Development of Android Multimedia “TRIGO-MEDIA” Using AIR Learning Model to Improve Mathematical Problem-Solving Ability

Gunawan1*, Aprilia Nurul Chasanah2, Syita Fatih ‘Adna3
1,2,3Pendidikan Matematika, Universitas Tidar, Indonesia
Jl. Kapten Suparman No. 39, Kota Magelang, Jawa Tengah, Indonesia
*Corresponding Author: aprilianurul@untidar.ac.id

ABSTRACT

This study aims to determine the validity, practicality, and effectiveness of the development of the Android multimedia “TRIGO-MEDIA” using the Auditory, Intellectually, Repetition (AIR) learning model to improve the mathematical problem-solving ability. This research is a development research using the ADDIE development model. The subjects of this study were students of classes X MIPA 1 and X MIPA 2 in SMA Negeri 2 Magelang. The results showed that the multimedia developed was in a very valid category with a percentage of 91.03% of the material validity and 90.41% of the media validity, multimedia was in a very practical category with a percentage of 82.54%. Then, multimedia meets the effective aspect with a significant difference between the control and experimental class (the average TKPMM value in the control class is 51.71 and the experimental class is 80.23). This can be concluded that the development of the Android multimedia “TRIGO-MEDIA” uses the learning model of the Auditory, Intellectually, Repetition (AIR) that is valid, practical, and effective to improve the mathematical problem-solving ability of students.

Keywords: AIR learning model, Android Multimedia “TRIGO-MEDIA, Mathematical Problem-Solving Ability

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INTRODUCTION

The era of society 5.0 is an idea designed by the Japanese government which aims to solve a social problem with the help of the integration of virtual and physical space (Skobelev & Borovik, 2017). This era is a challenge for a teacher to teach students several skills such as critical thinking, creativity, and innovation (Septiawan et al., 2020). A teacher is also required to innovate in learning to be able to make the quality of education in Indonesia better, one of which is by creating learning support facilities in the form of technology-based media, namely multimedia. The learning given to students is not only in the form of theory, but the material can be implemented in everyday life following the demands of the era of society 5.0.

Mathematics is one of the subjects that can be applied in everyday life. Mathematics is often considered a difficult subject by students. This is supported by the results of observations in class X SMAN 2 Magelang, where 84.62% of students find it difficult to understand the material in mathematics. However, mathematics must be obtained at all levels so that students are able to think analytically, logically, creatively, and critically (Bardi & Jailani, 2015). In addition, mathematics aims to equip students to be able to apply mathematical knowledge to study in various fields.

The factor that causes mathematics to be a scary thing for many students is caused by the lack of appropriate learning strategies used (Huzaimah & Amelia, 2021). When learning, teachers emphasize lectures and memorization so that students are less able to explore their knowledge and become passive so that they do not absorb the material being studied. Students also tend to be lazy and have low learning motivation (Istiqlal, 2017). The success of learning cannot be separated from the supporting components in learning, namely teachers, students, learning models, and learning media. With the collaboration of these components, it can enable the creation of effective learning.

There are several abilities that must be achieved by students in learning. It aims so that students can find concepts in mathematics and apply them in everyday life (Hafriani, 2021). Mathematical problem solving ability is one of the abilities that must be achieved. Based on the results of observations carried out in class X SMAN 2 Magelang, students have mathematical problem solving abilities which are still relatively low, with an average of 68.52 based on the Kriteria Ketuntasan Minimal (KKM) in the school. Problem solving skills in students are important to be applied in order to be able to solve a mathematical problem and other fields of science so as to be able to provide critical, logical, and systematic reasoning skills that can be useful in everyday life (Nurhayati et al., 2016). According to

Journal homepage: https://jurnal.ustjogja.ac.id/index.php/union/
NCTM (2000: 4), if communication, reasoning, problem solving, connection, and representation skills are low, it will result in low quality of human resources. This is what underlies the mathematical problem solving ability of students to be important to be improved. To support improving these abilities, appropriate media and learning are needed as facilities in learning activities.

One of the appropriate learning models applied to improve mathematical problem-solving skills is the Auditory, Intellectually, Repetition (AIR) learning model. This learning model is effective for use in online and face-to-face learning. This is supported by the results of Fitriana & Ismah’s research (2016) which states that after students participate in learning with the AIR learning model, their learning outcomes are better than students who follow the direct learning model. The AIR model can be said to be effective when it has fulfilled the components in the AIR model, namely auditory, intellectually, and repetition (Syahid et al., 2021).

The fact in the field is that the use of media and strategies in learning is not optimal, which is due to the lack of knowledge of teachers in the use of media and the limited availability of adequate learning resources (Bardi & Jailani, 2015). Learning can be effective and efficient when using interactive multimedia, especially to improve students' mathematical problem-solving abilities. Multimedia needs to be developed at SMAN 2 Magelang due to the limited media used by teachers and not varied. Media that are often used by teachers are PowerPoint, teaching materials, and videos that are accessed from YouTube. In addition, 84.65% of students easily understand the learning material with the help of the media.

The use of multimedia learning will be optimal if it is supported by devices that are easy to operate for the general public, especially students, one of which is a smartphone (Putri & Muhtadi, 2018). The form of smartphone in Indonesia that has the highest number of users is Android. This is evidenced by the results of a survey from Sutarsih & Hasyyati (2018: 15-17) which states that smartphone use at the high school/equivalent level reaches 73.56%. In addition, 100% of students at SMAN 2 Magelang have smartphone devices that can support learning. Smartphone devices are important for the success of this research because smartphones are used to operate multimedia and implement online learning. The use of technology in learning can make students actively involved in learning in the hope of increasing students' mathematical problem-solving abilities.

One of the materials in mathematics that can be applied to improve mathematical problem-solving ability is trigonometry. This material is one of the important materials and
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is classified as difficult at the high school/equivalent level (Aminudin et al., 2019). The characteristics of trigonometry are abstract so that mathematical problem-solving skills are needed to digest theories in mathematics and relate them to situations in everyday life. Based on this background, the researcher intends to conduct a development research with the title "Development of Android Multimedia "TRIGO-MEDIA" Using the AIR Learning Model to Improve Mathematical Problem-Solving Ability".

RESEARCH METHODS

Research and development is the type of research used in this research. Research and development is one type of research that focuses on creating and providing an assessment of a product being developed (Bardi & Jailani, 2015). The development model used in this research is the ADDIE model. The stages in the ADDIE development model are analysis, design, development, implementation, and evaluation. The research subjects were students of class X MIPA 1-2 at SMAN 2 Magelang. The instruments used in this study were multimedia needs questionnaires, relevance questionnaires, validation questionnaires, interview sheets, and TKPMM questions (Mathematical Problem-Solving Ability Test). Before the questions are used in the research class, it is necessary to analyze the instruments and analyze the items to meet the eligibility of the questions to be used as learning evaluations. After the data is obtained, then data analysis is carried out concerning the aspects of the criteria that have been set.

Quantitative descriptive data analysis techniques were used to process data from the validity and practicality questionnaire of the android multimedia "TRIGO-MEDIA". The validity and practicality of the android multimedia "TRIGO-MEDIA" were analyzed in the following stages.

1. The scoring is obtained using the criteria in the following table (Arikunto & Jabar, 2018: 36).

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Statement Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>5</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
</tr>
<tr>
<td>Enough</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>Don't agree</td>
<td>1</td>
</tr>
</tbody>
</table>

2. Tabulate the data that has been collected.
3. Calculate the total score obtained and the criterion score using the following formula (Riduwan, 2018: 14).

\[ \sum \text{criterion score} = \text{highest score of each item} \times \text{sum of respondents} \]

\[ \text{Validity/practical level} = \frac{\sum \text{Score obtained}}{\sum \text{Criteria score}} \times 100\% \]

4. Interpreting the results of the calculation of the level of validity and practicality based on Table 2 below (Riduwan, 2018: 15).

<table>
<thead>
<tr>
<th>Percentage (%)</th>
<th>Category</th>
<th>Validity</th>
<th>Practicality</th>
</tr>
</thead>
<tbody>
<tr>
<td>81.00-100.00</td>
<td>Very valid</td>
<td>Very practical</td>
<td></td>
</tr>
<tr>
<td>61.00-80.99</td>
<td>Valid</td>
<td>Practical</td>
<td></td>
</tr>
<tr>
<td>41.00-60.99</td>
<td>Enough valid</td>
<td>Enough practical</td>
<td></td>
</tr>
<tr>
<td>21.00-40.99</td>
<td>Not valid</td>
<td>Not practical</td>
<td></td>
</tr>
<tr>
<td>0.00-20.99</td>
<td>Invalid</td>
<td>Impractical</td>
<td></td>
</tr>
</tbody>
</table>

5. The android multimedia product "TRIGO-MEDIA" is said to be valid if the minimum validity is in the valid category and is said to be practical if the minimum practicality is in the practical category.

The effectiveness of the android multimedia "TRIGO-MEDIA" using the AIR learning model is determined from the different tests of the two post-test averages in the control and experimental classes by being given TKPMM questions. The Nonequivalent Posttest-Only Control Group Design is a type of quasi-experimental design used. Before knowing the significance of the difference from the post-test, the distribution of the data must be tested for normality and homogeneity. After that, the two mean differences were tested using the Independent Sample T-Test or Mann Whitney U test.

RESULT AND DISCUSSION

The android multimedia development "TRIGO-MEDIA" uses the AIR learning model through several stages of the ADDIE model, namely analysis, design, development, and evaluation. This multimedia was created as an effort to improve students' mathematical problem-solving skills in trigonometry material, especially in KD 3.7 and 4.7. This multimedia also collaborates with the AIR learning model. This multimedia was created with Microsoft PowerPoint, Website 2 APK Builder, Java, iSpring Suite, and HTML 5. To get a suitable multimedia product for learning, the android multimedia “TRIGO-MEDIA” needs
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to be validated by material experts, media experts, and field tests to obtain data to be analyzed and revised according to input from the validator to create multimedia that meets valid, practical, and effective aspects to be applied to learning activities. Based on the research that has been done, the following results were obtained.

Analysis

The analysis was carried out through two things, namely content analysis and analysis of students, teachers, and instructional results. In the content analysis section, a literature review is carried out from books and relevant research results sourced from national and international journals. The literature review is adjusted to the title of this research, which is related to the development of android multimedia, mathematical problem-solving abilities, AIR learning models, and trigonometry material.

In the analysis of students, teachers, and instructional results, interviews with teachers were conducted, giving needs questionnaires to students, and giving TKPMM questions to determine students' initial abilities. Based on the results of interviews with teachers, information was obtained that SMA Negeri 2 Magelang applies the 2013 Curriculum. This curriculum requires teachers to integrate technology-based learning, one of which is creating learning multimedia. Then, the trigonometry material is considered difficult by students because the material is abstract so that appropriate learning strategies are needed. In addition, there are still limited learning media used by teachers.

In addition to interviews with teachers, questionnaires of needs and TKPMM were also given to students. Based on the results of providing needs questionnaires and tests to students, it was found that students found it difficult to learn math material, students would more easily understand when learning using the help of learning media, one of which was by using android multimedia, students had smartphones that could support the learning process, and low ability of students in problem solving.

Figure 1. Android Multimedia Flowchart “TRIGO-MEDIA”
Design

At the design stage, three things were carried out, namely making flowcharts, making storyboards, and compiling data collection instruments (Luthfya, 2020). The flowchart form of the android multimedia “TRIGO-MEDIA” is shown in Figure 1. Then, after making the flowchart, proceed with making a storyboard. The storyboard is made as an overview of the multimedia android “TRIGO-MEDIA” that will be developed. The example of storyboard from android multimedia "TRIGO-MEDIA" is as follows.

![Flowchart](image1)

![Storyboard](image2)

Figure 2. Example of Android Multimedia Storyboard “TRIGO-MEDIA”

At the design stage, several research instruments were also prepared, which consisted of a material and media expert validation questionnaire, a practicality questionnaire, lesson plans, and TKPMM questions. The questionnaires, lesson plans, and TKPMM questions compiled in this study have not come from standard instruments, so it is necessary to carry out relevance for validation questionnaires from material experts and media experts, as well as practicality questionnaires. Then, the RPP needs to be analyzed for validity and the TKPMM questions need to be analyzed to determine the validity, reliability, level of difficulty, and differentiating power of the questions.

**Relevance of the Material Expert Validation Questionnaire, Media Expert, and Practicality**

The relevance of the questionnaire is used as the basis for the feasibility of the questionnaire to be given to material validators, media validators, and students to provide an assessment of the android multimedia "TRIGO-MEDIA" that has been developed. Based on the validation from the validator, it was found that the material, media, and practical validation questionnaire had met the requirements for a proper questionnaire to be used without revision as an android multimedia assessment "TRIGO-MEDIA".

**Analysis of the Validity of the RPP (Learning Implementation Plan)**

Based on the validation, it was found that the RPP had met the eligible category for use. The results of the validity of the RPP are as follows.
Table 3. Results of RPP Validity

<table>
<thead>
<tr>
<th>Review</th>
<th>$\sum S$</th>
<th>$V$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulation of Learning Objectives</td>
<td>39</td>
<td>0.98</td>
</tr>
<tr>
<td>Contents Served</td>
<td>28</td>
<td>0.70</td>
</tr>
<tr>
<td>Language</td>
<td>19</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>86</strong></td>
<td><strong>0.83</strong></td>
</tr>
</tbody>
</table>

Table 3 shows the results of the validity of the lesson plans, namely the validity of the review of the formulation of learning objectives is 0.98 (very valid), the content validity is 0.70 (medium validity), and the language validity is 0.79 (medium validity). Then, overall the results of the validity of the lesson plan are 0.83 (very valid). Based on the results of the validity, it can be concluded that the lesson plans have met the proper requirements to be used as a reference in learning activities.

Analysis of Instruments, Difficulty Index, and Distinctive Power on TKPMM Questions

TKPMM questions are used as an analysis of the effectiveness of the use of android multimedia "TRIGO-MEDIA" using the AIR learning model. Before being used in the research class, the TKPMM questions must go through the instrument analysis stage, namely validity and reliability. In addition, an analysis was also carried out to obtain an index of the difficulty of the questions and the differentiating power of the questions with the following results.

Table 4. Analysis of TKPMM Question Instruments

<table>
<thead>
<tr>
<th>Question</th>
<th>Validity</th>
<th>Reliability</th>
<th>Difficulty</th>
<th>Power of Difference</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.83 (Very valid)</td>
<td>0.76 (Good)</td>
<td>0.58 (Medium)</td>
<td>0.43 (Good)</td>
<td>TKPMM questions are worth using</td>
</tr>
<tr>
<td>2</td>
<td>0.67 (Medium)</td>
<td>0.58 (Medium)</td>
<td>0.31 (Enough)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.73 (Easy)</td>
<td>0.29 (Hard)</td>
<td>0.40 (Good)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.27 (Enough)</td>
<td>0.46 (Good)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the data in Table 4, it is obtained that the validity is in the very valid category (0.83) which is obtained from the analysis of the validation results from the validator using the V index formula from Aiken and the reliability of the questions is in the good category (0.76). Then, the questions have various levels of difficulty, namely moderate, easy, difficult, and have different levels of difficulty which are in the sufficient and good categories. It can be concluded that all TKPMM questions are feasible and can be used for evaluation in learning.
Development

This stage is carried out to realize the results of the analysis and design into the android multimedia form "TRIGO-MEDIA". Some examples of the "TRIGO-MEDIA" android multimedia display are as follows.

![Cover and Main Menu Display](image)

**Figure 3.** Cover and Main Menu Display

The multimedia cover contains the identity of the multimedia and there is a button to turn on the music and the developer profile. The main menu contains the Kompetensi Inti (KI) and Kompetensi Dasar (KD) submenus, learning objectives and indicators, learning materials, mathematical problem solving exercises, and learning evaluations.

![Display of KI and KD](image)

**Figure 4.** Display of KI and KD

The display of KI and KD contains descriptions of KI 3 and KI 4, KD which is in accordance with the material taken in this study is class X trigonometry at KD 3.7 and KD 4.7.

![Display of Learning Objectives dan Indicators](image)

**Figure 5.** Display of Learning Objectives dan Indicators
The display of learning objectives and indicators contains a description of the learning objectives and indicators to be achieved according to the competence of the learning material.

![Figure 6. Display of Learning Materials and Practice Questions](image)

The display of learning materials contains a description of the material, sample questions, and an explanation video related to the completion of the sample questions. The display of mathematical problem-solving exercises contains practice questions based on mathematical problem-solving in the form of multiple-choice which are carried out in group discussions according to predetermined divisions. In practice questions, there is also a discussion of each question number that has been locked with a password. The discussion shown refers to indicators of mathematical problem-solving ability.

![Figure 7. Learning Evaluation Display](image)

The learning evaluation display contains problems based on mathematical problem solving that can be used as a reference for the level of student understanding after studying the material on the android multimedia "TRIGO-MEDIA". The learning evaluation section can be used as a reference for the level of students' mathematical problem-solving abilities, the duration of time for working on the questions in 50 minutes, and there are 5 questions in the form of multiple choice.
Implementation

Material and Media Expert Test

After the android multimedia product "TRIGO-MEDIA" has been developed, the next step is validation by the material validator and media validator. Validation is done by filling out a validation questionnaire sheet that has met the requirements for a proper questionnaire to be used. The validation results from the material and media validators are as follows.

The material validator is tasked with assessing the android multimedia product "TRIGO-MEDIA" in terms of the integrity of the material, the systematics of the material, and the accuracy of the context of the material. The material validator consists of three experts, namely lecturers and teachers. Aspects of the assessment on the validation of the android multimedia material "TRIGO-MEDIA" consists of the feasibility of content, language, and mathematical problem solving. The results of the validation by the material validator are as follows.

Table 5. Results of Material Validation by Material Experts

<table>
<thead>
<tr>
<th>Number</th>
<th>Variable Validity</th>
<th>Total Score</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Content Eligibility</td>
<td>179</td>
<td>91.79%</td>
</tr>
<tr>
<td>2</td>
<td>Language</td>
<td>70</td>
<td>93.33%</td>
</tr>
<tr>
<td>3</td>
<td>Mathematical Problem-Solving</td>
<td>106</td>
<td>88.33%</td>
</tr>
<tr>
<td></td>
<td><strong>Total Score</strong></td>
<td><strong>355</strong></td>
<td><strong>91.03%</strong></td>
</tr>
</tbody>
</table>

The results of the validity of the material found that the category of content feasibility variables was very valid (91.79%), the category of language variables was very valid (93.33%), and the category of solving variables was very valid (88.33%). The results of the overall material validity are 91.03% (very valid). Based on these data, it can be concluded that the context of the material on the android multimedia "TRIGO-MEDIA" has met the valid requirements.

Then, the multimedia was also validated by the media validator in charge of assessing the multimedia android "TRIGO-MEDIA" in terms of media presentation. The media validator consists of three experts, namely lecturers and teachers. Aspects of the assessment on the validation of the android multimedia media "TRIGO-MEDIA" consists of programming and display. The results of the validation by the media validator are shown in Tabel 6.

The results of media validation showed that the programming variable category was very valid (95.24%) and the display variable category was very valid (87.92%). The results
of the overall media validation obtained media validity of 90.41% (very valid). Based on the data that has been described, it can be concluded that the media context on the android multimedia "TRIGO-MEDIA" has met the valid requirements.

<table>
<thead>
<tr>
<th>Number</th>
<th>Variable Validity</th>
<th>Total Score</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Programming</td>
<td>100</td>
<td>95.24%</td>
</tr>
<tr>
<td>2</td>
<td>Appearance</td>
<td>211</td>
<td>87.92%</td>
</tr>
<tr>
<td></td>
<td><strong>Total Score</strong></td>
<td><strong>311</strong></td>
<td><strong>345</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Validity Level</strong></td>
<td><strong>90.41%</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Field Test**

The android multimedia "TRIGO-MEDIA" which has met the valid requirements from the assessment of material validators and media experts, is then field-tested. The field test was conducted in classes X MIPA 1 (control class) and X MIPA 2 (experimental class) at SMAN 2 Magelang. The control class was not given treatment (direct learning model) and the experimental class was given treatment using the android multimedia "TRIGO-MEDIA" in collaboration with the AIR learning model.

The types of learning carried out are PJJ (Distance Learning) and PTM (Face-to-Face Learning). PJJ in the control class is carried out through the Zoom Meeting media. After explaining the material, students are given practice questions to increase their understanding of the material that has been explained. In PTM learning, the learning system used is in two directions, namely students who are in class being explained directly and students who are learning from home using Google Meet media. Learning in the experimental class uses the android multimedia "TRIGO-MEDIA" and the AIR learning model. PJJ is held through Zoom Meeting media by explaining the material using android multimedia "TRIGO-MEDIA". Then, students discuss in groups to complete the practice questions contained in the android multimedia "TRIGO-MEDIA". Group discussions are carried out through Breakout Room Zoom Meetings and Whatsapp Groups. At the next meeting, group representatives presented the results of the discussion and each group responded to each other if there were differences in the results found from solving practice questions. In PTM learning, the learning system used is in two directions, namely students who are in class being explained directly and students who are learning from home using Google Meet media. After using multimedia, students in the experimental class were given a practicality questionnaire to provide an assessment of the use of android multimedia "TRIGO-MEDIA". The results of student assessments on the practicality questionnaire are as follows.
Based on Table 7, the results obtained on the practicality of the display feasibility variable are 84.19% (very practical) and the content feasibility practicality variable is 81.19% (very practical). Then, the overall practicality of all the variables was 82.54% (very practical). Based on these data, it can be concluded that multimedia is said to be practical to use with a very practical category. The student's response to the android multimedia "TRIGO-MEDIA" is that students are very happy and excited when learning mathematics using multimedia. This is in accordance with the results of research from Lestari & Istiqomah (2017) which states that the development of multimedia learning mathematics is in the practical category and the student's response to the use of multimedia is that the multimedia used is attractive and easy to use.

After conducting a practical analysis of the android multimedia "TRIGO-MEDIA", the control and experimental classes were given TKPMM questions which were used to determine the effectiveness of the use of android multimedia "TRIGO-MEDIA" using the AIR learning model. The first step taken to determine the effectiveness is to conduct a normality test in both classes. The normality test used is the Liliefors test. The results of the normality test are as follows.

<table>
<thead>
<tr>
<th>Class</th>
<th>$L_{count}$</th>
<th>$L_{table}$</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.1629</td>
<td>0.1498</td>
<td>Data is not normally distributed</td>
</tr>
<tr>
<td>Experiment</td>
<td>0.1146</td>
<td>0.1498</td>
<td>Data is normally distributed</td>
</tr>
</tbody>
</table>

Based on Table 8, $L_{count}$ in the control class is 0.1628 and $L_{table} = 0.1498$, because $L_{count} > L_{table}$, the control class data is not normally distributed. Then, the experimental class obtained $L_{count} = 0.1146$ and $L_{table} = 0.1498$, because $L_{count} < L_{table}$, the data in the experimental class is normally distributed. Due to the normality test only one class is normally distributed, then the difference between the two averages is then tested with a nonparametric statistical test, namely the Mann Whitney U test. The results of the Mann-Whitney U test calculations can be seen in Table 9.
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Table 9. Mann-Whitney U Test in Control and Experiment Class

<table>
<thead>
<tr>
<th>Class</th>
<th>Z_{count}</th>
<th>Z_{table}</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-4.4635</td>
<td>1.96</td>
<td>There is a difference</td>
</tr>
<tr>
<td>Experiment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on Table 9, obtained $Z_{count}$ is -4.4635 and $Z_{table}$ is 1.96. Due to the value of $Z_{count} < Z_{table}$, there is a significant difference in mathematical problem-solving ability between the control class and the experimental class. Then, the average value of the control class was 51.71 and the average value of the experimental class was 80.23. It can be seen that the average value in the experimental class is superior to the control class. Based on this, it can be concluded that the use of android multimedia "TRIGO-MEDIA" using the AIR learning model is said to be effective for use in learning. This is relevant to the research results of Rohaeti et al. (2020) which states that the development of interactive multimedia is effective for use in learning.

Evaluation

The evaluation was conducted to determine student responses after operating the android multimedia "TRIGO-MEDIA" and the AIR learning model in the experimental class. When learning, students feel happy and excited when using the android multimedia "TRIGO-MEDIA". This is in accordance with Setyowati et al. (2020) opinion which states that students feel happy using multimedia in learning. In addition, students are also active in learning when using multimedia, enthusiastic when working on questions that are solved individually or in groups, and share opinions between groups when presenting the results of discussions. relatively perfect and effective to be implemented in learning.

CONCLUSION

The android multimedia development "TRIGO-MEDIA" uses the AIR learning model to improve mathematical problem solving skills that meet very valid criteria with the percentage of validity from material experts is 91.03% and validation percentage from media experts is 90.41%. Furthermore, multimedia meets the very practical criteria with a percentage of 82.54%. Then, multimedia is said to be effective because there is a significant difference between the control class and the experimental class with the average TKPMM value in the experiment is 80.23 and the experimental class is 51.71.
REFERENCES


Development of Android Multimedia “TRIGO-MEDIA” Using AIR Learning Model to Improve …
(Gunawan, Chasanah, A. N., & ‘Adna, S. F.)


