi, K., Wiryokusumo, I., & Leksono, I. P. (2021). Pengembangan Media Pembelajaran Model Addie Menggunakan Software Unity 3D. *Jurnal Education and Development*, *9*(4), 433–438.

Andi Rustandi, & Rismayanti. (2021). Penerapan Model ADDIE dalam Pengembangan Media Pembelajaran di SMPN 22 Kota Samarinda. *Jurnal Fasilkom*, *11*(2), 57–60. https://doi.org/10.37859/jf.v11i2.2546

Arif, D. S. F., Purnomo, D., & Sutrisno, S. (2019). Pengembangan Media Pembelajaran Interaktif Berbasis Etnomatematika Berbantu Macromedia Flash. *JKPM (Jurnal Kajian Pendidikan Matematika)*, *4*(2), 89. https://doi.org/10.30998/jkpm.v4i2.3673

Astuti, P. H. M., Margunayasa, I. G., & Suarjana, I. M. (2019). Pengembangan Perangkat Pembelajaran Kolaboratif pada Mata Pelajaran Matematika Topik Kubus dan Balok. *Jurnal Ilmiah Sekolah Dasar*, *3*(3), 271. https://doi.org/10.23887/jisd.v3i3.18331

Chasanah, F. M. (2021). Pengembangan video pembelajaran untuk meningkatkan minat belajar matematika siswa sekolah menengah pertama pada materi aritmetika. Universitas Islam Negeri Maulana Malik Ibrahim Malang

Damayanti, S. N., Tiaraningrum, F. H., Nurefendi, J., & Lestari, E. Y. (2023). Pengenalan Permainan

Tradisional untuk Melestarikan Budaya Indonesia. *Jurnal Bina Desa*, *5*(1), 39–44. https://doi.org/10.15294/jbd.v5i1.41045

Dewanti Lucky, & Yasmita Echa Martha. (2022). Pengembangan Bahan Ajar Tematik Terpadu Berbasis Buku Cerita Bergambar Pada Siswa Di SDN 17 Pasar Surantih Pesisir Selatan Sumatera Barat. *Jurnal Ilmiah Hospitality*, *11*(1), 381–388.

Dwitiyanti, N., Kumala, S. A., & Widiyatun, F. (2020). Using the ADDIE model in development of physics unit convertion application based on Android as learning media. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *10*(2), 125–132. https://doi.org/10.30998/formatif.v10i2.5933

Febrina, F., Fauzan, A., & Zusti Jamaan, E. (2022). Pengembangan Perangkat Pembelajaran Terintegrasi Etnomatematika Permainan Congklak Materi Operasi Hitung Pada Peserta Didik Kelas II SD/MI. *Jurnal Edukasi Matematika Dan Sains)*, *10*(1), 157–163. https://doi.org/10.25273/jems.v10i1.12035

Fitriyati, I., & Munzil, M. (2017). Penerapan Strategi Pembelajaran Inkuiri Terbimbing Berbantuan Media Untuk Meningkatkan Keterampilan Berpikir Ilmiah Siswa Pada Pembelajaran Ipa Smp. *Jurnal Penelitian Pendidikan IPA*, *1*(1), 1. https://doi.org/10.26740/jppipa.v1n1.p1-6

Hada, K. L., Maulida, F. I., Dewi, A. S., Dewanti, C. K., & Surur, A. M. (2021). Pengembangan Media Pembelajaran Blabak Trarerodi pada Materi Geometri Transformasi: Tahap Expert Review. *Jurnal Pendidikan Matematika (Kudus)*, *4*(2), 155. https://doi.org/10.21043/jmtk.v4i2.12047

Husein MR, M. (2021). Lunturnya Permainan Tradisional. *Aceh Anthropological Journal*, *5*(1), 1. https://doi.org/10.29103/aaj.v5i1.4568

Jannah, M., Suryandari, K., Nurjanah, S., Muhtadin, L., Maftuhah Hidayati, Y., & Desstya, A. (2023). Analisis Etnomatematik Dalam Permainan Congklak Sebagai Media Pembelajaran Bangun Datar Dan Bangun Ruang Di Sekolah Dasar. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *8*(1), 3818–3821. https://doi.org/10.23969/jp.v8i1.8669

Kurnia, T. D., Lati, C., Fauziah, H., & Trihanton, A. (2019). Model ADDIE Untuk Pengembangan Bahan Ajar Berbasis Kemampuan Pemecahan Masalah Berbantuan 3D. *Seminar Nasional Pendidikan Matematika*, *1*(1), 522.

Maryanih, M., Rohaeti, E. E., & Afrilianto, M. (2018). Analisis Kesulitan Siswa Smp Dalam Memahami Konsep Kubus Balok. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, *1*(4), 751. https://doi.org/10.22460/jpmi.v1i4.p751-758

Masikhah, A., Mahmudah, W., & Wildani, J. (2021). Penerapan Pembelajaran Van Hiele untuk Mendukung Pemecahan Masalah Geometri. *Unisda Journal of Mathematics and Computer Science (UJMC)*, *7*(1), 1–10. https://doi.org/10.52166/ujmc.v7i1.2447

Matulessy, A., & Muhid, A. (2022). Efektivitas permainan tradisional congklak untuk meningkatkan kemampuan matematika siswa: literature review. *AKSIOMA: Jurnal Matematika Dan …*, *13*(1), 165–178.

Moto, M. M. (2019). Pengaruh Penggunaan Media Pembelajaran dalam Dunia Pendidikan. *Indonesian Journal of Primary Education*, *3*(1), 20–28. https://doi.org/10.17509/ijpe.v3i1.16060

Nurdiana, U., & Widodo, W. (2018). Keefektifan Media Permainan Tradisional Congklak untuk Meningkatkan Hasil Belajar Siswa. *E-Journal-Pensa*, *06*(02), 161–164.

Paradesa, R. (2019). Pengembangan Bahan Ajar Geometri Transformasi Berbasis Visual. *Jurnal Pendidikan Matematika JPM RAFA*, *2*(1), 56–84.

Puspandari, I., Praja, E. S., & Muhtarulloh, F. (2019). Pengembangan Bahan Ajar dengan Pendekatan Induktif untuk Meningkatkan Kemampuan Representasi Matematis Siswa SMP. *Mosharafa: Jurnal Pendidikan Matematika*, *8*(2), 307–318. https://doi.org/10.31980/mosharafa.v8i2.460

Rohaeni, S. (2020). Pengembangan Sistem Pembelajaran Dalam Implementasi Kurikulum 2013 Menggunakan Model Addie Pada Anak Usia Dini. *Instruksional*, *1*(2), 122. https://doi.org/10.24853/instruksional.1.2.122-130

Rosmiati, M. (2019). Animasi Interaktif Sebagai Media Pembelajaran Bahasa Inggris Menggunakan Metode ADDIE. *Paradigma - Jurnal Komputer Dan Informatika*, *21*(2), 261–268. https://doi.org/10.31294/p.v21i2.6019

Sari, C. K., Muslihatun, A., Cahyaningtyas, L., Khaimmudin, R. N. L. H., Fijatullah, R. N., & Nisa', E. U. (2019). Pemanfaatan permainan tradisional untuk media pembelajaran: Congklak bilangan sebagai inovasi pembelajaran matematika sekolah dasar. *Transformasi: Jurnal Pengabdian Masyarakat*, *15*(1), 14–22. https://doi.org/10.20414/transformasi.v15i1.915

Siregar, S. N., Solfitri, T., & Roza, Y. (2018). Pengenalan Konsep Operasi Hitung Bilangan Melalui Permainan Congklak Dalam Pembelajaran Matematika. *Al-Khwarizmi: Jurnal Pendidikan Matematika Dan Ilmu Pengetahuan Alam*, *2*(1), 119–128. https://doi.org/10.24256/jpmipa.v2i1.107

Sugihartini, N., & Yudiana, K. (2018). Addie Sebagai Model Pengembangan Media Instruksional Edukatif (Mie) Mata Kuliah Kurikulum Dan Pengajaran. *Jurnal Pendidikan Teknologi Dan Kejuruan*, *15*(2), 277–286. https://doi.org/10.23887/jptk-undiksha.v15i2.14892

Susila, D. A. (2018). Metamorfosis Congklak. *SULUH: Seni Desain Budaya*, *1*(2), 153–177.

Yantoro, Y., Kurniawan, D. A., & Silvia, N. (2021). Implementation of the Congklak Traditional Game in Madrasah Ibtidaiyah and Elementary School. *Jurnal Pendidikan Agama Islam*, *18*(2), 407–430. https://doi.org/10.14421/jpai.2021.182-11