Application, Information System and Software Development Journal
Appissode Journal
Vol. 3, No.3, September 2025, Page 8-14
E-ISSN: 3032-5625, P-ISSN: 3032-5269

Design of An Android-Based Online Guidance Application as A Written Communication Medium for Students and Supervisors at Politeknik Penerbangan Surabaya

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Article History

Received August 1, 2025
Accepted August 22, 2025
Published September, 2025

Keywords

Online Guidance Application, Android, Written Communication, Waterfall, Expert Validation

Abstract

Android-based online guidance application is designed to support written communication between students and supervisors at Politeknik Penerbangan Surabaya. The previous academic guidance process was still carried out manually and separately, making it difficult to document and monitor student progress, especially for those undergoing final assignments or On the Job Training (OJT). This research uses the Waterfall model with the stages of needs analysis, system design, prototype implementation, and expert validation. Questionnaires to 58 respondents showed a very high level of need, with scores above 80% on all aspects of the main features such as scheduling, recording guidance results, digital validation, and PDF report export. Feasibility validation by two media experts and two material experts resulted in scores of 92.50% and 81.67% respectively, which were categorized as "very feasible." These results indicate that the online guidance application is able to provide an effective, efficient, and well-documented digital solution to support the academic guidance process in the vocational education environment.

1 INTRODUCTION

Information technology has brought significant changes in the world of education, including in the vocational education environment which demands efficiency and accuracy in the academic process. Politeknik Penerbangan Surabaya as a vocational higher education institution in the field of aviation is required to continue to adapt in supporting the academic guidance process of students, especially at the final project stage and field activities such as On the Job Training (OJT). However, the guidance process that is still carried out manually through separate physical records or digital forms creates obstacles in the form of limited documentation, time inefficiency, and difficulty monitoring student progress (Haleem et al., 2022; Aditya & Suranto, 2024)

A number of previous studies have discussed the digitization of technology-based academic processes. Online guidance monitoring applications such as MOBI have proven effective in facilitating academic guidance including the development of web-based information systems and Android applications to support lecturer and student communication (Nababan et al., 2024; Taufiq, 2022; Hadi Prayitno et al., 2024) However, most of these studies have not integrated specific features to support academic guidance that is documented systematically and in accordance with the needs of aviation vocational education.

This research offers novelty in the form of designing an Android-based online guidance application that is equipped with guidance scheduling features, recording guidance results, digital validation of lecturers, and exporting reports in PDF format, and is designed according to the needs of aviation vocational education institutions. Gap analysis shows that there is no special digital guidance media available at Politeknik Penerbangan Surabaya that is able to document the entire guidance process in a structured and integrated manner.

The objectives of this research are to: (1) analyze the needs of students and lecturers for online guidance applications; (2) design applications according to academic needs; and (3) evaluate the feasibility of applications as digital academic guidance media. The implications of this research are expected to improve the efficiency of the guidance process, the accuracy of academic documentation, and become a model for implementing digital guidance in the aviation vocational education environment (Moonlight et al., 2022; (M. F. Rozaq, 2021); Hadi Prayitno et al., 2024).

2 METHOD

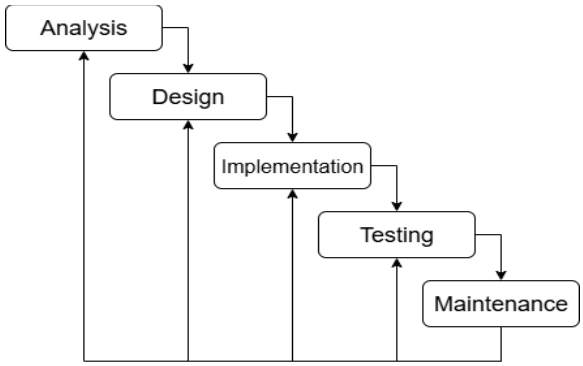

Figure 1. Model Waterfall

This research uses the Research and Development (R&D) method with a modified Waterfall development model into four main stages, namely: (1) needs analysis, (2) system design, (3) prototype implementation, and (4) expert validation (Sugiyono, 2019; Abdul Wahid, 2020; Pressman, 2015). The purpose of this design is to develop and validate an Android-based online guidance application as a written communication medium for students and supervisors at the Politeknik Penerbangan Surabaya, in order to improve the efficiency, accuracy, and regularity of the academic guidance process.

The conceptual framework of this research emphasizes application development through a structured approach involving user requirements analysis, interface design, limited testing, and feasibility evaluation by experts (Moonlight et al., 2022). Data collection methods were conducted through questionnaires, document studies, and expert validation. The questionnaire was distributed to 58 respondents consisting of students and supervisors to identify the needs for the main features of the application, such as scheduling guidance, recording guidance results, digital validation, and PDF report export. Document study was used to review the applicable manual guidance format.

The research subjects were students and supervisors at Politeknik Penerbangan Surabaya, while the validation was conducted by four experts consisting of two media experts (information technology) and two material experts (vocational education). The prototype application was developed using Android Studio with the Java programming language and the Firebase database, which was chosen because it supports real-time data synchronization and user authentication security (Hidayat & Fatmawati, 2020; Salamah et al., 2019).

Application validation is carried out through expert assessment using a Likert scale-based questionnaire to assess aspects of interface clarity, feature functionality, and academic content suitability. This research was conducted during the final project preparation period in the even semester of the 2024/2025 academic year. The validation results were used as a basis for assessing the feasibility of the application and providing development recommendations towards wider implementation in the academic environment of Politeknik Penerbangan Surabaya.

3 RESULTS

The questionnaire was distributed to 58 respondents consisting of students and supervisors. The results of the analysis show that the need for online guidance applications is very high. The aspects measured include scheduling features, recording guidance results, digital validation, ease of use, and completeness of documentation.

Table 1. Results of the Needs Questionnaire for the Design of an Android-Based Online Guidance Application

No	Aspect	Percentage	Category	Description
1	Functionality	89,40%	Very Important	Features such as systematic logging, digital validation, and PDF download are considered very important by respondents.
2	Performance	83,10%	Very necess ary	High demand for system stability, data re-access, security, and flexible scheduling.
3	Academic Benefits	83,79%	Very necessary	The application is considered capable of supporting written communication and smooth academic guidance.
4	Interface	79,08%	Need	Attractive appearance and ease of use are important, although not top priorities.

All aspects scored above 80%, indicating a strong need to develop a documented digital mentoring application.

Figure 2: Lecturer Questionnaire Distribution (left); Student Questionnaire Distribution (right)

Based on the results of the needs analysis, an online mentoring application prototype was designed with the following main components:

1. Firebase authentication-based Login Page for user account security.
2. Student Dashboard for submitting guidance schedules and viewing guidance history.
3. Lecturer Dashboard to approve guidance schedules, write guidance notes, and provide digital validation.
4. Export PDF feature to produce guidance recapitulation that can be downloaded by students and supervisors.

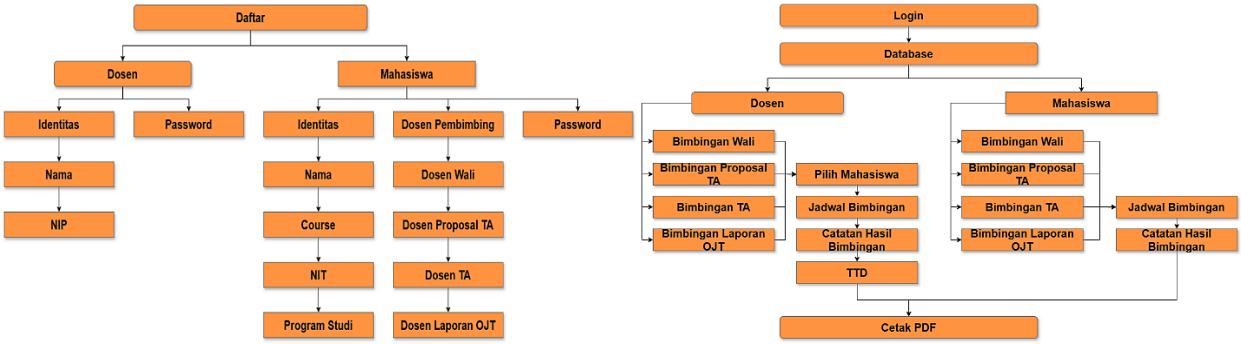

Figure 3. Flowchart of How the Instrument Works

The application prototype was developed using Android Studio with Spreadsheet database. The feasibility test was conducted by two media experts (information technology) and two material experts (vocational education). The assessment includes aspects of functionality, ease of use, appearance, and content suitability using a Likert scale.

Table 2. Media Expert Validation Results

Assessment Aspect	IT Expert Score	IT Staff Score	Max Score	Percentage
Interface	27	32	32	85%
Functional	41	48	48	100%
Total	68	80	80	92,5%

Table 3. Material Validation Results

Assessment Aspect	Prodi Staff 1	Prodi Staff 2	Max Score	Percentage
Material	30	35	40	75%
Language	15	18	20	88%
Total	45	53	60	81,5%

Validation results show:

A. Media Expert: 92.5% (*Very Feasible*)
B. Material Expert: 81.5% (*Appropriate*)

The internal test results ensure that all features run well, including login, schedule submission, guidance recording, digital validation, and PDF export.

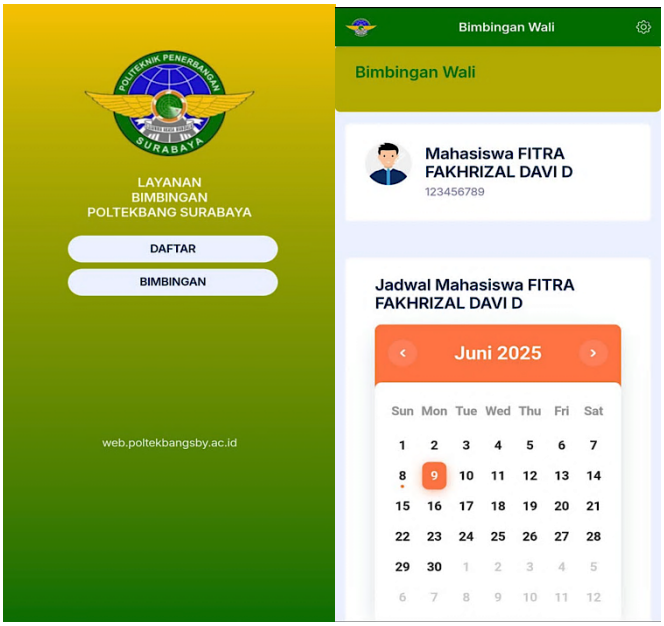

Figure 4. Login Page (left); Schedule Submission Dashboard (right)

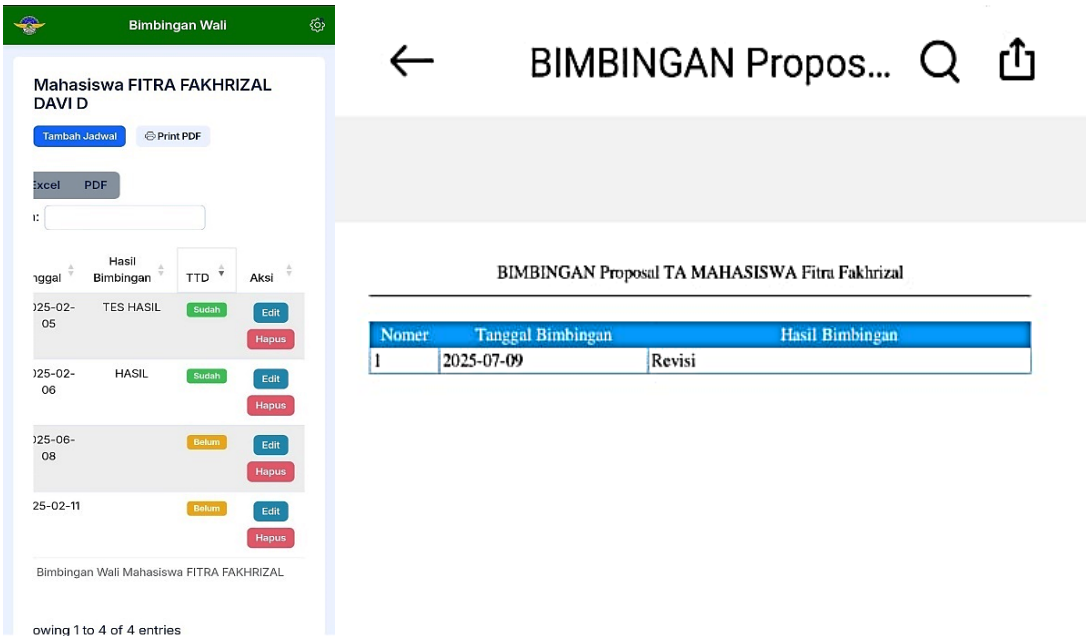

Figure 5. Guidance Recording Dashboard (left); PDF Download Result (right)

4 DISCUSSIONS

The results show that the Android-based online guidance application is able to solve the main problems in the manual guidance process, namely the irregularity of documentation, the difficulty of monitoring student progress, and the low efficiency of written communication between students and supervisors. This supports the hypothesis that digitalization of academic guidance can improve the effectiveness, accuracy, and accountability of the guidance process, as well as the utilization of digital technology accelerates the documentation of academic communication and supports innovation for the analysis of guidance data. (Ilman et al., 2024; Cornelius & Wilson, 2021; Indra, 2024)

Scientifically, the efficiency of the application is reflected in its integrated guidance scheduling features, real-time recording of guidance results, and automation of PDF report generation. Accuracy is improved through uniform digital recording and direct validation by supervisors, minimizing the risk of data loss or manual recording errors. The system also supports data security and high accessibility through encrypted cloud storage (Rozaq et al., 2021; Moonlight et al., 2022)

This finding is consistent with research that proves that Android-based guidance applications can improve the efficiency of academic interactions. However, the advantage of this study is the complete integration of features, including scheduling, mentorship recording, digital validation, and automatic report export in one centralized platform tailored to the needs of aviation vocational education (Erlangga et al., 2021).

Compared to previous research that only focuses on communication via messaging applications or uploading documents without formal documentation, this application offers a documented system with a track record of guidance that can be accessed at any time. This provides advantages in terms of academic accountability and ease of evaluation of mentorship performance (Taufiq, 2022).

It is important to note that the effectiveness of the application is also influenced by user acceptance. Based on the results of expert validation, the app obtained a high feasibility score (92.5% media and 81.5% material), which confirms the suitability of the design and features to the needs of users in a vocational academic environment (Rozaq et al., 2021). This suggests that the app is not only technically feasible, but also relevant to the context of its implementation at Politeknik Penerbangan Surabaya.

However, the application still has limitations, such as the absence of automatic notification features or real-time communication integration (chat) that can support quick discussions between students and lecturers. Nevertheless, the flexibility, cloud-based data security, and the ability to generate documented reports make this application very potential to be widely implemented in academic environments and further developed with additional features that support data-driven mentoring (Latif Ricaro & Susilo, 2020; Anderson, 2011).

ACKNOWLEDGEMENTS

The author expresses gratitude to Allah SWT for His grace and guidance so that this journal can be completed properly. The author would also like to thank Mrs. Meita Maharani Sukma, M.Pd. as the first supervisor and Dr. Faoyan Agus F., M.Pd. as the second supervisor who have provided direction, guidance, and support during this research process. Gratitude is also extended to Mrs. Lady Silk Moonlight, S.Kom., M.T. as Head of the D3 Air Transportation Management Study Program at Surab Politeknik Penerbangan Surabaya for the direction given, as well as to the media expert validators and material experts who have participated in the application feasibility test process. The author is also grateful to all lecturers, instructors, and caregivers of the Politeknik Penerbangan Surabaya for the knowledge and experience that has been provided during the study period, as well as to both parents for their moral support, prayers, and material support that always accompanies them. Hopefully this journal can provide benefits and be a positive contribution in the development of digital academic guidance media in the Politeknik Penerbangan Surabaya environment and the world of vocational education in general.

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