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DEVELOPMENT OF LEARNING MEDIA BASED ON AN ANDROID APPLICATION AT VOCATIONAL HIGH SCHOOL 5 JAKARTA

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ABSTRACT

This research aimed to develop a suitable Android-based mobile learning application as a learning medium for milling machine techniques at Vocational High School (SMKN) 5 Jakarta and to assess the feasibility of the EduFrais application based on evaluations by material experts, media experts, and student responses. The study employed a Research and Development (R&D) approach using the 4D model: Define, Design, Develop, and Disseminate. Validation was conducted by one material expert and one media expert. The developed media was tested on 35 eleventh-grade students majoring in Machining Techniques at SMKN 5 Jakarta. Results showed that the EduFrais application's feasibility level, based on the material expert's assessment, scored 53.00 (96.36%), categorized as "Very Suitable" and "Very Feasible." The media expert's assessment yielded a score of 50.00 (83.33%), categorized as "Very Good" and "Very Feasible." Student responses during testing were predominantly positive, with each question receiving >70% positive responses and an overall percentage of 94.28%. This indicates that the Android-based EduFrais application is suitable for use as a learning medium in milling machine technique courses. The study concludes that the developed EduFrais application meets the feasibility criteria for implementation in the Milling Machine Techniques course at SMKN 5 Jakarta.

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INTRODUCTION

Improving the quality of education in vocational high schools (SMK), particularly in vocational expertise programs, is essential to produce competent and work-ready graduates. One of the current educational issues is the low quality of SMK graduates who do not yet fully possess competencies that meet industry needs (Suryanti et al., 2019). Therefore, enhancing the quality of vocational education in SMK becomes crucial to address this issue. One approach to improve the quality of vocational education is by utilizing mobile-based technology, known as mobile learning.

Mobile learning is a learning process that utilizes mobile information and communication technology devices such as smartphones, laptops, and tablets (El-Sofany et al., 2020). The development of mobile technology is currently very rapid, especially Android-based smartphones widely used by

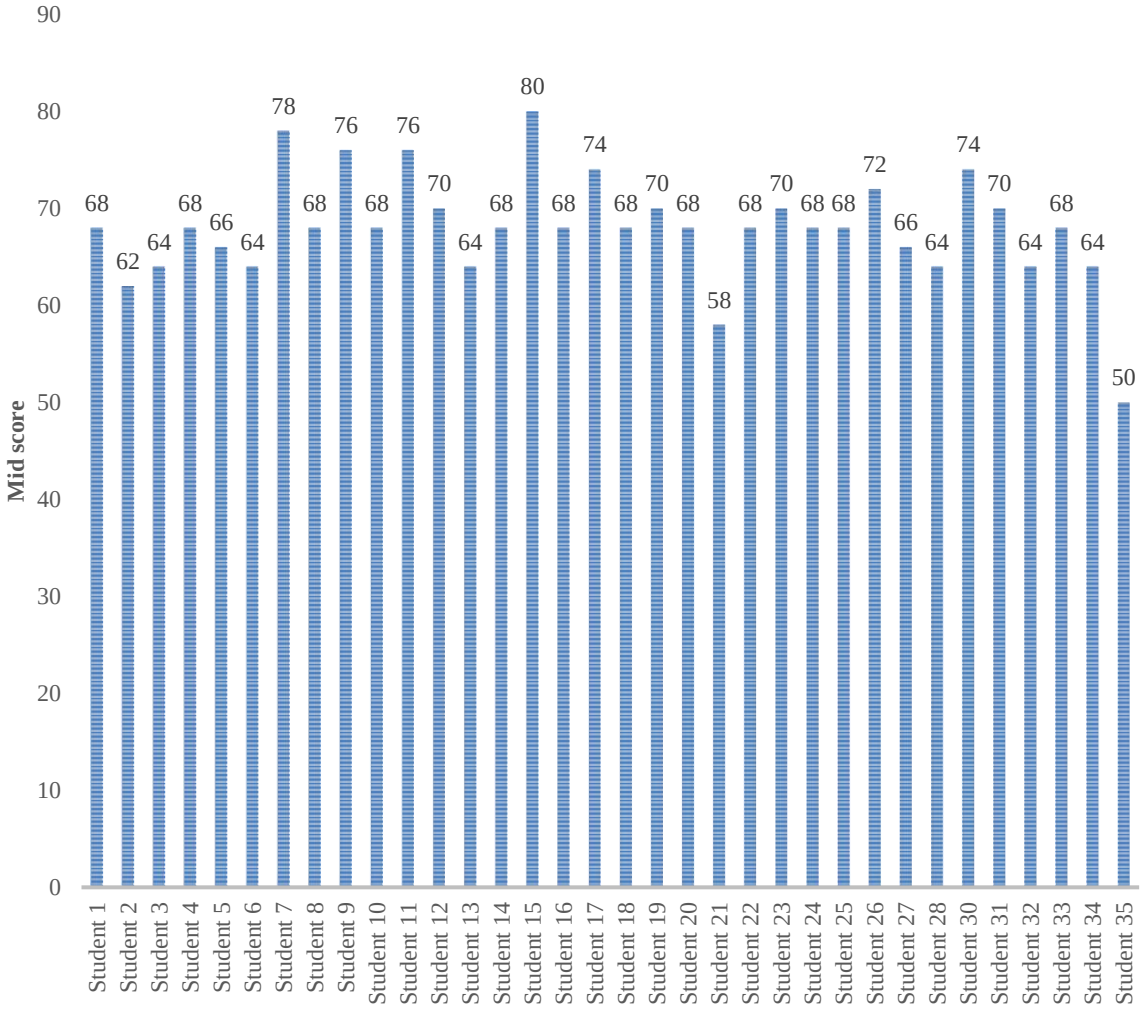
students and teachers. According to Surahman et al. (2017), "The use of Android-based mobile learning in vocational education at SMK aims to provide easy access to learning materials while increasing the interactivity and flexibility of the learning process". Therefore, developing Android application-based learning media is considered appropriate to support vocational learning activities in SMK to be more interactive and efficient. Thus, integrating mobile-based technology in the form of Android learning applications can improve the quality of learning in vocational expertise programs at SMK to address the issue of low competency of current SMK graduates.

The development of Android-based mobile learning is expected to be a solution in improving the quality and efficiency of vocational learning in SMK, thereby producing graduates relevant to industry needs. Ideal vocational learning should already utilize cutting-edge technology and Industry 4.0 concepts to align with developments in the working world. However, based on observations and interviews with teachers and students at SMK in Malang City, it was found that most vocational schools still implement conventional learning with dependence on textbooks and lecture methods (Prasetyo et al., 2019).

Learning media such as whiteboards, PowerPoint presentation slides, and printed modules used are considered less interactive and innovative (Kusuma et al., 2020), thus less than optimal in equipping 21st-century competencies for SMK students. Additionally, the limited time allocation for face-to-face learning in SMK, which averages only about 5 hours per day, also becomes an obstacle to delivering all vocational materials optimally (Kusuma et al., 2020). This condition illustrates a considerable gap between the expectation of developing Android-based vocational mobile learning idealized to be more efficient, attractive, and interactive with the reality of current vocational learning that still takes place conventionally.

Based on an interview conducted on January 18, 2024, with Mr. Suharto, a teacher in the machining engineering department at SMKN 5 Jakarta, it was stated that the use of learning media is still conventionally based and has not used digital-based media. Conventional-based media include blackboards, printed textbooks, and simple teaching aids such as maps (Sadiman et al., 2014). Based on the researcher's teaching practice results at State Vocational High School (SMKN) 5 Jakarta, it was found that innovation in learning media development is needed for the milling machine engineering subject. This is because during the learning of milling machine engineering using conventional learning media, students' interest in the milling machine engineering subject was quite low, as evidenced when the mid-semester exam was held for the milling machine engineering subject for class XI machining engineering major, the learning outcomes of some students were still low or had not reached the predetermined Minimum Completeness Criteria (KKM) of 75. The data obtained showed that only about 11.42% achieved scores above the KKM, while 88.58% of students took remedial given by the teacher, or 4 out of 35 students scored above the KKM. The KKM score is 75 points.

Tabel 1.1. Mid Term Exam Scores For Milling Machine Engineering Class XI



Therefore, innovation in learning media development is needed for this milling machine engineering subject that can assist teachers in delivering their materials and can also attract students' learning interest to improve student learning outcomes. Thus, this Android-based mobile learning development research is important to bridge the gap in vocational learning.

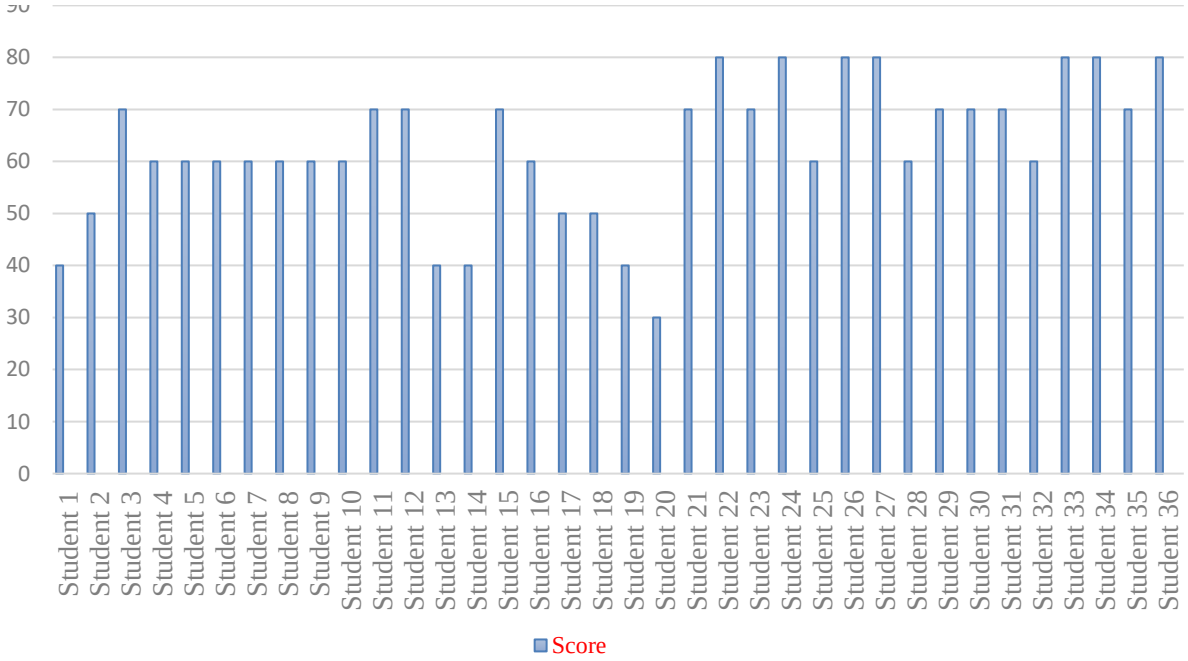
Based on research conducted by Khudlori, A. (2019) using the ADDIE development method, the results stated that the developed Android-based learning media is feasible and effective in improving student learning outcomes. Al Hakim et al. (2020) using the waterfall system development method, the results stated that the Android application-based learning media is "Good" to be used as a learning medium. Agustina Wulandari (2018) using the ADDIE development model, the results obtained showed that the level of feasibility of the developed learning media is very suitable for use.

Based on the above studies, this is a proposal for novelty for the researcher's thesis in developing Android application-based learning media such as the application of modern UI/UX design by applying modern mobile UI/UX design principles to improve appearance, ease of use, and user experience,

integration of interactive multimedia content such as videos, animations, simulations, and interactive quizzes that can increase user interest and active participation, and automatic assessment and feedback features that will be equipped with assessment features through quizzes and automatic feedback allowing users to evaluate their understanding independently, cross-device and platform accessibility where the application is designed to run on various Android devices and form factors such as smartphones, tablets, and TVs, as well as the application of gamification by implementing game elements such as points, badges, leaderboards, challenges, and rewards to increase motivation, participation, and user satisfaction.

Some problems that often arise in learning milling machine engineering at SMK include the lack of practical opportunities for students due to the limited number of machines and workshop usage time (Purnomo et al., 2019), not yet optimal use of interactive digital learning media, and low learning interest and student attraction to textbooks that are still delivered conventionally. As a result, students' understanding of basic concepts and milling machine programming procedures tends to be low. This is evidenced by the pretest results of class XI machining engineering students at SMKN 5 Jakarta on May 13, 2024.

Tabel 1.2. Pretest Results Measuring Student Ability In Milling Machine Engineering Class XI



On the other hand, print-based learning media such as books, modules, and job sheets that have been dominantly used are considered to have several weaknesses compared to Android-based mobile learning. According to research by Pratiwi (2022), the use of conventional media often makes the classroom atmosphere passive and boring for students.

Conventional media is considered less able to stimulate student interest and involvement in learning. In addition, research by Hakim (2021) also shows that the limitations of conventional media in displaying visual materials make it difficult for students to understand abstract concepts.

Moreover, the low learning interest and attraction of students to conventional textbooks are caused by several factors. First, conventional textbooks generally only contain text without attractive illustrations. This makes textbooks feel boring for students (Haryono, 2018).

Second, the delivery of material in conventional textbooks tends to be monotonous and less interactive. Students find it difficult to understand the material delivered only through text (Setiawan, 2020). Third, the development of technology and the internet makes students more interested in seeking information digitally. Students are reluctant to read conventional textbooks that are considered outdated (Nurhalimah, 2019). As a result, student learning outcomes are low due to a lack of comprehensive understanding.

The selection of class XI as the subject is because the developed Android application can become a medium for class XI to strengthen basic understanding that is still low so that the media can be used as independent learning material, and class XI feedback on the developed learning application can be very beneficial for improvement. The use of Android applications as digital learning media for milling machines is very potential and strategic to bridge existing problems. Therefore, after seeing several problems and explanations above, the researcher gives the title of this research "Development of EduFrais Mobile Learning Media Based on Android Application in Milling Machine Engineering Subjects for Class XI at SMKN 5 Jakarta."

METHOD

The research methodology used in this development study is the Research and Development method with the 4D model (Define, Design, Develop, Disseminate) developed by Thiagarajan (1974). The research procedure consists of four main stages:

1. Define Stage
   - Initial analysis to identify basic problems in learning milling machine techniques.
   - Learner analysis to understand student characteristics and needs.
   - Concept analysis to organize material delivery strategy.
   - Task analysis to determine details of students' main tasks.
   - Specification of learning objectives.
2. Design Stage
   - Selection of appropriate learning media.

- Selection of material presentation format.
- Creation of initial learning media design.

3. Develop Stage
   - Expert validation by material experts and media experts.
   - Core revision based on validators' suggestions and comments.
   - Product trials on class XI students majoring in Machining Engineering.
   - Further revision based on students' responses and suggestions (if needed).
4. Disseminate Stage
   - Submission of the final product to the research school through subject teachers.
   - Publication of research results in scientific journals.

Data collection is carried out through expert validation, product trials, and analysis of student responses. Data analysis uses quantitative and qualitative descriptive techniques to assess the feasibility of the developed learning media.

The subjects for product validation are 2 experts, namely a material expert and a media expert. Meanwhile, the subjects for the interactive multimedia learning product trial in this development research are class XI Machining Engineering students at SMKN 5 Jakarta.

RESULTS AND DISCUSSION

The development of the EduFrais Learning Media" based on an Android application was developed using the 4D model (Define, Design, Develop, Disseminate). The Define stage resulted in an analysis of students' needs and characteristics, which became the basis for application design. The Design stage included format selection, material compilation, and application storyboard design. Material Expert Validation: The application was rated as very feasible with a percentage of 96.36%. Media Expert: The application was rated as very suitable with a percentage of 83.33% which means it is effective to be implemented.

Aspects assessed included material suitability, presentation systematics, interface design, and ease of use. User Response from 35 students of class XI Machining Engineering at SMKN 5 Jakarta showed a positive response with a percentage of 94.28% "Yes" answers. Positively responded aspects included material suitability, improved understanding, ease of use, and attractive design.

Supporting factors included the ease of development with command blocks and student enthusiasm for application-based learning media. Meanwhile, inhibiting factors included the limited ability of researchers in using development tools. The strengths of the EduFrais application include flexibility of use (anywhere and anytime), attractive design that increases learning interest, and ease of operation. The weaknesses of the EduFrais application are the need for large RAM specifications, dependence on internet connection, and limited features (no video acceleration and file management yet).

The discussion links the research results with previous studies that show the effectiveness of Android-based learning media in improving students' motivation, learning outcomes, and critical thinking skills. This research emphasizes the importance of expert validation and user trials in developing effective learning media that meet needs.

CONCLUSION

The development of mobile learning media based on an Android application for the milling machine engineering subject for class XI vocational high school students used the 4D development model: Define, Design, Develop, and Disseminate. After completing the learning media development process with the 4D model above to design the learning media, the EduFrais application was tested in learning activities. During the use of the EduFrais application in learning, student learning outcomes improved, as can be seen in the student quiz results for each material, which can be found in the appendix.

The feasibility of mobile learning media based on an Android application for the milling machine engineering subject, according to the material expert's assessment from all aspects, obtained a total score of 53.00, placing it in the very suitable assessment category, and when calculated as a percentage, it obtained 96.36%. Meanwhile, based on the media expert's assessment from all aspects, it obtained a total score of 50.00, placing it in the very good assessment category, and when calculated as a percentage, it obtained 83.33%. This shows that the media, from an overall aspect based on the percentage figures, is in the very feasible category to be used as learning media for the milling machine engineering subject. Furthermore, after being tested on class XI students majoring in Machining Engineering, it showed a positive response, as evident from the percentage figures for all questions showing percentages >70%. Based on this data, it can be concluded that the EduFrais learning media is very feasible to be used as learning media.

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