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Web-Based TOEIC Test Simulation Design to Improve Students' English Language Competence

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Abstract

English Test for International Communication (TOEIC) is part of an academic program or graduation requirement used to measure a person's English ability in the context of the world of work. Surabaya Aviation Polytechnic has provided an official website, but the website related to the TOEIC test is only used for the final assessment of TOEIC test results. For that, a separate website is needed that can be used for TOEIC test practice simulations.

The purpose of this study is to be able to develop a website-based TOEIC test simulation, to determine the feasibility of a website-based TOEIC test simulation. The benefits of this study for the author can further explore the concept of web-based programming, PHP programming language and MySQL database, for users as an in-depth study and get an overview of materials related to web-based TOEIC questions and for academics can find out the abilities of Poltekbang Surabaya students in mastering the material and applying the knowledge that has been obtained during college.

This research method uses a type of development research, the design used in this study uses a waterfall approach with a research flow consisting of needs analysis, system design, implementation, testing and maintenance. data collection techniques use questionnaires, while data analysis techniques use descriptive quantitative analysis techniques.

The results of the study indicate that the development of a website-based TOEIC test simulation at the Surabaya Aviation Polytechnic used a sequential and systematic waterfall model development method. This includes: Needs Analysis and System Design. The results of this test also represent the quality assurance of the product developed so that it is stated that it can be implemented in a real system, which shows that the results of the needs analysis of the media expert team, material experts, and users are in the very feasible category. This indicates that the website-based TOEIC test simulation at the Surabaya Aviation Polytechnic is very feasible to use.

1 INTRODUCTION

English language proficiency is a crucial competency for vocational students, particularly in the aviation sector, which demands professional communication skills on a global scale (P. S. Noviaty et al., 2022). English has become the primary language of instruction in international communication, including in aviation procedures, technical documents, and interactions in the workplace (ETS, 2019). With the advancement of information technology, English learning is no longer limited to conventional classroom methods but can be conducted flexibly and effectively through web-based media (A. Syarif & R. E. Prasetya, 2019; A. H. Miqawati et al., 2021). Surabaya Aviation Polytechnic, a vocational educational institution under the Ministry of Transportation, has adapted to this development (Surabaya Aviation Polytechnic, 2025). One implementation is the implementation of the Test of English for International Communication (TOEIC) as a graduation requirement, in line with the Ministry of Transportation's policy to ensure graduates possess adequate English language competency.

The TOEIC is an internationally standardized test that measures English language proficiency in a professional context, encompassing listening and reading comprehension skills, and in some programs, structure and written expression (ETS, 2019). At the Surabaya Aviation Polytechnic, TOEIC test results are used to map students' English proficiency and serve as part of their preparation for entering the workforce (P. S. Noviaty et al., 2022). However, preliminary studies indicate that some students have not achieved the minimum score of 500 required for graduation, indicating a competency gap that needs to be addressed immediately (A. H. Miqawati et al., 2021).

Previous studies have confirmed that the use of technology in language learning has a significant impact on improving students' skills (L. S. Moonlight & F. Nuraini, 2022). Alfi et al. (2021) emphasize the importance of universities adapting to developments in digital technology so that graduates are ready to face global challenges. Achmad & Rizky (2019) state that the TOEIC is not only a tool for measuring language competence but also a strategic investment that can increase graduates' competitiveness in the international job market. Yosua (2022) shows that TOEIC practice simulations can help participants familiarize themselves with the test format, hone their time management skills, reduce anxiety, increase self-confidence, and identify weaknesses that need improvement.

However, the majority of existing TOEIC practice apps or media are still general and not specifically designed for the needs of vocational students in the aviation field, and do not fully simulate the conditions of the official exam (A. Z. Al Muhtadi & L. Junaedi, 2021). Therefore, this study has a novelty in developing a web-based TOEIC test simulation specifically designed for students of the Surabaya Aviation Polytechnic. This application is designed to resemble the official exam, covering the listening section, reading section, and structure and written expression, equipped with an automatic scoring system, direct feedback, and features that allow students to practice in conditions close to the actual exam (D. Aipina & H. Witriyono, 2022).

A gap analysis shows that although the Surabaya Aviation Polytechnic has an official website for the TOEIC test, this facility is only used for final assessments and does not provide structured, interactive practice tools (P. Melian, 2022). This research aims to fill this gap by developing TOEIC practice media tailored to the needs of aviation vocational students (L. S. Moonlight, A. Kristianto, & M. Z. Alimudin, 2023), thereby improving their scores and helping them meet graduation requirements.

The primary objective of this research is to develop a web-based TOEIC test simulation suitable for use at the Surabaya Aviation Polytechnic and to test its feasibility through expert judgment. The results of this study are expected to provide practical contributions to students in preparing for the TOEIC test more effectively and efficiently. For institutions, this application can be part of a strategy to improve graduate quality while supporting the achievement of foreign language competency standards set by the aviation industry. More broadly, this research has the potential to serve as a reference for the development of web-based learning media in other vocational education fields, particularly those requiring English language proficiency as a core competency.

2 METHOD

This study uses a research and development approach with the Waterfall model (H. M. Jogiyanto, 2019; S. Arikunto, 2019; Sugiyono, 2019; H. Prayitno, D. Supardam, & N. Idyaningsih, 2023). The selection of this model is based on its systematic and sequential nature (L. Setiyani, 2021), so that each stage of system development is carried out in a structured manner starting from needs analysis, system design, implementation, testing, and maintenance. The conceptual framework of the study starts from identifying the problem of low TOEIC scores achieved by students of the Surabaya Aviation Polytechnic, then designing and developing a web-based TOEIC test simulation application that resembles the official test (S. M. Ibnu, 2020; G. G. Saka & N. Ratama, 2023), and testing the feasibility of the system before being implemented more widely.

The needs analysis phase was conducted through discussions, brief interviews, and information gathering from campus stakeholders, including faculty, staff, and students. The analysis revealed the need for a TOEIC practice platform separate from the official test system, allowing students to practice independently with a format and difficulty level similar to the actual exam (A. Christian et al., 2020).

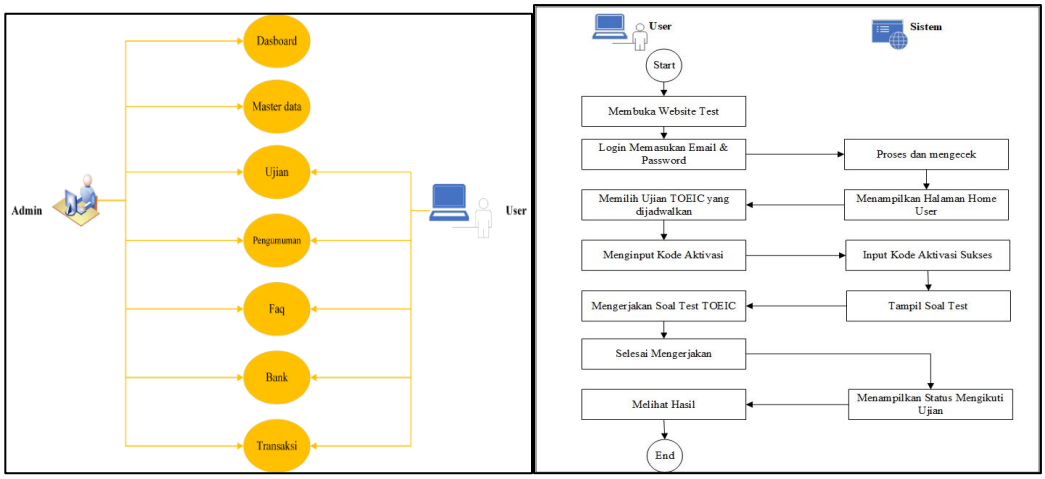

Figure 1. Use Case Diagram (Left); Activity Diagram (Right)

The system was developed using the Laravel framework based on the PHP programming language (D. Aipina & H. Witriyono, 2022; G. G. Saka & N. Ratama, 2023), utilizing the Bootstrap framework to support responsive interface design (A. Christian et al., 2020). System design included the creation of use case diagrams (L. Setiyani, 2021), activity diagrams, login flow and activation code settings, question management, and automatic score calculation (T. Saputra, 2024).

Research data was obtained through questionnaires administered to two groups of respondents: experts (media and material validators) and student users. Validity was tested using Pearson Product Moment correlation (H. D. Siregar et al., 2024), while reliability was tested using the Cronbach Alpha coefficient (S. Arikunto, 2019). The results were analyzed using quantitative descriptive statistics techniques to categorize the media's suitability (Sugiyono, 2019).

Table 1. Number of Samples

No	Class	Amount
1	MTU 8 Alpha	25
2	MTU 8 Bravo	23
3	MTU 8 Charlie	25
4	MTU 8 Delta	25
	Amount	98

The research instrument was a questionnaire compiled based on media, material, and user experience indicators, using a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree). The instrument grid for media validators, material validators, and users is presented in Table 3.2 to Table 3.4. Validity testing was conducted using Pearson Product Moment correlation to ensure each instrument item measures the correct aspect, while reliability testing was conducted using Cronbach Alpha coefficient to measure inter-item consistency.

System testing was conducted in two stages: expert testing (media and materials) and student user testing. Expert assessments were used to evaluate technical aspects, design feasibility, material suitability, and ease of use. User assessments focused on the system's user experience, including ease of navigation, clarity of instructions, accuracy of evaluation, practicality, and content suitability. Test data were processed descriptively quantitatively by calculating a percentage feasibility score based on a formula referenced by Sugiyono (2019). These percentages were then categorized into five feasibility levels.

Tabel 2. Tingkat Kelayakan

Percentage	Category
<21	Totally Unworthy
21-40	Not feasible
41-60	Enough
61-80	Worthy
81-100	Very Worthy

The final stage of this research is maintenance, which includes fixing errors found after testing, updating features as needed, optimizing system performance, and providing technical support to users. The Waterfall model used ensures that each stage is completed properly before proceeding to the next stage, so that the final result is a web-based TOEIC simulation application that has been tested for feasibility and is ready for use by students of the Surabaya Aviation Polytechnic.

3 RESULTS

The development of a web-based TOEIC test simulation application was carried out according to the Waterfall Model stages (H. M. Jogiyanto, 2019; S. Arikunto, 2019; Sugiyono, 2019) starting from needs analysis, design, implementation, testing, and maintenance. The final result of the research is a web-based application that can be used by students to practice working on TOEIC questions independently, with a format similar to the official exam. The application is equipped with three main sections, namely the Listening Section, Reading Section, and Structure and Written Expression, and displays the final score automatically after participants complete all questions. The interface display and menu structure are designed to be simple, interactive, and responsive so that it can be accessed from various devices (A. Christian et al., 2020; G. G. Saka & N. Ratama, 2023).

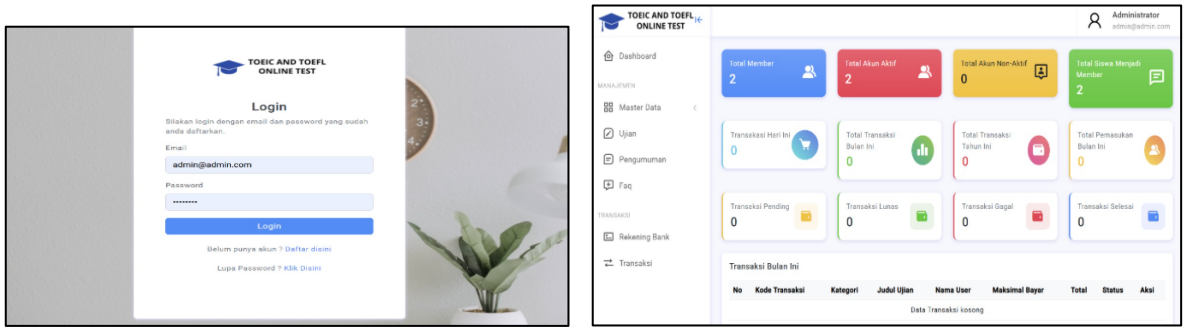

Figure 2. Admin and User Login Pages (Left); Admin Main Menu (Dashboard) (Right)

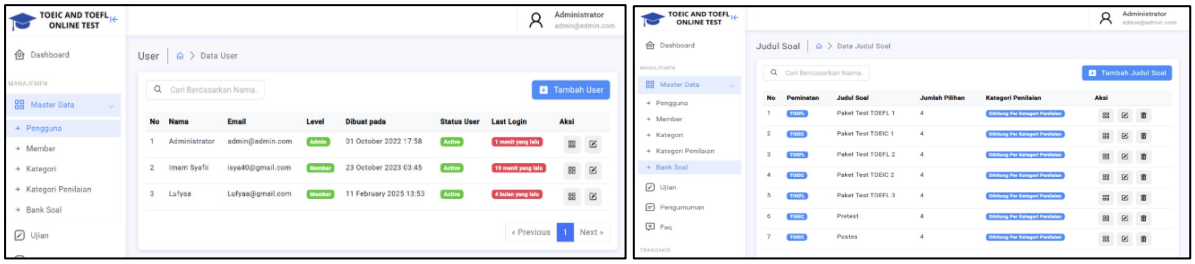

Figure 3. User Data Page (Left); Question Bank (Right)

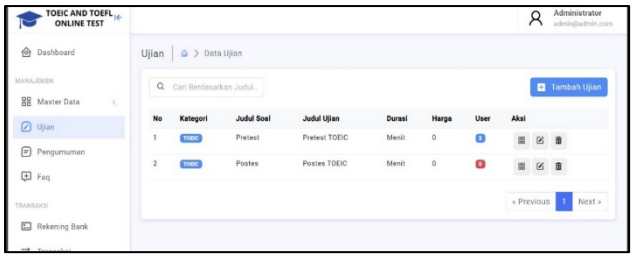

Figure 4. Exam page

Feasibility testing was conducted on two groups of respondents, namely expert judgment (media and material validators) and student users (H. Prayitno, D. Supardam, & N. Idyaningsih, 2023).

Table 3. Media Expert Validity Test

	rhitung	rtabel (α= 5%)	Information
Statement_1	0.442	0,296	Valid
Statement_2	0.599	0,296	Valid

	rhitung	rtabel (α= 5%)	Information
Statement_3	0.796	0,296	Valid
Statement_4	0.455	0,296	Valid
Statement_5	0.463	0,296	Valid
Statement_6	0.575	0,296	Valid
Statement_7	0.425	0,296	Valid
Statement_8	0.445	0,296	Valid
Statement_9	0.443	0,296	Valid
Statement_10	0.532	0,296	Valid

Table 4. Media Expert Validity Test

	rhitung	rtabel (α= 5%)	Information
Statement_1	0.565	0,296	Valid
Statement_2	0.543	0,296	Valid
Statement_3	0.733	0,296	Valid
Statement_4	0.518	0,296	Valid
Statement_5	0.588	0,296	Valid
Statement_6	0.603	0,296	Valid
Statement_7	0.757	0,296	Valid
Statement_8	0.669	0,296	Valid
Statement_9	0.716	0,296	Valid
Statement_10	0.750	0,296	Valid

The results of the calculation of the question validity test show that all question items are declared valid because the calculated r for all question items is greater than r table at a significance level (α) = 5%, which is 0.296. So there are 10 statement items that are declared valid (table 3). The results of the calculation of the question validity test show that all question items are declared valid because the calculated r for all question items is greater than r table at a significance level (α) = 5%, which is 0.296. So there are 10 statement items that are declared valid (table 4).

Table 5. Media Expert Validity Test

	rhitung	rtabel (α= 5%)	Information
Statement_1	0.716	0,296	Valid
Statement_2	0.729	0,296	Valid
Statement_3	0.587	0,296	Valid
Statement_4	0.649	0,296	Valid
Statement_5	0.644	0,296	Valid
Statement_6	0.589	0,296	Valid
Statement_7	0.758	0,296	Valid
Statement_8	0.485	0,296	Valid
Statement_9	0.504	0,296	Valid
Statement_10	0.506	0,296	Valid
Statement_11	0.597	0,296	Valid
Statement_12	0.554	0,296	Valid
Statement_13	0.591	0,296	Valid
Statement_14	0.766	0,296	Valid
Statement_15	0.717	0,296	Valid
Statement_16	0.470	0,296	Valid
Statement_17	0.485	0,296	Valid
Statement_18	0.533	0,296	Valid
Statement_19	0.460	0,296	Valid
Statement_20	0.430	0,296	Valid

The results of the question validity test indicated that all questions were valid, as the calculated r for all items was greater than rtable at a significance level (α) of 5%, which was 0.296. Therefore, 20 statements were declared valid (Table 5). These findings indicate that the application optimally met the technical, material substance, and user experience criteria (H. D. Siregar et al., 2024).

The interpretation of these results indicates that the application successfully met the research objective, namely to produce a web-based TOEIC practice tool that is suitable for use. A high feasibility score from the media expert assessment reflects the application's technical quality, design, and features, which meet educational software development standards (S. M. Ibnu, 2020). Meanwhile, a high feasibility score from the material expert assessment confirms that the content presented is relevant to the official TOEIC exam format (ETS, 2019) and able to accommodate students' learning needs. The high scores from users indicate that this application is well received in terms of ease of use, clarity of instructions, and benefits for TOEIC exam preparation (P. S. Noviaty et al., 2022).

The results of this study are consistent with the findings of Yosua (2022), who showed that TOEIC exam simulations can improve student readiness through familiarization with the question format and time management practice. Furthermore, this study supports the view of Achmad & Rizky (2019), who asserted that the TOEIC is a strategic instrument for preparing students to enter the global workforce. Compared with existing computer-based TOEIC training media, this study offers advantages in the flexibility of web-based access, adaptation to the needs of vocational students in the aviation field, and the integration of automated assessments that mimic the official test mechanism (A. Syarif & R. E. Prasetya, 2019; P. Melian, 2022).

Significant differences from previous studies lie in the more specific user segmentation, namely students at the Surabaya Aviation Polytechnic, and the focus on integrating materials according to aviation industry standards (L. S. Moonlight, A. Kristianto, & M. Z. Alimudin, 2023). Another advantage is the selection of the Laravel framework, which enables efficient question database management and user data security (A. Z. Al Muhtadi & L. Junaedi, 2021). Thus, this application not only meets academic needs but also supports institutional policies to improve students' TOEIC scores.

These findings have both practical and theoretical implications. Practically, the application can be used as an official training tool within the Surabaya Aviation Polytechnic to help students achieve a minimum TOEIC score of 500 as a graduation requirement. Theoretically, this research enriches the literature on the development of web-based learning media for international English language tests, particularly in aviation vocational education (L. S. Moonlight, M. Taqyudin, & D. Fajarwati, 2023; H. Prayitno et al., 2023). These results also open up opportunities for further research to test the application's effectiveness in improving TOEIC scores over a specific period of time and to develop adaptive features tailored to user abilities (Y. D. Arimbi et al., 2022; S. Narulita et al., 2024).

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