# Development of Learning Media Using Ethnomathematics-Based Augmented Reality on Cube and Block Material

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The use of technology in Indonesian education is still quite far behind. Therefore, researchers conducted research aimed at developing android-based learning media using ethnomathematics-based Augmented Reality on cube and block material that is suitable for use and knowing student learning outcomes. This type of research is Research and Development using the ADDIE development model which includes 5 steps, namely Analysis, Design, Development, Implementation, and Evaluation. Research instruments in the form of media validation questionnaires, material validation questionnaires, and learning outcomes tests. The sample of this study was all grade VIII students of SMP Walisongo 1 Semarang. Media development using Blender 2.90.1 and Unity Engine 2018 4.36 software. Data analysis was carried out by normality, homogeneity, t-test, and learning due diligence. The results of this study can be concluded that (1) the percentage of validation of media experts is 91.5%, and material experts are 93%. (2) data from the field shows that the learning outcomes of students who obtain android-based learning media using ethnomathematics-based Augmented Reality are better than students who use lecture learning methods (conventional learning).

**Keywords**: Development, Augmented Reality, Ethnomathematics

# Pengembangan Media Pembelajaran Menggunakan *Augmented Reality* Berbasis Etnomatematika pada Materi Kubus dan Balok

### Abstrak

Pemanfaatan teknologi dalam pendidikan Indonesia masih terbilang cukup jauh tertinggal. Oleh karenanya peneliti melakukan penelitian yang bertujuan untuk mengembangkan media pembelajaran berbasis android menggunakan Augmented Reality berbasis etnomatematika pada materi kubus dan balok yang layak digunakan dan mengetahui hasil belajar siswa. Jenis penelitian ini adalah Research and Development dengan menggunakan model pengembangan ADDIE yang meliputi 5 langkah-langkah, yaitu *Analysis*, *Design*, *Development*, *Implementation*, dan *Evaluation*. Instrumen penelitian berupa angket validasi media, angket validasi materi, dan tes hasil belajar. Sampel penelitian ini adalah seluruh siswa kelas VIII SMP Walisongo 1 Semarang. Pengembangan media menggunakan software *Blender 2.90.1* dan *Unity Engine 2018 4.36*. Analisis data dilakukan dengan uji normalitas, homogenenitas, uji t dan uji ketuntasan belajar. Hasil dari penelitian ini

dapat disimpulkan bahwa (1) presentase validasi ahli media sebesar 91,5%, ahli materi 93% . (2) data dari lapangan menunjukan bahwa hasil belajar siswa yang memperoleh media pembelajaran berbasis android menggunakan *Augmented Reality* berbasis etnomatmatika lebih baik di banding dengan siswa yang menggunakan pembelajaran dengan metode ceramah (pembelajaran konvensional).

**Kata kunci**: Pengembangan, *Augmented Reality*, Etnomatematika

## INTRODUCTION

Mathematics is a basic science that underlies the development of other sciences, basically, mathematics is the queen of science. Ismail et al (Muhlisrarini, 2014) Giving a definition of the nature of mathematics as a science that discusses numbers and their calculations, discusses numerical problems, regarding quantities and magnitudes, studies the relationship of patterns, forms, and structures, means of thinking, a collection of systems, structures, and tools. (Muhlisrarini, 2014) His book also says mathematics is a tool to solve problems by translating problems into mathematical symbols. But in fact, learning mathematics is a complaint for students, students consider that mathematics is difficult and scary. One of the mathematical materials that is considered difficult for students is geometry, especially the Cube and Beam material.

However there are still many students who have difficulty solving math problems. As conveyed by (Fahlevi et al., 2020) Finding out the understanding of the material taught can be seen when students finish working on a problem. (Nursalam, 2016) said some of the difficulties that students often experience include: 1) students learn without knowing what goals to achieve; 2) lack of motivation to learn; 3) studying with bare hands; 4) considering learning the same as memorization; 5) interpreting learning to acquire knowledge only; 6) learning without concentration of mind; 7) learning without a plan and doing learning of incidental origin desires. One of the materials that students still find difficult is the cube and block material. According to research Afrilianto &; Rohaeti (2018) Students' difficulties include (a) difficulty mastering the concept of cubes and blocks consisting of difficulty mentioning and showing the elements of cubes and blocks in pictures, difficulty distinguishing the concepts of sides in 3D shapes, and difficulty in giving understanding cubes and blocks, (b) difficulty finding the formula for the surface

area of cubes and blocks, (c) difficulty using the surface area formula of cubes and blocks.

According to the results of observations made by researchers at SMP Walisongo 1 Semarang showed that the mathematics learning process was less active and less interesting, this was due to the lack of supporting media in the learning process. Another obstacle is caused by the lack of school facilities such as the unavailability of LCD Projectors in each class that supports teachers to facilitate the delivery of material. The use of learning media should get the attention of teachers in learning activities. According to (Saputro et al., 2014) Learning media turns out to follow the development of existing technology, ranging from print technology, audio visual, computers to combined technology between print technology and computers. One of the benefits that can be taken from the existence of this technology is to use it as an effective, creative and educational learning medium. So that educational application media can continue to be developed, one of which is technology Augmented Reality (AR). Suharso & Muhaimin, (2016) shows that the use of learning applications using AR technology can facilitate the task of teachers in presenting material, shorten the duration of time needed and can create a more interactive learning atmosphere. In addition, it was also revealed that the advantage of this application is that it has high interactivity, namely with the existence of AR virtual objects that can interact directly with users. According to (Buchori et al., 2017) Android learning media that can be selected according to (Saputro et al., 2014) defines AR technology or can also be referred to as the integrity of digital elements that are added to the real world directly (real world data) and follow environmental conditions that exist in the real world and can be applied to mobile devices.

The importance of using learning media is supported by the statement (Pranasiwi, 2015) that the demands of the times require children to know technology early and appropriately to increase children's interest in learning. Not only learning media, the learning process should be emphasized on the relationship between mathematical concepts and student experience. The math problem presented must be real, meaning that the problem situation must be experiential real for the student (Wijaya, 2012). According to (Treffers, 2012) The context or real problem is used as a starting point for learning mathematics. Context doesn't have to be a real-world

problem, but it can be in the form of a game, use of props, or any other situation as long as it's meaningful and imaginable in the student's mind. Through the use of context, students are actively involved in exploring a problem. The ethnomathematical context used in this study is the Great Mosque of Demak, Central Java.

The use of context is needed by students in constructing knowledge based on contextual problems given at the beginning of learning. Culture can be used as a context in the learning process and in solving problems contextually because culture is closely related to everyday life (Orey & Rosa, 2008). Contextual problems based on cultural context as a source and reference for learning mathematics are relevant forms of ethnomathematics  (Sintiya et al., 2021). This is in line with the research submitted by  (Lubis et al., 2018) that education and culture are two inevitable essential elements of everyday life, because culture is a complete and inclusive entity applicable to society and education is the fundamental need of everyone in society. One of the relevant studies in research (Fauzi et al., 2021) said that the development of android-based learning media with Augmented Reality features using an ethnomathematical approach to 3D shapes material is practically used in learning by looking at the percentage value of student responses of 89.06%; and based on field result trials, the average learning outcomes in experimental classes using android-based learning media with Augmented Reality features using an ethnomathematical approach are better than the average learning outcomes in control classes using conventional learning. This research is novel to describe the development of mathematics learning media using ethnomathematics-based Augmented Reality at the junior high school level. The development of this learning media aims to invite students to build mathematical concepts from the real world, using their smartphones with an ethnomathematical approach. The real-world context used in this study is the context of Islamic culture which is the *Great Mosque of Demak, Central Java*. While smartphones act as a bridge between cultural contexts and mathematical concepts, which in this case use augmented reality-based applications.

Based on this background, this study aims to: (a) To find out whether android-based learning media using ethnomathematics-based Augmented Reality on cube and block material is valid for use in mathematics learning (b) To find out whether Android-

based learning media using ethnomathematics-based Augmented Reality on cube and block material is effective when viewed from student learning outcomes.

**RESEARCH METHOD**

This research is a Research and Development research using the ADDIE development model. The stages in the ADDIE model are: (1) Analysis (Analysis), in this stage 3 stages of analysis are carried out, namely student needs analysis, material analysis, curriculum analysis. (2) Design (Design), in this stage media design is carried out using ethnomathematics-based Augmented Reality, (3) Development (Development), in this stage product development and product improvement are carried out based on the results of data analysis from the assessment of media experts and material experts, (4) Implementation (Implementation), at this stage the product is tested in learning activities, (5) Evaluation (Evaluation), at this stage it is carried out Pre-Test and post-test. Products are used by class VIII with material Cube and Beam. The samples used in this study were class VIII B as an experimental class and class VIII A as a control class. The analysis stage consists of five stages, namely student needs analysis, curriculum analysis, characteristics analysis, material analysis and work plan analysis. The design stage, carried out to prepare and design the device by compiling: a syllabus that refers to Curriculum-13, designing 3D shapes worksheets which is done by adapting the worksheets held by students and designing android applications. Development stage, product validation is carried out by validators. In this study, there are 2 categories that are validated, including media expert validation and material expert validation. The implementation stage where researchers implement or apply media designs that have been developed in real situations is the experimental class. Researchers will guide students to achieve learning goals and solutions enhance student creativity. The evaluation stage is where researchers conduct a final test in the form of *a post test* at the last meeting to determine the increase in students' creative thinking skills after carrying out learning using android-based media. The stage of product development can be seen in figure 1.
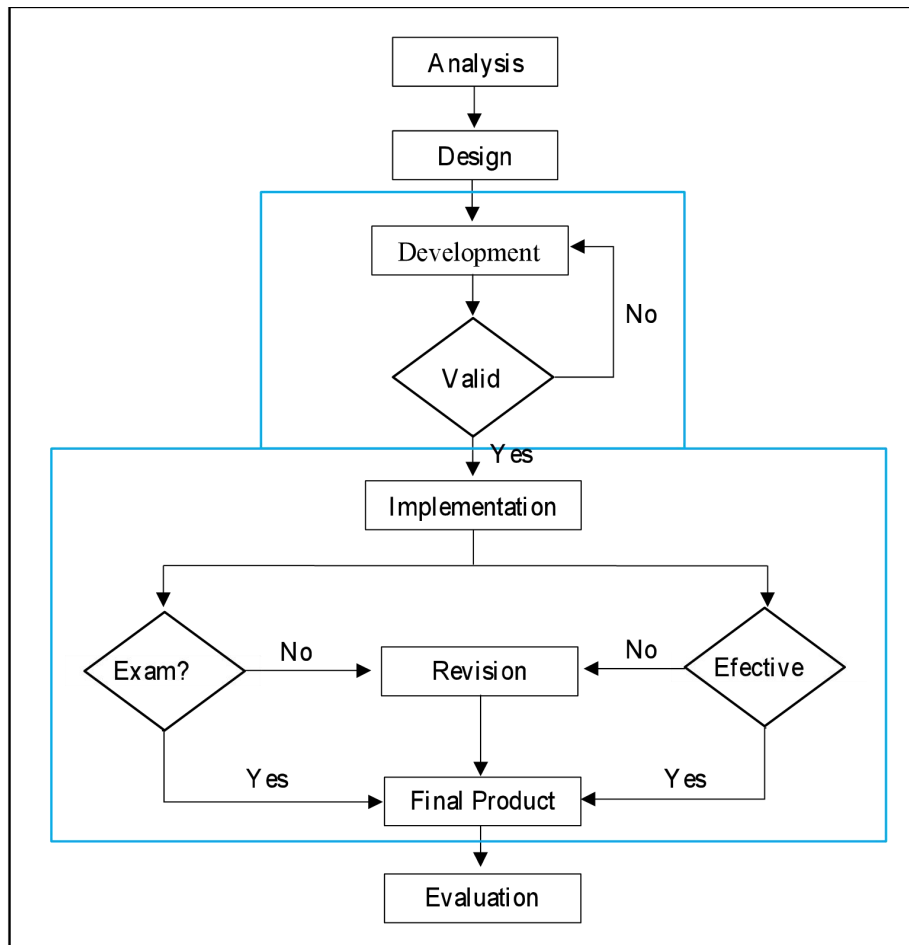
Gambar 1: Development Procedure with ADDIE Model (Cabang, 2009)

This research was conducted at Walisongo 1 Junior High School Semarang. The samples in this study were class VIII-A as the control class and class VIII-B as the experimental class. The study will be conducted from March 17, 2023, to April 5, 2023. The research data includes 1) initial needs data obtained based on the results of questionnaires and interviews aimed at students and teachers at SMP Walisongo 1 Semarang, 2) data from expert validation from expert teachers as media and material experts to assess the developed ethnomathematics-based AR media, 3) the results of student response data to assess the practicality of the media, and 4) pre-test and post-test *results*. The data collection instruments used are validation sheets, student response questionnaires and test questions in the form of *pre-test and* post-test to evaluate students' creative thinking skills. The validity and practicality sheet of this instrument uses a scale range of 5, namely strongly agree, agree, do not argue, disagree and strongly disagree. The data is converted into qualitative data using the following criteria:

Table 1. Percentage Range and Program Quantitative Criteria

| No | Interval | Criterion |
|---|---|---|
| 1 | 81%-100% | Excellent |
| 2 | 61%-80% | Good |
| 3 | 41%-60% | Enough |
| 4 | 21%-40% | Less |
| 5 | 0%-20% | Less Than Once |

Effectiveness data were obtained from experimental and control class learning outcomes tests. The data of each class were tested for effectiveness using a right-party t-test. Then a learning due diligence was carried out to determine student success after using learning with Augmented Reality media for experimental classes and conventional learning for control classes. Before testing effectiveness, an assumption test (prerequisite) is carried out, namely the normality test is intended to test whether the data obtained comes from a normally distributed population or not, a normality test is used. The normality test in the study used the kolmogrov smirnow and Shapiro-wilk tests. The test hypothesis is as follows:

$H_0$ : The sample comes from a normally distributed population

$H_1$ : The sample does not come from a normally distributed population

The homogeneity test is intended to determine whether the data modeled in this study is homogeneous or heterogeneous. The homogeneity test in this study used a statistical levene test. The test hypothesis is as follows:

$H_0$ : The modeled data is homogeneous

$H_1$ : The modeled data is inhomogeneous (heterogeneous)

After the prerequisite test is met, then hypothesis testing is carried out. Hypothesis testing in this study used t-test. The test hypothesis is as follows:

$H_0$ : The average learning outcomes of students who use learning media to 3D shapes using ethnomathematics-based Augmented Reality are no better than the average learning outcomes of students who use conventional.

$H_1$ : The average learning outcomes of students who use learning media to 3D shapes using ethnomathematics-based Augmented Reality are better than the average learning outcomes of students who use conventional.

$H_0$ : The experimental class had no learning completeness compared to the control class.

$H_1$ : The experimental class has learning completeness compared to the control class.

The instruments used include LAS, media expert validation questionnaires, expert validation questionnaires and tests. Validity to determine the eligibility / validity of media with judment experts through media experts and material experts. To determine whether the resulting product is effective in improving student learning outcomes using test instruments that were previously tested in trial classes and then analyzed using tests of validity, reliability, difficulty, and discriminating power. Questions that meet the criteria in the validity, reliability, difficulty and differentiating power tests are used for pre-test and post-test. The effectiveness indicators used in this study are based on the indicators conveyed by Lintang et al., (2017), namely: (1) learning completeness $\geq 75\%$, (2) the learning outcomes of the experimental class are better than the control class, (3) there is an increase in the ability of students who use these learning devices.

## RESULTS AND DISCUSSION

### a) *Analysis*

The analysis phase is the initial stage before designing electronic student worksheets. At this stage, an analysis of student needs, curriculum, student characteristics, and work plans is carried out. The intended analysis is to develop student worksheets that suit their needs.

### *Analysis of Student Needs*

Observations are made to find out the existing problems based on the points of view of teachers and students. Based on observations, we found that the average scores of students' daily tests and midterm math exams have not reached the minimum qualification scores. Furthermore, learning activities oriented towards developing creative thinking skills have been carried out through the practice of several questions but unroutine. Last, teachers never make teaching materials interactive, and teachers want students to always have an interest in learning mathematics. So far, teachers still find it difficult to measure students' understanding and participation in the material presented. From the results of the interview, information was obtained that in the learning process the media used were in the form of *powerpoints* and package books.

The LKS also does not attract students' attention and interest because it only discusses the material in general and there is a lack of supporting image visualization. From this problem, researchers will develop learning media using ethnomathematics-based Augmented Reality on 3D shapes materials. According to (Buchori et al., 2017) android learning media that can be selected according to geometry characteristics is android media using *Augmented Reality*. Because *Augmented Reality* is a technology that combines two-dimensional and three-dimensional virtual objects into a real three-dimensional in our environment and projects virtual objects in *real time* with an android phone (Azuma, 1997). The use of context is also needed by students in constructing knowledge based on contextual problems given at the beginning of learning. Culture can be used as a context in the learning process and in solving problems contextually because culture is closely related to everyday life (Orey &; Rosa, 2008).

### *Curriculum Analysis*

Curriculum analysis is carried out to find out the curriculum used in schools as a reference in developing android applications using Augmented Reality. The curriculum used at SMP Walisongo 1 Semarang is the 2013 curriculum. From interviews with teachers, we found that students often have difficulties in 3D shapes materials, for example the concept of nets and diagonal builds. Therefore, they suggest that real examples are needed to help students understand them. One of them is to use learning media that can take an important role in making real examples to be presented to students. The results of researchers who examined the syllabus and lesson plans showed that the school used the 2013 curriculum. Core Competencies (IC), Basic Competencies (KD), and Learning approaches/methods/models follow the 2013 curriculum. In the 2013 curriculum, student-centered learning requires students to be actively involved in learning activities. One approach that can facilitate students to be actively involved in learning activities is the problem-based learning method.

### *Characteristic Analysis*

Students of grade VIII are in the age range of 13-15 years, information is obtained from the teacher at the interview. Currently, the age range of 13-15 years is required to be able to operate mobile phones, laptops, and computers properly. Based on

observations, it was found that 70% of students enjoy learning mathematics using *smartphones*. Therefore, it can be concluded that grade VIII students really need technology that can make it easier for students to understand the material to 3D shapes.

### *Material Analysis*

Based on the 2013 curriculum in grade VIII mathematics subjects, one of the materials studied is 3D shapes space. Based on curriculum analysis, in conventional learning students are less able to visualize a field of 3-dimensional geometry. And the absence of innovative and varied learning media can attract students' attention in following learning. Therefore, researchers use the material 3D shapes space in a mathematics android application using Augmented Reality which is expected to help improve student learning outcomes.

### *Work Plan Analysis*

Work plan analysis aims to formulate things that researchers want to achieve and can be realized through a series of formulations of certain activity plans. The researcher makes a work plan as follows: (a) Set development goals. (b) Drafting the necessary instruments and performing validation. (c) Test pre-test and post-test questions in experimental and control classes. (d) Test the validity, practicality, and effectiveness of learning media.

### b) *Designs*

At this stage researchers will prepare and design tools by compiling a syllabus that refers to Curriculum-13, designing Special Mathematics LAS which is done by adapting the package book held by students and designing android applications, making expert validation sheets for product assessment, making questionnaires of student responses to products, evaluation questions, grids, answer keys and question scoring rubrics. At this stage the researcher produces a product design where the researcher designs the initial product to be made for research. The main menu display is presented in figure 1

Figure 1. Main Menu Display

Figure 1 is the main display and several menus that will make it easier for students to learn material of 3D shapes space. on the first menu entitled SK, KD and Indicators is a button to Competency Standards, Basic Competencies and Indicators. On the 3D shapes Space button is a button that will direct to the 3D shapes material, and also a camera to bring up AR 3D shapes space. On the Great Mosque of Demak button will bring up the camera to scan the mosque and bring it up into 3D. The profile button will direct the name of the maker and supervisor. As well as a button in the upper right corner to exit the application.



Figure 2. 3D shapes Menu Display

In the display menu, figure 2 contains a brief understanding of 3D shapes space and there is an AR camera to scan the available marker images to bring up the image and volume, 3D shapes space in real time. On the 3D shapes menu, a brief explanation is given about the meaning of 3D shapes space and also the understanding of building cubes, and blocks. Each of these space buildings is equipped with an AR camera that can bring up 3D shapes space objects in three dimensions.
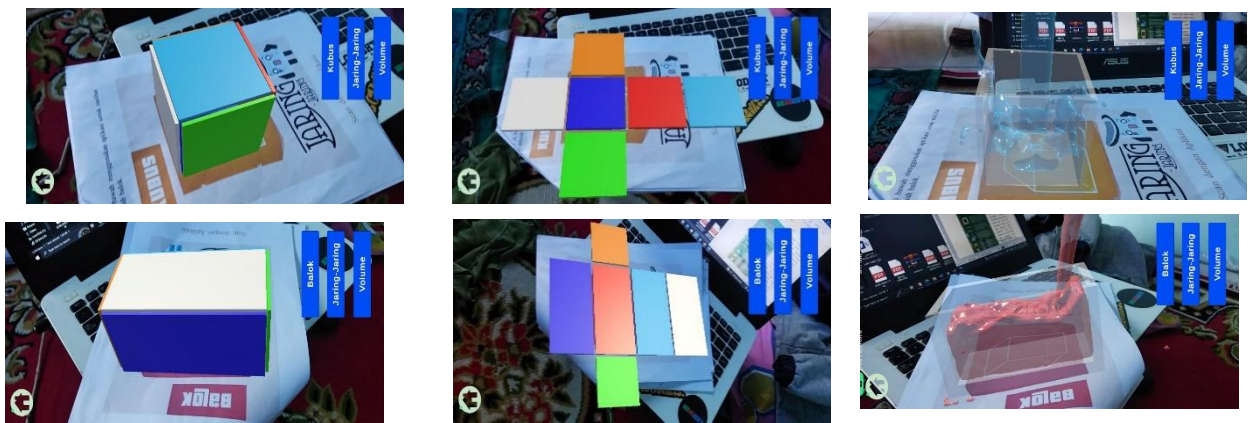


In figure 2 is the display inside the AR camera containing the wake name, nets, volume, and back button. The "*Cube"* button section is a button to bring up cube objects in three dimensions. The *"Nets"* button is to display animated cube webs. The "*Volume"* button will display a cube-shaped place filled with water to display the contents (volume) of the place. At the top of the left, there is a button to return to the previous menu. The next menu, the Great Mosque of Demak, Central Java, displays a brief history of and AR scan menu for the Great Mosque of Demak. By describing the visualization of the mosque's 3D objects, students can analyze what 3D shapes spaces are in it. It can be seen in figure 3.

Figure 3. Menu and AR of Great Mosque of Demak Central Java

In figure 3 there is a brief explanation of the Great Mosque of Demak in general, this aims to let students know that the Great Mosque of Demak is one of the mosques that has historical and cultural value. Researchers use the object of the Great Mosque of Demak because in this mosque has a lot of elements of 3D shapes space that can help students understand the material easily. The visualization given about the Great Mosque of Demak is quite clear with images that can be enlarged and reduced, and can be rotated 360 degrees making it easier for students to analyze the ethnomathematics contained in it.

### c) *Development*

Third stage Development, after completion of product manufacturing, then the product will be validated by media experts and material experts. The data obtained is then analyzed, and from the analysis it is obtained that the product is declared feasible / valid. Results are shown in Table 1.

**Table 1.** Media Expert Validity Results

| No | Validators | Score | Percentage | Category |
|----|------------|-------|------------|----------|
| 1 | Validator 1 | 90 | 90% | Excellent |
| 2 | Validator 2 | 93 | 93% | Excellent |
| | Sum | 183 | | |
| | Average | 91,5 | 91,5% | Excellent |

Based on Table 1, the results of material expert validity data have an average of 91.5 with a percentage of 91.5% having Very Good criteria. Thus, it shows that the learning media to 3D shapes space using ethnomathematics-based Augmented Reality developed has valid categories based on media experts. Furthermore, the results of material expert validation are shown in Table 2 below.

**Table 2.** Material Expert Validity Results

| No | Validators | Score | Percentage | Category |
|----|------------|-------|------------|----------|
| 1 | Validator 1 | 76 | 91% | Excellent |
| 2 | Validator 2 | 73 | 95% | Excellent |
| | Sum | 149 | | |
| | Average | 93% | 93% | Excellent |

Based on Table 2, the results of material expert validity data have an average of 93 with a percentage of 93% having Very Good criteria. Thus, it shows that the learning media to build 3D shapes space using ethnomathematics-based Augmented Reality developed has valid categories based on material experts. We use the input of material expert validators as material for improving instruments related to LAS, syllabus, RPP, and questions by researchers, namely correcting some sentences that are not in accordance with KBBI and there are still some ambiguous sentences. The researcher then revised and corrected some of the ambiguous sentences.

After conducting expert validation, the development of android-based learning media using Augmented Reality on the 3D shapes space material was then revised according to validators' criticisms and suggestions before conducting product trials. Based on the results of the discussion from expert validation, it can be concluded that android-based learning media using Augmented Reality on 3D shapes space material is valid and worthy of dissemination.

### d) Implementation

The fourth stage of implementation, after obtaining data from validators and analyzing which then concludes that the product is valid/suitable for use, the next stage is the implementation of products used in experimental class learning. Before carrying out the learning, researchers conducted an initial analysis using pretest data and final data using a post test and then carried out a normality test, homogeneity test and right-

party t test to find out whether the learning outcomes of the experimental class and the control class were the same. The data test process uses manual and Microsoft excel. The normality test results of the pretest and postest data are shown in Table 3.

**Table 3.** Test Analysis of Normality and Homogeneity of Initial Data

| Description | Normality | | Homogeneity |
| --- | --- | --- | --- |
| | Experiment | Control | |
| Initial Data | 0,1555 | 0,0928 | 1,1435 |
| Final Data | 0,0615 | 0,0685 | 1,1922 |

Based on Table 3, information related to values for the normality test and homogeneity test is obtained. The normality test of the initial data of the experimental class was obtained by both classes with a normal distribution, namely obtained by the experimental class of 0.1555 0.159, $L_{hitung}<L_{tabel}$ and the control class of 0.092 0.159, $<$ the homogeneity test of the two classes was obtained $L_{hitung}<$ by 1.1435 1.840 $F_{hitung}<$ so that both classes were homogeneous. $F_{tabel}<$ For the final data of the normality test, $L_{hitung}<$ the experimental class was obtained at 0.0615 0.159 and the control class at 0.0685 $L_{tabel}<L_{hitung}<$ 0.159 $L_{tabel}<$ so that both classes were normally distributed. In the homogeneity test, $F_{hitung}<$ 1.1922 $F_{tabel}<$ is obtained 1.840 so that both classes are said to be homogeneous.

It is known that both classes of initial data and final data are normally distributed and homogeneous. Then a t-test will be carried out to find out whether the learning outcomes of experimental class students who have used android-based learning media with Augmented Reality features using ethnomathematics-based are better than conventional learning in the control class. The results of the Right Party t-test are presented in table 4.

**Table 6.** Right Party t Test Analysis Results

| Aspects | $t_{hitung}$ | $t_{tabel}$ |
| --- | --- | --- |
| **Learning Outcomes** | 6,5212 | 1,676 |

Based on table 4, information related to values = 6.5212 and = 1.676 is obtained. Because in this > it can be concluded that the average experimental class that uses Android-based learning media with $t_{hitung}t_{tabel}t_{hitung}t_{tabel}$ Augmented Reality features with an ethnomathematical approach to 3D shapes material is better than the control class with conventional learning.

Furthermore, the N-Gain test was carried out to calculate the magnitude of the increase in learning outcomes in students using the learning outcomes of initial data and final data (post-test) for the experimental class and control class. For the n-gain test results in the experimental class of 0.53 which has medium criteria, while for the control class of 0.41 which is also included in the criteria. Then the completeness of learning is tested to determine the completeness of students classically. The results of the learning due diligence are presented in Table 7.

**Table 7.** Results of Classical Learning Due Diligence Analysis

| Class | $t_{hitung}$ | $t_{tabel}$ |
|---|---|---|
| Experiment | 2,425 | 1,6955 |
| Control | -2,931 | 1,6955 |

Based on Table 7 for experimental classes with n = 31 and a significant level of 5% obtained and . This means that it is thus accepted, while the t-test calculation for the control class with n = 31 and a significant level of 5% is obtained. This means that it is rejected. Based on these calculations, it can be concluded that in the experimental class the proportion of student learning completeness has been achieved than the control class with the proportion of student learning completeness has not been achieved. $t_{hitung} = 2,425 t_{tabel} = 1,6955 t_{hitung} > t_{tabel} H_0 t_{hitung} = -2,931 t_{tabel} = 1,6955 t_{hitung} < t_{tabel} H_0$

This research is in line with the results of research from (Sari et al., 2012) who said that by applying AR technology innovation in learning, it will create a new atmosphere that is effective and provides an overview of the real-world environment in the learning system. The same is said by (Suharso & Muhaimin, 2016) that there is a significant difference in results before and after using learning-based media Augmented Reality MagicBook.

Based on the results and discussion, then overall "Development of learning media using Augmented Reality Based on cube and block material" is feasible to be used in learning activities according to media experts and material experts, and from learning outcomes. In addition, learning media also uses Augmented Reality Ethnomathematics-based on cube and block material is better than learning outcomes with conventional learning.

**CONCLUSION**

Based on the results of research and discussion, it can be concluded that (a) This research produces learning media products using ethnomathematics-based Augmented Reality on cube and block materials declared valid or suitable for use with a percentage of 91.5% media experts and 95% material experts (b) learning media using Augmented Reality Based on ethnomathematics on cube and block material is declared effective in improving student learning outcomes, the proportion of learning completeness is achieved so that the learning media is effectively used in mathematics learning and student evaluation based on the results of the N-Gain calculation of 0.53 with the medium category. So that learning media using ethnomathematics-based Augmented Reality on cube and block material can be said to be feasible to be used to improve student learning outcomes.

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