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Validity Test of Android-Based Learning Media Assisted by Ispring Suite on Pythagorean Theorem Material

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Abstract

The development of technology today has a great influence on human life. This influence also includes the use of technology in education, such as the utilization of learning media connected to information technology. This research was conducted to validate the use of learning media in the form of Android applications with the help of iSpring Suite in learning Pythagorean Theorem material. The research method used is RnD, which is applied to the ADDIE model. The research subjects consisted of 3 experts, one practitioner, and 5 grade VIII students. Data collection involved qualitative and quantitative data. The results of the analysis showed that the experts gave an average assessment of 92.09% with the category "Very Valid." Trials conducted on practitioners and small groups also showed a "Very Valid" assessment with an average of 90%. Overall, it can be concluded that the use of Android-based learning media with iSpring Suite is appropriate and effective in achieving learning objectives. With this learning media that has been proven valid and effective, it can be an interesting alternative to improve the quality of mathematics learning in the classroom. Integrating technology into learning can also provide students with a more interactive and interesting learning experience. Thus, this study's results positively contribute to answering the challenges of education in the digital era, enriching learning methods, and increasing the attractiveness of learning materials.

Keywords: Android; Pythagorean Theorem; Validity Test

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INTRODUCTION

The development of technology today has a significant impact on human life. More than 75% of human work has been integrated with technology (Zimmerman, 2018) making humans the main users of the technology. The education sector is one of the sectors affected by this phenomenon. Technological developments in education have resulted in demands for quality learning outcomes (Larasati et al., 2021). Quality learning outcomes are influenced by several factors, one of which is the learning method. In this context, teachers have an important role in creating innovative learning and encouraging optimal student learning motivation. One of the innovations used is to develop conventional learning methods through the use of interactive learning media.

In this modern era, the application of technology in making learning media is an important need. This is so that learning can develop actively, interactively, and with quality. If there are no learning media available, students will face challenges in following the material and have difficulty being directly involved in the learning process (Djamas et al., 2018). The utilization of learning media has a positive impact on the quality of education and increases students' understanding of the material being taught. Without learning media the learning process cannot reach its maximum potential. This is in line Aisyah & Sulaikho (2021), Larasati

et al (2021), Sulistyorini & Listiadi (2022) that using learning media effectively and appropriately can create a pleasant learning atmosphere for students.

The learning process requires elaboration and collaboration between teachers and students to achieve learning objectives. As a facilitator, one of the roles of the teacher is to utilize educational technology to optimize the use and development of learning media as a support in the teaching and learning process. Teachers can use various types of media, simple and sophisticated technology such as smartphone utilization to achieve these goals (Nuraeni et al., 2020). Most students have adopted the use of smartphones. Based on the results of Cambridge International (2018), it shows that Indonesian students have a high level of familiarity with technology. The use of technology in the form of laptops and smartphones by students is not only limited to social media but also in the context of learning. According to the study, Indonesian students topped the global rankings as IT users in schools with a percentage reaching 40%. One form of technology that is widely used is Android.

Android is a software platform used on smartphones that is experiencing rapid growth. This platform includes the operating system, middleware, and main applications (Hakky et al., 2018; Sulistyo et al., 2020). The advantages of Android as an operating system that is open source and can be easily installed on various compatible devices provide a great opportunity in the development of mobile learning (Setyadi, 2017). The use of android in the creation of learning media can positively affect the learning process of students with the ability to provide access to learning anytime and anywhere (Priyadi & Kuswanto, 2023; Suendarti et al., 2022). In addition, learning media developed using android has the potential to improve material understanding (Qohar et al., 2021). The flexibility of android not only creates a more personalized learning experience but also allows increased accessibility for various user groups (Mandailina et al., 2019; Siahaan et al., 2021; Suci et al., 2023). Integrating android in learning contexts can therefore be considered a progressive step towards a more inclusive and technologically responsive education.

To develop Android-based learning media, devices are needed that can support the development process. Some tools that can be utilized to support the development of Android-based learning media include Adobe Flash, Apache Cordova, Unity, and other tools. ISpring Suite is one of the tools that allows users to easily convert presentation files into flash format and integrate with Microsoft PowerPoint without requiring complex skills (Hakky et al., 2018). Using ISpring Suite, users can combine professional products to create effective e-learning programs, including quizzes and interactions that are already familiar with the PowerPoint environment. In addition, iSpring Suite also provides tight integration with iSpring QuizMaker and iSpring Kinetics to create visual interaction and appeal that exceeds the basic functions of PowerPoint (Handayani & Rahayu, 2020).

After conducting observations at one of the Junior High Schools in Kabupaten Malang, the researcher found that students faced several challenges in learning the Pythagorean theorem. These challenges include difficulties in identifying hypotenuses, especially in algebraic operations, as well as difficulties in conveying ideas appropriately. This observation also revealed some problems that need to be addressed. One of them is students' difficulty in understanding abstract concepts in mathematics, especially for junior high school students. There are several difficulties faced by students as stated by Sunismi (2015). One of the main reasons is the abstract nature of mathematical concepts which makes their application difficult. This obstacle becomes more complicated due to the lack of effectiveness of learning media used in the classroom, especially in determining the hypotenuse. Students also have difficulty in conveying ideas or opinions, as they tend to passively receive material without being actively involved in the learning process. Rahmawati et al (2023) added a further dimension related to mathematics learning problems. Her research shows that students have difficulties in several aspects, such as calculating square roots, determining the hypotenuse of the picture presented, determining one side of the Pythagorean triple, and solving Pythagorean theorem problems presented in story form. These difficulties highlight the need for accuracy and clear thinking in

understanding mathematical concepts. Rohaeti et al (2023) and Sarifah et al (2022) said that learning mathematics requires accuracy and rational thinking of students in solving problems. Errors in the process can affect the learning experience and student learning outcomes. Therefore, it is important for teachers to choose the right learning media to increase learning effectiveness (Sudargini & Purwanto, 2021). However the problem is not only limited to the learning aspect. Student interest in mathematics is also a concern that can have a negative impact on the achievement of student learning outcomes.

This research innovates in mathematics learning by presenting an application that is specifically designed to fulfill the Kompetensi Inti (KI) and Kompetensi Dasar (KD) in the curriculum. The app creates illustrative and contextualized sample problems and provides students with a more thorough learning experience that is relevant to everyday life. Furthermore, the questions on the quizzes are designed in a contextual story format, providing a better and easier understanding for students. This innovation is expected to increase the effectiveness of math learning, bridge the gap in student understanding and provide a more positive learning experience.

As a solution to these challenges, researchers developed learning media in the form of applications that can be accessed through the Android platform. By using this application, students can maximize the use of student smartphones in the learning process. Students have the freedom to learn Pythagorean theorem material independently according to their preferences, anytime and anywhere. Thus, this application is expected to be an effective alternative learning media to improve students' understanding and motivation to learn, and achieve optimal learning outcomes. In line with that, the purpose of this research is to test the validity of Android-based learning media using iSpring Suite on the Pythagorean theorem material in class VIII.

METHOD

In this research, researchers used the ADDIE Research and Development (RnD) Model which was used to create learning media and assess the efficiency of product use. ADDIE model research uses 5 stages, namely analyze, design, development, implementation, and evaluation. This model was chosen because the process has a clearly structured and systematic sequence of steps (Mahuda et al., 2021; Novaliendry et al., 2021; Rahmawati et al., 2023). However, this research is limited to validity testing at the development stage, not including later stages such as field trials or analyzing the effectiveness of media use.

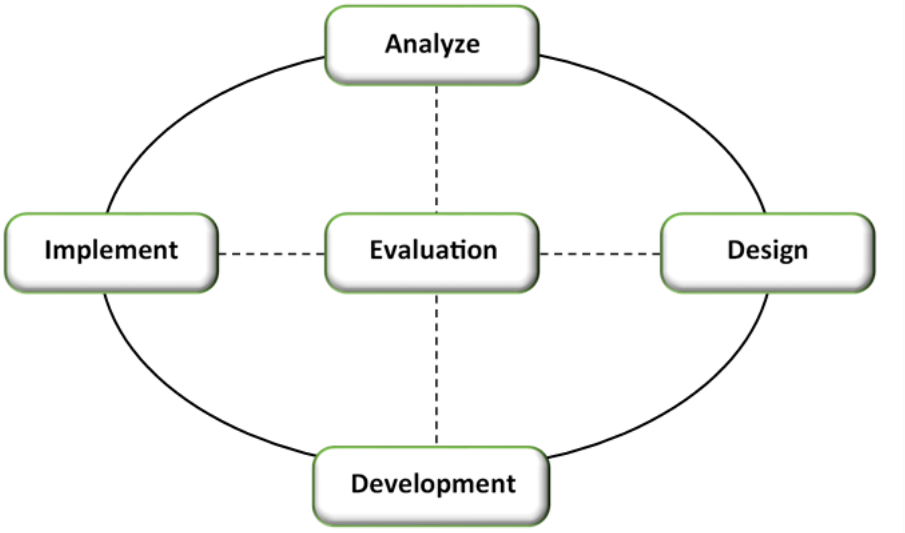

Figure 1. ADDIE Model Develovement (Sugiyono, 2013)

The subjects selected in this study have been carefully structured to cover a wide range of relevant perspectives and expertise (Novaliendry et al., 2021). The subjects used in this study

were 3 experts, 1 practitioner and 5 grade VIII students. Here there are three experts consisting of media experts, material experts, and learning experts. Media experts come from among mathematics lecturers at private universities in Malang who are competent in their fields and have a minimum education of S3, the background of expert selection is to get a comprehensive evaluation of the learning media developed. Learning experts and material experts come from mathematics subject teachers in two different schools at the junior high school/ MTs level because they can bring insights from diverse classroom perspectives. The practitioners involved were subject teachers who have expertise in IT, and 5 grade VIII students who were required for the small group limited trial in order to illustrate the end-user response and experience of the learning media.

This study uses data collection techniques through instruments/ questionnaires with rating scales. Questionnaire is a data collection method that involves respondents to answer a set of questions or written statements. The choice of questionnaire as this technique is based on the desire to get a more directed assessment and in accordance with the characteristics of the product that has been developed. Questionnaires provide flexibility in evaluating respondents' understanding and perceptions of the validity of learning media in the form of applications. The decision to use questionnaires was taken with the consideration that this technique can provide a more detailed and contextual view of the effectiveness of the learning media developed. By involving respondents directly, the questionnaire becomes a relevant instrument to measure the validity and get significant feedback regarding the quality of the learning application. The data collected includes quantitative and qualitative data. Quantitative data is in the form of numbers from the instrument filling, while qualitative data contains comments and suggestions from respondents. The data from the experts' validation results will be analyzed using a Likert scale, and the questionnaire data from practitioners' and students' responses will be analyzed using a Guttman scale. The research instrument uses an assessment score with a scale range of 4, starting from 4 (Agree), 3 (Moderately Agree), 2 (Disagree), to 1 (Disagree). Furthermore, to calculate the percentage of validity of the assessment media, researchers applied the Likert scale formula found in Table 1 and the results of the validation calculations and responses to the media developed will then be interpreted in the form of percentages with categories in Table 2.

Table 1. Likert Scale Formula(Sugiyono, 2013)

Formula	Information
$X = \frac{\Sigma M}{M.max} \times 100\%$	X = Percentage score ΣM = Total score for each aspect $M.max$ = Maximum aspect score

Table 2. Categories of Validity (Riduwan, 2008)

Value (%)	Category
81 - 100	Very Valid
61 - 80	Valid
41 - 60	Fairly Valid
21 - 40	Invalid
0 - 20	Very Invalid

RESULTS AND DISCUSSION

In the early stages of research, namely analysis, researchers conducted two analyses, namely curriculum analysis and needs analysis. The need to do an analysis first in order to find out the desired needs (Malahayati & Zunaidah, 2021). To conduct this analysis, researchers conducted observations and interviews with students, subject teachers, and deputy head of curriculum at one of the Junior High Schools in Kabupaten Malang. From the results of

observations and interviews, it was found that teachers still rely on the lecture method in delivering material from textbooks without optimally utilizing learning media. The use of learning media is limited to simple choices and does not attract students' interest in learning, especially in understanding abstract concepts, so students have difficulty in understanding the material. In addition, other problems were found such as students who were more interested in playing gadgets during learning and often asked permission to go to the toilet. Based on this analysis, researchers provide a solution in the form of developing learning media in the form of android-based applications. This is in line with research conducted by Septia et al (2021), Suendarti et al (2022) dan Wahid et al (2020) that the development of android-based learning media can overcome the difficulties that occur in learning, especially in understanding the material.

In the second stage, the design stage, researchers carry out planning by compiling several steps, including making validation sheets, designing questionnaires/ instruments to respond to responses from experts, practitioners and students, and designing android-based learning media starting from flowchart, storyboard to the stage of realizing the product. In the process of designing this learning media, researchers used several software, including: 1) Canva, which functions to create elements as assets in the application display (Enramika et al., 2023); 2) Microsoft PowerPoint, used as the main media in making learning media in the form of slides (Damayanti & Qohar, 2019); 3) iSpring Suite, as an additional feature that combines text, images, videos, animations, simulations, sounds, and quizzes in one learning media (Sulistyorini & Listiadi, 2022); and 4) Website 2 APK Builder Pro, a computer-based application specifically used to create applications with the APK extension (Handayani & Rahayu, 2020).

Figure 2. Front Page Display, Main Menu and Sub Main Menu

Figure 3. Animated Video on Pembuktian menu and Penerapan Menu

The next step in this research is development, where researchers start by creating a learning media prototype in the form of an Android application and testing the prototype. After that, the media will go through a validation process by media experts, material experts, and learning experts. During this process, various inputs and suggestions will be given as guidelines for making improvements to the media.

In Figure 2 there is a design of the home page and main menu that aims to directly centralize the function of the buttons that match the content. On the main menu there are two buttons, namely the Materi button and the Quiz button. In the Materi menu, there are four buttons containing Kompetensi Inti and Kompetensi Dasar of Pythagoras Material which explain in detail what students should understand; the history of the discovery of the Pythagorean theorem; proof of the concept of the Pythagorean theorem; and the application of the Pythagorean theorem in everyday life. In Figure 3. Researchers utilize animated videos in two important aspects, namely in the menu section of the proof and application of the Pythagorean theorem. The animated video was designed with an attractive appearance, creating a connection to real life, and customized to be easily understood by students. This approach aims to facilitate students' understanding and self-learning of the Pythagorean theorem. This decision is reinforced by the views of Asnawati, & Sutiah (2023) and Halmuniati et al (2022) who stated that the use of learning media in the form of videos, such as videos, can help students understand the Pythagorean theorem. Who stated that the use of learning media in the form of animated videos can significantly help students in learning independently and understanding the material more effectively.

In the Quiz menu, students can work on practice questions independently to test their understanding of the material they have learned. Before working on the quiz, students are required to fill in their identity first. Furthermore, students can directly see the value obtained when completing the practice questions. One of the advantages here, the quiz can be repeated many times.

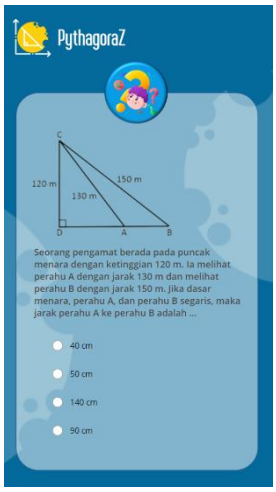

Figure 4. Quiz Display

Furthermore, the application will be tested on a small class to identify weaknesses, obstacles, or improvements that need to be made before the product is introduced to a wider class. The findings from this trial have a high value in making improvements and refining the design before entering the Implementation stage (Hidayat & Nizar, 2021).

Validity Test Results

The media validity test is carried out using an instrument/ questionnaire. In addition, this instrument also includes criticism and suggestions that will be filled in for experts and respondents to evaluate and improve the application made. Suggestions given by experts include: 1) media experts recommend consistency in the use of font size and include the identity of the creator; 2) material experts suggest that the questions on the quiz be made contextual;

and 3) learning experts propose that the appearance be made as attractive as possible. The results of the assessment scores from the experts can be seen in Table 3.

Table 3. Expert Validation Test Results

Test Subjects	Validation Results (%)	Information
Media Expert	93.75	Very Valid
Material Expert	95	Very Valid
Learning Expert	87.5	Very Valid
Average Assessment Percentage Category	**92.09**	**Very Valid**

From the evaluation results listed in Table 3, it can be concluded that the overall evaluation has an average of 92.09% which shows a "Very Valid" interpretation from media experts, material experts, and learning experts. The average value of the material expert is 93.75% in the very valid category, the material expert is 95% in the very valid category and the learning expert is 87.5% in the very valid category. This evaluation indicates that learning media in the form of Android-based applications is very practical and meets the standards set. Furthermore, this learning media will be tested by practitioners and small groups consisting of 5 students. The purpose of this trial is to understand the role, benefits, and advantages of learning media in the form of Android-based applications. This small group trial will be conducted after the learning process is complete, so as not to interfere with the learning process itself. In distributing the application, researchers have created a Google Drive link so that users can download it independently if they have access to the Google Drive link.

Respondents involved in the assessment included practitioners and five students. The instrument used consists of 20 statements that discuss the practicality of using learning media in the form of Android-based applications. The results of responses to the application for Pythagorean theorem material are shown in Table 4.

Table 4. Practitioner and Student Response Questionnaire Results

Test Subject	Percentage (%)	Description
Practitioner	92,5	Very Valid
Student 1	91,25	Very Valid
Student 2	90	Very Valid
Student 3	87,5	Very Valid
Student 4	88,75	Very Valid
Student 5	90	Very Valid
Average Assessment Percentage Category	**90**	**Very Valid**

Table 4 displays the results of the pilot test on practitioners and small classes, which resulted in an average score of 90% with a "Very Valid" interpretation. These results are based on the evaluation of several aspects, such as core feasibility, display quality, learning, and media operation.

After going through the validation and trial stages, the learning media that has been developed has successfully met the established validity standards. This positive result is not only reflected in the validity assessment results, but also through the positive responses given by students in the response questionnaire. The aspects assessed in the questionnaire show good acceptance of the learning media, reflecting its effectiveness and relevance in supporting the learning process. Overall, this positive response indicates that the development of learning media based on Android applications using animated videos has succeeded in achieving the goal of increasing students' self-learning ability and interest in learning Pythagorean theorem material.

CONCLUSION

Based on the results of the research conducted and the discussion that has been carried out, it can be concluded as follows: 1)learning media in the form of Android-based applications developed with the help of iSpring Suite received a "Very Valid" assessment from media experts, material experts, and learning experts; 2)student responses to the use of this learning media were very positive by indicating that the media were "Very Valid" in terms of core feasibility, display quality, learning, and media operation; and 3)overall, learning media in the form of Android-based applications successfully achieved the learning objectives set and met the applicable curriculum requirements with appropriate content and relevant to the learning materials taught. Thus, this application-based learning media makes a positive contribution in improving the quality of learning and facilitating the achievement of the desired learning objectives. Nevertheless, further research needs to be done to explore the potential of using other software in developing similar learning media. Such research should focus on the integration of interactive features to enhance meaning and engagement in the learning process, ensuring a more holistic and enjoyable approach for students.

RECOMMENDATION

The use of Android-based applications as learning media can not only improve students' self-learning ability and interest, but also be a driving force to direct the development of educational technology in the future. The results of this study make a significant contribution by providing educators with guidelines and understanding of the potential of creativity in creating innovative, engaging and fun learning experiences. The importance of innovative approaches in learning, as proposed in this study, is expected to encourage educators to continue to innovate in creating more adaptive and powerful learning methods. Although limited by time constraints and limited trials, the recommendation to involve a larger sample in further development is an important foothold. Trials with larger samples can provide a more comprehensive picture of the impact and potential of this app on different levels of students. By involving more parties in further testing and research, the results can serve as a foundation for the development of better educational technology in the future.

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