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DEVELOPMENT OF P-PROF APPLICATION BASED ON ISLAMIC VALUES AS A MEDIA FOR LEARNING MATHEMATICS AT MAN 1 SOPPENG

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ABSTRACT

This research aims to: 1) Analyze the level of need for developing the P-Prof Application based on Islamic values in mathematics learning at MAN 1 Soppeng; 2) Analyze the level of validity, practicality and effectiveness of the P-Prof application based on Islamic values in mathematics learning at MAN 1 Soppeng. The type of research used is Research and Development (R&D) with a 4D model consisting of Define, Design, Develop and Disseminate. This research was carried out at MAN 1 Soppeng, with research subjects consisting of small group trials (10 students) and field trials (30 students). Data sources include documents, students, subject teachers, and experts/validators. Data collection methods include questionnaires, learning outcomes tests, interviews, and documentation. Data processing and analysis techniques through qualitative and quantitative methods. The research results show that the P-Prof application based on Islamic values has a level of validity with a material expert assessment of 81.94% (valid category) and a media expert assessment of 76.79% (valid category). The level of practicality based on teacher responses was 85.71% (convenient category), small group student responses were 83% (convenient category), and large groups were 83.50% (convenient category). The level of effectiveness can be seen from the increase in the average score from the pre-test (60.27) to the post-test (82.2), with an N-Gain of 0.63 (effective category). The research results show that the Android-based P-Prof application is suitable because it effectively increases students' interest and learning outcomes in mathematics.

Keywords: P-Prof Application; mathematics; Android; media learning

1. INTRODUCTION

Education in Indonesia, by law No. 20 of 2003 concerning the National Education System (Sisdiknas), is defined as a conscious and planned effort to create a learning environment and learning process that allows students to develop their potential. The main aim of education is to develop students to become people who are faithful, devout, have noble character, healthy, knowledgeable, capable, creative, independent and responsible as democratic citizens.

Education focuses on academic development and the formation of dignified national character and civilization (Tarigan at All, 2023).

The function of education is essential in forming a generation that can face the challenges of the times. Therefore, the role of educators is crucial in organizing, directing and creating a conducive learning atmosphere (Anggraini G at All, 2022). Educators must create an environment that supports creativity and innovation and build new paradigms relevant to technological and social developments (Nugroho MN, 2016). Apart from that, teachers must also motivate students to learn effectively and form good character through character education and local cultural values (Rafidah D & Khalif Musa, 2020). In developing creativity, a teacher in the learning process must create a conducive classroom climate and be able to manage various aspects of learning. Teachers can utilize social innovation to connect ideas for problem-solving and find ways to instil change in students, teachers, and school members (Wijayanti et al. l, 2021).

Innovative and contextual learning media is essential to achieve practical educational goals. Learning media is a crucial communication tool that helps convey educational messages to students more engaging and comprehensibly. Attractive and interactive media can significantly enhance students' attention, making understanding and retaining the material easier. By incorporating diverse and dynamic learning media, educators can cater to different learning styles and preferences, thus fostering a more inclusive and effective learning environment. However, the lack of varied and interesting media often becomes a significant obstacle to learning. This gap can decrease student motivation and engagement, ultimately hindering academic progress. Therefore, it is imperative for educators to continually explore and integrate a wide range of learning media to overcome these challenges and support student success (Ginanjar at All, 2021).

Technological developments have significantly enhanced interactive learning media and communication within educational settings (Humairah E & Lhutfia WS, 2022). These advancements enable active student participation, boosting overall engagement (Darwin D at All, 2023). Android applications and similar technology-based tools offer students flexible access to learning resources, supporting iterative learning processes that contribute to improved academic outcomes (Ananda Febri et al., 2023). Mathematics is often considered a complex subject by students. The results of international studies, such as PISA 2018, show that Indonesian students' mathematics abilities are still low. At the national level, daily and semester test results also show that many students have not reached the KKM (Minimum Completeness Criteria). Factors such as the lack of use of technology in schools, monotonous learning methods, and lack of attention to students' learning needs contribute to low mathematics learning achievement.

To overcome this problem, innovative solutions are needed, such as the development of engaging and effective technology-based learning media. One example is the P-Prof Application, a learning application based on Islamic values that is creative and innovative. These applications can include features such as videos, animations, voice recordings, etc., to make the learning process more engaging and interactive. P-Prof Application is an application that can be used to convert PDF digital page-flipping publications, which allows us to create interactive

learning content with several supporting features. The advantage is that the P-Prof Application is easy to operate on laptops and mobile devices (Bariah at all, 2024).

This application is expected to increase students' interest in learning and learning outcomes and instil Islamic values that will shape students' character. Thus, the learning process does not only focus on academic aspects but also on developing character and moral values that are important in everyday life.

2. METHODS

This research is a research and development co-called Research and Development (R&D). The research and development method, along with the Borg & Gall model, is applied in developing and validating research and education products, which involves a systematic process to improve and test the product's effectiveness (Gustiani, 2019). The location of this research and development was MAN 1 Soppeng, Jln. Kayangan No. 162 Soppeng, South Sulawesi. The researcher chose MAN 1 Soppeng because the school had never developed a learning application, especially a mathematics learning application. Another supporting factor is that researchers will find it easy to conduct research at MAN 1 Soppeng because the school provides time for students to use cellphones or PCs, and there is free Wi-Fi that students can access in the learning process, making it easier for researchers to research students.

Three criteria are needed to determine the quality of learning media development: validity, practicality, and effectiveness. 1) Validity refers to the aspects of material, media and language. Learning media is valid regarding material, software engineering, and language aspects. 2) Practicality refers to the appeal and ease for users. Learning media is practical if it is attractive and easy for users to use; in this case, it is easy for students and teachers. 3) Effectiveness refers to the achievement of the desired goals. Learning media is effective if the learning objectives are achieved, which can be seen from the response of student learning outcomes and the results of mathematics learning tests.

The research and development design used to produce a quality learning media prototype in this study uses the 4-D development model. According to Thiagarajan, the 4 D development model (4D Models) consists of 4 main stages: (1) Define; aims to determine and define learning requirements. (2) Design: The purpose of the design stage is to design and compile learning devices and data collection instruments. (3) Develop; consists of validation by expert validators and practitioners, product development tests and revisions. (4) Disseminate ensures educators and students can explore and utilize the applications developed to obtain constructive feedback for further improvement. This study is intended to develop mathematics learning media with Trigonometry material to improve students' interest and cognitive learning outcomes. The subjects of this study were students of MAN 1 Soppeng in the small group trial of 10 students in class X1 F1.2 and the field test (large group), namely X1 F1.1 of 30 students.

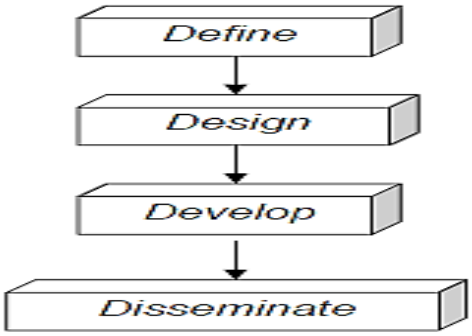

Figure 1. Learning Media Development Model According to 4D Theory

This study used multiple data sources to ensure comprehensive and accurate findings. Primary data sources included documents, educators, students, and experts or validators, each of whom provided valuable insights into various aspects of the study. This study used several techniques to collect data or information, including questionnaires, achievement tests, interviews, and documentation. These methods allowed the researcher to collect subjective and objective data, ensuring a thorough analysis. Furthermore, the research and development process relied on a dual approach to data analysis tailored to the research problem. The analysis was conducted using qualitative methods to interpret non-numerical data and capture underlying patterns or themes, as well as quantitative methods to process numerical data, measure outcomes, and validate hypotheses. This combination ensured a strong and detailed understanding of the research questions and objectives.

3. RESULTS AND DISCUSSION

The main product of this research and development is the P-Prof Application, a learning media rooted in Islamic values, specifically designed for teaching mathematics with a focus on Trigonometry. This application aims to provide a pedagogically practical educational experience that is culturally and spiritually aligned with Islamic principles. To ensure the validity, practicality, and effectiveness of the media developed, this research adopts the 4D model (Four D Models). This systematic approach includes four important stages: Define, where the objectives, target audiences, and needs are analyzed; Design, focusing on creating a blueprint for the application, including the integration of Islamic values into Trigonometry content; Develop, which involves creating and testing prototypes to refine their quality and effectiveness; and Disseminate, where the final product is distributed and implemented in educational settings, accompanied by evaluation for further improvement. Through this structured process, the P-Prof Application is expected to improve the understanding of mathematics and character education meaningfully.

a. Definition

The definition stage is an important foundation in developing practical learning tools, especially for mathematics learning in Trigonometry material. This stage involves identifying and analyzing the specific needs of teachers and students to ensure that the next stage of development is well-informed and on target. Several insights were obtained from interviews

conducted with subject teachers at MAN 1 Soppeng: (a) Teaching methods mainly involve lectures and discussions, which limit student engagement. (b) The primary learning materials are textbooks, LKS (Student Worksheets), and internet resources. (c) Presentation tools like PowerPoint are commonly used, but interactive digital media are unavailable. (d) Students have smartphones and have access to the internet, which provides an opportunity to integrate technology-based learning tools. (e) Learning facilities are still inadequate, although free Wi-Fi is available at school, which helps quick access to information. Despite these resources being available, there are significant challenges. Many grade XI students have difficulty understanding the basic concepts of Trigonometry. They face difficulties in applying formulas, interpreting angle relationships, and solving problems involving trigonometric functions. These issues lead to frequent miscalculations and an inability to handle complex problems, ultimately affecting student performance and learning outcomes. This underscores the need to develop innovative and interactive learning media to address these gaps and improve student understanding and achievement in mathematics.

b. Design

The design stage is a critical phase in the initial preparation for developing the P-Prof Application media based on Islamic values. This stage focuses on creating a strong framework to ensure the application effectively addresses the identified learning needs. Key activities in this stage include constructing criterion-referenced tests, which involve developing questionnaires and learning outcome tests to evaluate students' understanding and gauge the effectiveness of the media. These instruments provide benchmarks for measuring progress and ensuring alignment with learning objectives. Media Selection: The media chosen for the P-Prof Application incorporates various elements, such as images, audio, videos, simulations, internet-based resources, and compatibility with devices like desktops and smartphones. These components aim to create an engaging and interactive learning experience for Trigonometry topics. Format Selection: Media formats are selected based on their suitability for the teaching material. The Design considers the characteristics of trigonometry concepts and integrates tools that facilitate differentiated learning aligned with Islamic values. Initial Design: This stage outlines the application's structure, including the logical arrangement of media and content. It focuses on ensuring that the steps of learning activities are coherent, user-friendly, and aligned with the principles of effective pedagogy and Islamic values. This comprehensive design stage lays the foundation for developing a robust and innovative learning tool.

c. Develop

The development stage is a crucial phase in evaluating the feasibility of the P-Prof Application, which integrates Islamic values into trigonometric learning. This stage involves an expert validity test to ensure the material aligns with educational standards and effectively delivers the intended content.

1) Validity Test

a) Material Experts Assessment

The trigonometric comparison material in the P-Prof Application, designed to integrate Islamic values into mathematics learning, underwent a comprehensive assessment by material experts

to evaluate its feasibility. The primary goal of this assessment was to ensure that the content met educational standards while aligning with Islamic principles. Experts reviewed various aspects, such as the accuracy and relevance of the trigonometric concepts, the effectiveness of the learning design, and the appropriateness of the language used. The following are the results of the assessment of the trigonometric comparison material by material experts:

Table 1. Results of Material Expert Assessment

No	Assessment Aspect	Assessment Score	Persen (%)	Category
1	Learning Design	29	80,56	Valid
2	Language	10	83,33	Valid
	Average		81,94	Valid

The evaluation results indicated that the trigonometric material demonstrated high validity. Specifically, the learning design aspect scored 80.56%, reflecting the structured presentation of trigonometric topics in a manner conducive to student understanding. The language aspect scored 83.33%, showcasing clear and culturally appropriate communication. The average score across all assessed criteria was 81.94%, categorizing the material as valid based on established standards. These results underscore the material's readiness for implementation within the P-Prof Application, ensuring educational effectiveness and promoting Islamic values.

b) Media Expert Assessment

The media expert assessment aims to evaluate the application's Design, appearance, and functionality feasibility to deliver the developed trigonometric comparison material. This assessment ensures that the application's interface is user-friendly, visually appealing, and functionally reliable. Media experts analyzed various elements, including the clarity of the layout, navigation system, graphic quality, and application responsiveness on different devices. The following are the results of the media expert assessment that has been carried out:

Table 2. Results of Media Expert Assessment

No	Assessment Aspect	Assessment Score	Persen (%)	Category
1	Software Engineering	22	78,57	Valid
2	Visual Communication	27	75	Valid
	Average		76,79	Valid

Based on the assessment results by media experts, the evaluation focused on two key aspects: the software engineering aspect, which achieved an average score of 78.57%, and the visual communication aspect, which scored 75%. The average score from these assessments is 76.79%, placing the product in the "valid" category according to the product validity criteria. These results indicate that the application demonstrates solid technical reliability and functional performance, as evidenced by its satisfactory score in the software engineering aspect. Additionally, visual communication highlights the application's ability to convey information effectively through an aesthetically pleasing and user-friendly interface. The "valid" rating

suggests that the application meets the necessary standards for usability and functionality, making it suitable for further development or use in its intended educational context.

2) Practicality Test Results

To evaluate the practicality of the P-Prof Application, which integrates Islamic values into its Design, an assessment was conducted involving mathematics subject teachers and students. The evaluation consisted of two stages: a limited test with 10 students and a broader field test involving 30 students. Mathematics teachers played a critical role by assessing the application's alignment with the curriculum and its ease of use in classroom settings. Meanwhile, students provided feedback on the application's usability, content engagement, and relevance to their learning needs. The combined results from these assessments offer valuable insights into the application's effectiveness and potential for broader implementation in differentiated mathematics instruction, ensuring it meets both educational objectives and user expectations.

a) Mathematics Subject Teacher Assessment

Practical assessments conducted by mathematics teachers play an important role in evaluating the P-Prof Application that integrates Islamic values into its Design. Teacher assessments are critical because they are the primary users of the application in the educational environment. This assessment covers two main aspects: learning materials and learning media. Teachers test the learning content's relevance, accuracy, and clarity and ensure it is aligned with the curriculum and educational objectives. In addition, the assessment also considers the functionality and usability of the learning media and determines how well the application supports an interactive and engaging learning experience. The feedback collected from this assessment is critical in refining the application and ensuring its effectiveness for teachers and students.

Based on the assessment results carried out by mathematics teachers, the application received high ratings across several key aspects. In terms of learning design, the application scored 88.89%, indicating that the structure and approach to teaching were well-received.

The following are the results of the mathematics teacher assessment of the developed application:

Table 3. Results of Mathematics Teacher Test

No	Assessment Aspect	Assessment Score	Persen (%)	Category
1	Learning Design	32	88,89	Very practical
2	Language	10	83,33	Very practical
3	Software Engineering	23	82,14	Very practical
4	Visual Communication	31	86,11	Very practical
	Average		85,71	Very practical

The language used in the application also earned a solid score of 83.33%, reflecting its clarity and appropriateness for the target audience. The software engineering aspect scored 82.14%, demonstrating the application's functionality and reliability. Additionally, visual communication was highly praised, with a score of 86.11%, suggesting that the Design and

presentation of content were visually engaging and effective. The average score of 85.71% in the mathematics teacher assessment places the application in the "very practical to use" category according to the teacher response value criteria. This suggests that the developed application is user-friendly and effective for educational purposes.

b) Small Group Student Responses

The small group trial was conducted with 10 students from class XI F1.2 at MAN 1 Soppeng, who participated in evaluating the developed learning application. Each student was asked to provide feedback by completing a questionnaire to assess various application aspects. This trial aimed to gather insights into how the students interacted with the application, their understanding of the learning materials, and the tool's usability. The results of the small group trial will help identify areas of strength in the application and aspects that may require further development. The feedback from the students, compiled in the table below, will be used to refine the application to meet educational goals better and enhance the learning experience for future users.

Table 4. Results of the Small Group Trial

No	Assessment Aspect	Assessment Score	Persen (%)	Category
1	Software Engineering	167	83,50	Very practical
2	Learning Design	167	83,50	Very practical
3	Visual Communication	164	82,00	Very practical
	Average		83,00	Very practical

The assessment of the developed learning application by 10 students provided valuable insights into its effectiveness. The students evaluated several aspects of the application, including software engineering, learning design, and visual communication, with the scores for each aspect being 83.50%, 83.50%, and 82.00%, respectively. The overall average score for the small group student assessment was 83.00%, placing it in the "very practical to use" category according to the student response criteria. While the feedback was largely positive, some constructive suggestions were made. Students recommended that the language used in the application be more communicative to improve user engagement and understanding. Additionally, they emphasized the need for continued development to enhance further the application's usability and effectiveness in the learning process. These insights will be instrumental in refining the application, ensuring that it meets the needs of students and can be effectively utilized in educational settings.

c) Large Group Student Responses

Following the analysis and improvements made to the P-Prof Application based on feedback from the small group trials, large group trials were conducted in class XI F1.1 at MAN 1 Soppeng. This phase involved 30 students who participated in evaluating the application. The large group trial aimed to assess the overall effectiveness of the application after its revisions, with particular attention given to its integration of Islamic values. The results of these trials were analyzed to understand the students' responses and to determine the application's impact in real-world classroom settings. The feedback gathered will play a crucial role in further refining the application, ensuring that it is educationally effective and aligned with the values it seeks to

promote. The responses from these 30 students will help identify areas of strength and aspects that need further enhancement, guiding the next steps in the development process.

Table 5. Results of the Large Group Trial

No	Assessment Aspect	Assessment Score	Persen (%)	Category
1	Software Engineering	506	84,33	Very practical
2	Learning Design	510	85	Very practical
3	Visual Communication	501	83,50	Very practical
	Average		84,28	Very practical

The assessment results based on feedback from 30 students, including those in large groups, show a positive reception to the developed application. The average score in software engineering was 84.33%, indicating a solid understanding and appreciation of the technical framework. For the learning design aspect, the score was 85%, reflecting the effective pedagogical structure of the application. Visual communication scored 83.50%, showing that the application's Design is clear and visually engaging for users. The overall average score for student assessments in large groups was 84.28%, suggesting that the application is widely accepted across various aspects. Additionally, according to the student response value criteria, the application falls within the "very practical to use" category, further highlighting its effectiveness in meeting the educational needs of the students. These results affirm the application's potential to enhance learning experiences in large groups, with feedback suggesting areas for further refinement to maintain its high usability and effectiveness.

3) Effectiveness Test Results

To test the effectiveness of the P-Prof Application based on Islamic values, it was assessed from the learning interests of students from the pre-test and post-test results on 30 students. The following are the results of student learning interests, pre-test results and post-test results as follows:

a) Pre-test and Post-test Results

The initial test (pre-test) was conducted to determine students' abilities before the P-Prof Application based on Islamic values, and the final test (post-test) was conducted to determine students' abilities after the P-Prof Application based on Islamic values was implemented.

The pre-test questions were done at the beginning of learning to determine students' initial knowledge before the P-Prof Application based on Islamic values was implemented in learning. Then, I continued applying the P-Prof Application based on Islamic values in learning Trigonometry material. After being treated with P-Prof Application based on Islamic values, a post-test was conducted to determine the effect of using P-Prof Application based on Islamic values on student learning outcomes by comparing the pre-test and post-test scores. Students were given an initial test in the form of multiple choice questions of 15 questions. The results of the pre-test and post-test in the field trial increased. The average pre-test result of 60.27 increased in the post-test to 82.2. It is necessary to conduct an N-Gain test and a T-T test to

determine whether there is an effect after learning to use a P-Prof Application based on Islamic values.

b) T-Test

The T-Test assessed whether the P-Prof Application based on Islamic values impacted students' learning outcomes by comparing pre-test and post-test results. This statistical test helps determine if there is a significant difference in performance before and after applying the P-Prof Application. However, before proceeding with the T-test, it was necessary to conduct a normality test to ensure that the data met the assumption of normal distribution. This was done using the Shapiro-Wilk test with SPSS 27.0 for Windows software. The results of the normality test showed that the significance (sig) values for both the pre-test (0.357) and post-test (0.125) were more significant than 0.05, indicating that the data from both tests were usually distributed. This suggests that the P-Prof Application could be further analyzed using the T-Test to examine the differences in students' learning outcomes without concerns about the data violating normality assumptions.

c) N-Gain

In addition to performing the T-Test, an N-Gain test was also carried out to assess the impact of using the P-Prof Application based on Islamic values. The N-Gain test compares students' pre-test and post-test scores to measure the effectiveness of the application. The results from this test indicate that the average N-Gain score for the students was 0.63. This value falls from 0.30 to 0.70, corresponding to the moderate or effective category. A score in this range suggests that the P-Prof Application effectively enhanced students' learning outcomes, particularly trigonometry. Therefore, the P-Prof Application, which integrates Islamic values into the learning process, has a positive effect and is suitable for use in educational settings, contributing to better student performance.

d. Develop

At this stage, the dissemination process includes workshops and training sessions focused on the P-Prof Application, a learning media developed based on Android, to enhance learning outcomes. These workshops and training activities are conducted for mathematics teachers at MAN 1 Soppeng and mathematics educators at various madrasas within the Soppeng Regency. Additionally, students from each class XI at MAN 1 Soppeng participate in these sessions, ensuring that educators and students have the knowledge to utilize this innovative application effectively in their learning environments. Beyond local dissemination, international scientific publications are also pursued. These publications aim to share the results of this educational innovation with the global academic community, thereby contributing to the advancement of learning technologies on a broader scale. The expected impact of this publication is to enhance Indonesia's global standing in the field of technology-based education, fostering greater international collaboration and the adoption of modern learning tools.

4. CONCLUSION

The analysis of research results has revealed a clear need to develop learning media for trigonometry material in mathematics at MAN 1 Soppeng. Both teachers and students acknowledge the importance of integrating learning media to enhance understanding, yet there remain challenges in the learning process. These challenges are particularly evident in mathematics, with a shortage of creative and engaging learning media. Developing the P-Prof Application, an educational tool based on Islamic values is essential to address these issues. This application aims to foster a positive learning experience by making students feel engaged, motivated, and involved in the learning process.

The initial version of the P-Prof Application has been evaluated for its validity, practicality, and effectiveness. The validity assessment, with an expert media evaluation score of 76.79%, placed the application in the valid category. The application received highly positive feedback on practicality, with mathematics teachers rating it 85.71% as very practical. Student responses were similarly favorable, with small groups scoring 83% and large groups scoring 84.28%. Furthermore, the application demonstrated effectiveness, reflected in the improved cognitive results from the pretest and post-test scores. The pretest average was 60.27, while the post-test average increased to 82.2, leading to an N-Gain value of 0.63, categorized as moderate. Based on these findings, the P-Prof Application is considered suitable for use in the learning process.

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