

## Evaluation of Android-Based Mobile Application for Student Grade Management at SMKN 1 Payakumbuh

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Received October 2, 2025; Revised October 29, 2025; Accepted October 30, 2025.

**DOI:** <https://doi.org/10.24036/javit.v5i3.270>

**Abstract:** Teachers play an essential role in conducting learning assessments; however, manual grade recording remains a challenge due to high administrative workloads and time constraints. These limitations often lead to inaccuracies and delays in academic data processing. Therefore, this study aimed to evaluate the practicality and effectiveness of an Android-based grade management application designed to support teachers in administering student assessments more efficiently. The research was conducted at SMK Negeri 1 Payakumbuh involving two practitioners and twenty subject teachers as respondents. Practicality data were collected through a questionnaire consisting of three assessed aspects: ease of use, flexibility, and features and functionality. The results showed that the application achieved an average practicality score of 89.17% based on practitioners' responses and 84.50% based on subject teachers' responses, both of which fall into the "very practical" category. These findings indicate that the application is easy to operate, accessible, and supportive of mobile-based administrative tasks. Furthermore, effectiveness was tested by comparing post-test results between a control group (manual grade entry) and an experimental group (using the application). Statistical analysis using an independent samples t-test demonstrated a significant difference in performance ( $p = 0.000 < 0.05$ ), with the experimental group achieving a higher average score of 77.8 compared to 65.5 in the control group. This confirms that the Android-based application improves accuracy and efficiency in grade processing. In conclusion, the developed grade management application is both practical and effective, and it has strong potential to assist teachers in simplifying assessment administration through a fast, accurate, and user-friendly system.

**Keywords:** Mobile application, Grade management, Android, Teacher evaluation, Practicality, Effectiveness

### 1. Introduction

The rapid development of information and communication technology (ICT) has become one of the major driving forces behind the transformation of the global education system in the digital era. Its adoption has expanded from learning media to administrative and management services in schools, enabling data processing to be more accurate, efficient, and transparent [1], [2]. Among

the range of ICT innovations, mobile technology – particularly Android-based platforms – has gained significant attention due to its high accessibility, user familiarity, and cost-effectiveness within the educational sector [3], [4]. These capabilities enable mobile applications to serve not only as instructional tools, but also as strategic solutions for improving academic administrative workflows.

Student grade management is a critical component in the education system, functioning as a valid indicator of learning success and competency achievement. Teachers are responsible for documenting student performance consistently throughout the learning process and ensuring that assessment reports are delivered in a timely manner. However, traditional practices involving handwritten grade books or simple spreadsheet applications remain widely used in many vocational schools, including in developing regions such as Payakumbuh City, Indonesia [5], [6]. These conventional methods often lead to problems such as delayed grade recap submission, miscalculation, lost data, limited access, and increased teacher workload due to overlapping academic and administrative duties [7].

To address these challenges, mobile-based academic management systems have been increasingly adopted to streamline teacher tasks through automatic data recording, real-time accessibility, enhanced accuracy, and centralized reporting [8]–[10]. Several studies have confirmed that mobile applications for educational administration significantly improve teachers' productivity, facilitate systematic grade monitoring, and support better decision-making at the school management level [11], [12]. Despite the widespread technological advancements, gaps still exist in the practical implementation and usability of mobile applications specifically tailored to the operational needs of vocational education institutions. Some available systems are often complex, require continuous network connectivity, or lack user-centered features necessary for classroom-based assessment execution [13].

Furthermore, digital transformation in education must not only focus on availability of technology, but also emphasize practicality, responsiveness, and effectiveness from the user perspective. In vocational high schools – where structured, competency-based assessment is mandatory – teachers need digital tools that allow efficient grade input, flexible access, and reduced administrative burden. Therefore, mobile applications must be developed and evaluated comprehensively to ensure their relevance and positive impact on teachers' performance [14]–[18].

Based on these problems and research gaps, this study aims to evaluate an Android-based mobile application specifically designed to support student grade management at SMKN 1 Payakumbuh. The evaluation focuses on two essential indicators: practicality, which refers to ease of use, accessibility, and efficiency; and effectiveness, which refers to accuracy and support for teachers

in performing assessment tasks. The findings of this research are expected to strengthen the implementation of mobile administrative systems in vocational education environments, contribute to digital transformation initiatives in Indonesian schools, and provide recommendations for scalable development of similar systems in the future.

## 2. Materials and methods

### 2.1 Type of Research

This research employed a descriptive-evaluative design, focusing on measuring the practicality and effectiveness of an Android-based mobile application for student grade management. The descriptive phase explored user perceptions, while the evaluative phase compared outcomes between a control group and an experimental group to determine system performance and impact [19], [20].

### 2.2 Practicality Stage

At this stage, the practicality of the Android-based grade management application was evaluated through a limited implementation involving teachers as end users. Practicality data were collected using a structured questionnaire designed to measure usability, flexibility, and functional suitability of the system in supporting teachers' assessment tasks. Initially, two expert practitioners assessed the preliminary version of the application to ensure its suitability for classroom use. Suggestions from the expert review were used as the basis for refinement prior to a wider trial.

Subsequently, practicality testing was carried out on 20 subject teachers who utilized the application in real grade input activities. Their responses reflected their perceptions of accessibility, efficiency, and user experience when managing student performance data through mobile devices. The practicality rating was determined based on the percentage score of teacher responses, which was then categorized into predefined interpretation levels.

The indicators used in the practicality questionnaire are presented in Table 1. These indicators were formulated to evaluate the extent to which the developed application is easy to operate, accessible across different usage contexts, and equipped with essential features required in vocational school assessment systems.

**Table 1.** Practicality Assessment Indicators of the Android-Based Grade Management Application

Aspect	Indicator
Ease of Use (Usability)	Easy-to-navigate interface; simple and intuitive design; straightforward grade input process

Aspect	Indicator
Flexibility	Accessible via smartphone or tablet; capability to enter grades anytime and anywhere; ability to modify or update grade entries
Features and Functionality	Supports formative and summative assessment; provides features aligned with teacher needs; availability of automated student grade recap; ability to export or download grade data

These indicators served as the basis for analyzing teacher responses and determining the practicality category of the developed application in the context of digital-based administrative support for vocational education.

### 2.3 Effectiveness Stage

The trial results of the application usage in the control and experimental groups were used as an instrument to measure the effectiveness of Android-based grade management. Although the experimental group used Android-based grade management to enter student grades, the control group did not use this feature. The effectiveness of Android-based grade management can be seen by comparing usage in the control and experimental groups [21]-[23].

**Table 2.** Research Design

Group	Treatment	Final Test
Control Group	-	Y1
Experimental Group	X	Y2

The experimental group was treated by entering grades using an Android-based grade management system, as shown in Table 1. The effectiveness of Android-based grade management was then assessed by comparing the results of the application usage of both groups after the same trial for the control and experimental groups. By comparing the results of the use of these two programs, this study is expected to determine how effective Android-based grade management is in the use of the application, which will then show significant differences in the usability of the application. The t-test was used to compare the results of use in the experimental and control groups [22].

The research subjects in the development of Android-based value management as a tool to assist teachers in the process of processing values in a practical and easy-to-use manner at SMKN 1 Payakumbuh. The research subjects were taken by random sampling or randomly with subject teachers as the control group of 20 subject teachers and the experimental group of 20 subject teachers.

### 2.4 Data Analysis Techniques

The data analysis consisted of two components: practicality analysis and effectiveness analysis. Practicality data collected from subject teachers were quantified using percentage calculations to determine the level of practicality of

the Android-based grade management application. The percentage score was obtained by comparing the total score from the questionnaire responses with the ideal maximum score using the following formula:

$$\text{Practical Value} = \frac{\text{Total score of each item's answers}}{\text{Ideal item score total}} \times 100 \quad (1)$$

The resulting percentage score was then interpreted according to the practicality classification categories presented in Table 3. These categories were used to determine whether the developed mobile application was considered very practical, practical, or otherwise, based on user perceptions.

**Table 3.** Practicality Categories of Android-based Value Management Applications

No	Achievement Level (%)	Category
1	81-100	Very practical
2	61-80	Practical
3	41-60	Quite practical
4	21-40	Less practical
5	0-20	Not practical

Effectiveness analysis was conducted to determine whether the use of the application provided significantly better outcomes than manual grade entry. The results of application usage from the experimental group were compared with the control group using an independent sample t-test. Before performing the t-test, a normality test using the Kolmogorov–Smirnov method was applied to ensure that the data were normally distributed at a significance level of 0.05. If the significance value (Sig.) was greater than 0.05, the data were considered normally distributed.

If the normality assumption was met, an independent t-test was conducted using SPSS software to identify whether there was a statistically significant difference between the two groups. A significance value of  $p < 0.05$  indicated that the Android-based grade management application had a meaningful positive effect on improving the efficiency and accuracy of grade processing compared to traditional manual methods. This statistical approach ensured that the effectiveness findings of the developed application were valid, reliable, and empirically supported.

### 3. Results and Discussion

#### 3.1 Practicality Test Data

The practicality test was conducted to evaluate the usability of the Android-based grade management application. The assessment involved two practitioners/teachers and 20 subject teachers at SMK Negeri 1 Payakumbuh.

The practicality questionnaire covered three aspects: Ease of Use, Flexibility, and Features & Functionality.

The first part of the practicality assessment was carried out by two practitioners. As shown in Table 4, all evaluation aspects obtained scores within the very practical category. The average practicality score for the ease of use aspect was 88.50%, followed by the Flexibility aspect with 90.50%, and the Features & Functionality aspect with 88.50%. Overall, the application achieved an average practicality score of 89.17%, indicating that the Android-based grade management application is highly efficient and supports teachers in inputting student grades more quickly, accurately, and conveniently.

**Table 4.** Practicality Results of Android-based Grade Management (Practitioner Responses)

No	Assessment Aspects	Percentage of Assessment			Category
		P1	P2	Average	
1	Ease of Use (Usability)	87	90	88,50	Very Practical
2	Flexibility	90	91	90,50	Very Practical
3	Features and Functionality	88	89	88,50	Very Practical
<b>Average</b>				<b>89,17</b>	<b>Very Practical</b>

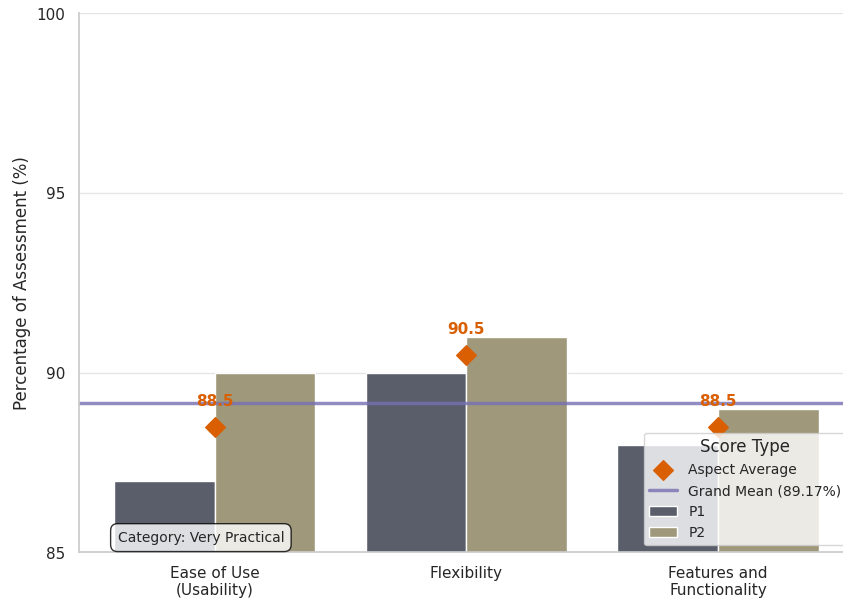
To strengthen the findings from practitioners, a broader assessment was conducted on 20 subject teachers who used the application directly. As shown in Table 5, the practicality results also demonstrated a very practical category, with average scores of 85.26%, 83.81%, and 84.43% across the three aspects. The overall average score was 84.50%, indicating that the application is efficient, user-friendly, and supports teachers' mobile-based administrative performance.

**Table 5.** Practicality Results of Android-based Grade Management (Subject Teacher Responses)

No	Assessment Aspects	Percentage	Category
1	Ease of Use (Usability)	85,26	Very Practical
2	Flexibility	83,81	Very Practical
3	Features and Functionality	84,43	Very Practical
<b>Average</b>		<b>84,50</b>	<b>Very Practical</b>

These results are further illustrated through bar chart diagrams (Figure 1 and Figure 2), which clearly show that all practicality indicators achieved scores above 83%. This demonstrates that the Android-based grade management application meets usability standards and is well-received by users in real school settings.

**Practical Results: Practitioner/Teacher Responses on Android-based Value Management Application**



**Figure 1.** Bar Chart of Practicality Test Results Based on Practitioner Responses

**Practical Results: Assessment of Android-based Value Management Application**



**Figure 2.** Bar Chart of Practicality Test Results Based on Subject Teacher Responses

Overall, the practicality evaluation indicates that the application is capable of simplifying teacher workflows, especially in managing student grades efficiently and accurately.

### 3.2 Effectiveness Test Data

In the posttest results of the application usage of teachers in the control group (classes not using the Android-based Grade Management Application) and the experimental group (using the Android-based Grade Management Application) [24]–[27]. The results of the application usage of the control group of 20 teachers obtained an average posttest result of 65.5, but the results of the application usage of the experimental group of 20 teachers obtained an average posttest result of 77.8.

Next, to determine the significant difference in the results of the two groups, a t-test was conducted. Before conducting the t-test, several steps were taken, namely conducting a normality test and a homogeneity test. The simplest test for normality is to create a frequency distribution graph of the existing values. Normality testing relies on the ability to observe the data plot. If the dataset is very large and the distribution is not 100% normal (not perfectly normal), then the conclusions drawn may be incorrect [28]–[30]. The Kolmogorov-Smirnov test was used to test for normality. The following values were obtained from the normality test conducted using SPSS:

**Table 6.** Normality of Control Group and Experimental Group

f	Sig	
	Control	Experiment
20	0,84	0,58

The next step is to conduct a homogeneity test. This is used to determine whether the variance is the same across the population. The homogeneity test aims to ensure that the data obtained from a series of analyses indeed come from the same product, the results of the test participants differ little, and the quality of the test results is guaranteed [31]. The homogeneity test for the learning outcomes of the control and experimental groups using the SPSS application produced a significant homogeneity test value of 0.342, greater than 0.05, this indicates that there is uniformity of variance between the control and experimental groups.

After conducting normality and homogeneity tests, we found that both groups were normally distributed and had uniform variances, so we used the t-test to test the difference in means between the two groups. The purpose of the t-test is to test how each independent variable (free to use the android-based value management application) affects the dependent variable of application use. This test can be done by comparing the calculated t with the t table. The average learning outcomes of the control and experimental groups after the t-test were obtained from data processing with SPSS, the significance price of 0.000 is smaller than 0.05, and the calculated t value > t table is 3.325 > 2.101. We can

conclude that there is a big difference between group management and experimentation.

### 3.3 Practicality of Value Management Application

Data on the practicality of the grade management application was obtained from a product trial at SMKN 2 Payakumbuh with subject teachers. The aim was to assess the app's usability. Teachers/practitioners completed a questionnaire to measure the practicality of the grade management application, and the results are shown in Table 4. This is evident from the scores of the first and second practitioners, which reached 90%, in the very practical category, indicating that the developed grade management application is beneficial for both teachers and practitioners.

The practicality of the application was assessed based on responses from subject teachers through a questionnaire. The results revealed that the Android-based grade management application scored 85.26% for ease of use, 83.81% for flexibility, 84.43% for features and functionality, and an overall average score of 84.50%, categorized as very practical.

These results indicate that the grade management application used to assist teachers in classroom administration is very practical. Being categorized as practical means that the tool makes it easy for teachers to understand. Information technology plays a significant role in improving educators' work efficiency through the use of digital media to assist in managing academic data. The use of digital technology in education can improve teachers' effectiveness and efficiency [32]-[34].

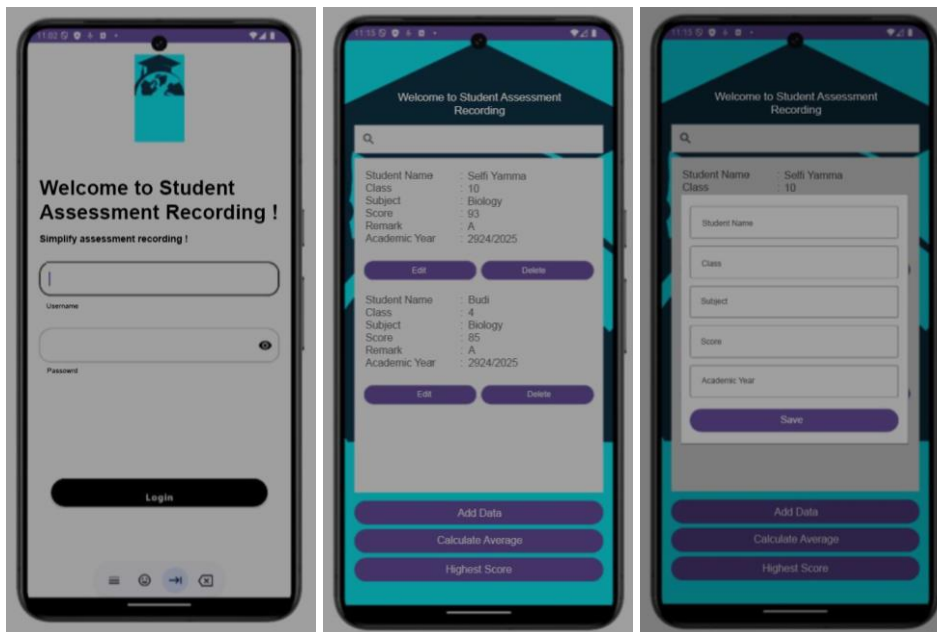
### 3.4 Effectiveness of Android-based value management application

The evaluation of effectiveness was conducted to determine whether the Android-based grade management application could improve teachers' performance in administering student grades. The use of digital technology in educational administration has been proven to reduce errors, accelerate processing time, and increase user productivity. In this study, the effectiveness test involved comparing the results between the experimental group, who used the application, and the control group, who continued to perform grade entry manually.

Effectiveness data were obtained through a post-test administered to both groups. The experimental group (n=20) achieved an average score of 84.8%, whereas the control group (n=20) recorded an average score of 75.5%. Statistical analysis using an independent samples t-test showed a significant difference between the two groups ( $p = 0.000 < 0.05$ ). These results demonstrate that the Android-based application significantly improves efficiency, accuracy, and effectiveness in grade processing compared to traditional manual methods.

Therefore, the developed system meets the expected effectiveness criteria and supports teachers in completing administrative tasks more efficiently.

To further illustrate the functionality of the system, the main interface screens of the developed application are displayed in Figure 3. These interface components are designed with intuitive navigation, simplified workflows, and accessibility considerations to ensure teachers can operate the system seamlessly in various conditions.



**Figure 3.** Main Interface Screens of the Android-Based Grade Management Application (a) Login Page, (b) Home Page, (c) Input & Edit Page

The login page (Figure 3 (a)) serves as the entry point for users, ensuring secure access through a unique username and password. The home page (Figure 3 (b)) provides an overview of student records, enabling teachers to easily monitor grade status. Meanwhile, the input and edit page (Figure 3 (c)) allows teachers to efficiently enter, modify, and update student grades in real time. The simple and responsive design supports mobile-based usability, allowing teachers to perform academic data management anytime and anywhere.

### 3.5 Discussion

The findings of this study demonstrate that the Android-based grade management application is both practical and effective in supporting teachers' administrative tasks. The practicality test results obtained from practitioners and subject teachers consistently showed that all assessed aspects—including ease of use, flexibility, and features & functionality—were categorized as very practical, with average percentages above 84%. These results indicate that the system aligns with the usability principles proposed by Davis in the Technology Acceptance Model (TAM), which states that perceived ease of use strongly

influences technology adoption in educational settings [35]–[37]. The application's intuitive interface and mobile accessibility allowed teachers to manage grades efficiently, supporting the results of previous studies that highlight the significance of usability in educational technology platforms [38], [39].

From the effectiveness perspective, this study found a statistically significant improvement in post-test outcomes among teachers who used the application compared to those using conventional manual methods. The mean effectiveness score of the experimental group (84.8%) was notably higher than that of the control group (75.5%), with  $p < 0.05$ , indicating that the application contributes to greater accuracy and reduced administrative errors. This supports findings by earlier researchers who emphasized that mobile-based administration tools can enhance productivity and reduce processing time in school environments [40], [41]. Thus, digital transformation in academic administration is proven to accelerate data processing and improve performance in line with global education modernization trends.

Furthermore, the application integrates essential features needed for continuous assessment, including automatic grade recapping and editable inputs, making it adaptable to dynamic school requirements. This is consistent with prior research stating that digital systems must provide flexible operational capabilities to support teachers' work efficiency [42], [43]. By reducing workload and time spent on manual data entry, the application enables teachers to reallocate more time for pedagogical engagement and student development.

The implications of these findings extend beyond practical efficiency. The adoption of mobile-based assessment management systems contributes to the development of data-driven education, where student performance records become more structured and immediately accessible. Moreover, the success of implementation in a real classroom setting indicates that similar applications may be scaled across other vocational and non-vocational schools.

However, despite the positive impact observed, some technical challenges were noted during usage, such as the need for stable internet connectivity and teacher ICT adaptation levels. These limitations align with existing reports regarding mobile learning implementation barriers in developing countries. Future system upgrades should incorporate offline-capable features and teacher digital literacy support to maximize long-term sustainability.

Overall, this study contributes meaningful advancement to the field of educational technology by validating that Android-based grade management not only simplifies administrative workflows but also improves teacher performance outcomes. These results strengthen the argument that integrating

ICT into school administration is a critical step toward achieving effective and modern educational ecosystems in the era of digital transformation.

#### 4. Conclusion

This study successfully developed and evaluated an Android-based grade management application aimed at improving teachers' administrative efficiency in vocational schools. The practicality test results from practitioners and subject teachers demonstrated very practical scores above 84%, indicating that the application is easy to use, flexible, and equipped with functional features aligned with user needs. The effectiveness analysis also showed a significant improvement in teachers' performance in managing student grades compared to manual methods ( $p < 0.05$ ), proving that the developed application enhances efficiency, accuracy, and productivity in academic administration. Although the implementation produced positive outcomes, the study has several limitations, including the limited sample size from a single school, short-term evaluation, and the current system's focus solely on grade input without integration into broader school information systems. Therefore, future research should involve larger and more diverse educational settings, conduct long-term user adoption studies, and enhance application functionality through cloud-based integration, automated reporting, improved security, and utilization of artificial intelligence for advanced data analysis and user support. With continuous development and wider implementation, the application has strong potential to contribute to digital transformation and data-driven decision-making in school management practices.

#### Author's statement

##### Author Contributions

**Rince Tridiana:** Responsible for the conceptualization and design of the research, development of the Android-based Value Management Application, data collection, and manuscript preparation. The author has read and approved the final version of this article.

##### Funding Declaration

The author declares that this research was conducted without financial support or sponsorship from any funding agency, commercial sector, or non-profit organization.

##### Acknowledgements

The author would like to express his sincere gratitude to the STKIP Al-Maksum Foundation, the STKIP Al-Maksum Leadership and Staff, the Head of the Informatics Engineering Education Study Program, staff, and lecturers for their support and assistance throughout this research.

## Competing Interests

The author declares no competing interests.

## Ethical Clearance

Ethical approval for this study was obtained from the institutional ethics committee of SMK Negeri 1 Payakumbuh, West Sumatra, Indonesia. All procedures conducted in this research involving human participants were in accordance with institutional guidelines and the ethical principles of the Declaration of Helsinki. Participation in the study was voluntary, and informed consent was obtained from all teachers involved. Confidentiality and anonymity were strictly maintained, ensuring that no personal data or individual identities were disclosed during data collection, analysis, or publication. Moreover, respondents were assured that the data collected would only be used for academic research purposes and would not affect their professional evaluations or responsibilities.

## AI Statement

This article is the author's original work, written based on original research, and no parts or images were generated by AI. English was checked using Grammarly and has been verified by the author.

## Publisher and Journal Notes

Padang State University as the publisher and editor of the Informatics Vocational Journal states that there is no conflict of interest regarding the publication of this article.

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