



# Development of a Level-Based Self-Study Feature in the TOEIC Preparation System to Enhance Students' Self-Regulated Learning

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**Abstract.** English proficiency represents an important skill for vocational students, particularly in preparing them to compete effectively in an increasingly globalized labor market. TOEIC is widely recognized as an international standard for assessing professional English proficiency and is commonly required for graduation and employment. Although a web-based TOEIC Try Out system had previously been developed at Politeknik Negeri Bali, it primarily supported summative assessment and lacked structured self-study features. This study aims to develop a level-based self-study feature within the TOEIC Preparation system to support students' Self-Regulated Learning (SRL). The system provides TOEIC practice from Part 1 to Part 7 through a level-unlocking mechanism that requires students to complete each section before accessing the next. It also includes a learning progress dashboard that enables students to monitor their performance and evaluate learning outcomes. The system was developed using the Laravel framework and evaluated through black-box testing and an SRL assessment with a one-group pretest–posttest design ( $N = 24$ ). The results of the black-box testing demonstrated that all implemented system functions performed according to the specified requirements. The SRL assessment revealed a statistically significant increase in the mean SRL score from 37.58 ( $SD = 7.89$ ) to 42.83 ( $SD = 6.01$ ), with  $t(23) = 3.662$ ,  $p = 0.0013$ . These findings suggest that the level-based self-study system is positively associated with enhanced self-monitoring and self-evaluation during TOEIC preparation.

**Keywords:** Information system, Self-Regulated Learning, Self-study, TOEIC, Web Based System

## 1 Introduction

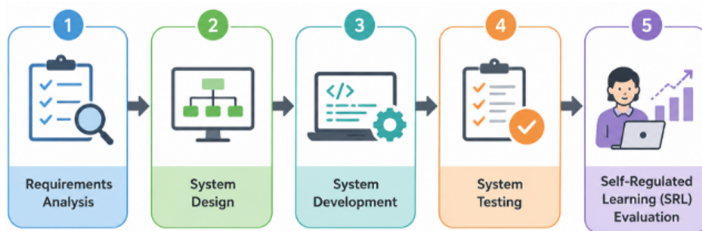
English has become the dominant language for communication in education, business, technology, and tourism, making proficiency in English a crucial skill for career advancement in both domestic and global professional environments. (Polvonova, 2024). Effective English communication skills represent a significant added value for individuals to expand their career opportunities, both nationally and internationally (Ni'mah et al., 2025). The Test of English for International Communication (TOEIC)

serves as a globally recognized standardized instrument for assessing English language proficiency in workplace and professional contexts. Developed by the Educational Testing Service (ETS), the assessment is intended to measure the English communication skills required by individuals working in international business settings and globally oriented service industries (Hille et al., 2026). This test evaluates two primary skill pillars, namely Listening and Reading Comprehension, representing real-world workplace communication scenarios through seven instrument sections (Part 1–7) (Kitjaroonchai & Kitjaroonchai, 2026). For Politeknik Negeri Bali (PNB), TOEIC certification is not merely an academic curriculum requirement, but a crucial strategy to enhance the competitiveness of vocational graduates in the international job market (Peling et al., 2025). However, a persistent challenge that arises is the low average score among students, which is often caused by the limited duration of face-to-face learning and the lack of practice facilities capable of stimulating self-directed learning motivation. As a solution, in 2025, the first phase of research successfully developed one web-based Try Out TOEIC Preparation platform at PNB. Although this system has proven beneficial in introducing the digital exam format, evaluation results indicate that the existing platform still focuses on summative assessment and does not fully support structured self-directed learning (Peling et al., 2025). Facing full-scale test simulations without phased preparation often causes students to encounter technical obstacles and excessive cognitive load, which stems from low Self-Regulated Learning (SRL) capabilities (Setyadi & Pratama, 2022). Without features that guide students granularly, the self-directed learning process becomes unmeasurable and inconsistent (Arrafii, 2025). Existing learning platforms reveal notable limitations when applied to TOEIC preparation. While general gamified platforms (e.g., Duolingo) offer strong engagement, they lack the specific item taxonomy and structural constraints of official TOEIC exam formats (Parts 1–7). Conversely, mainstream Learning Management Systems (e.g., Moodle) deliver structured content but treat practice modules as isolated quizzes without domain-specific progress analytics. Commercial TOEIC simulators predominantly focus on full-length try-outs, imposing high cognitive fatigue without diagnostic scaffolding for self-monitoring (Theobald, 2021). Although gamification and progressive unlocking mechanisms are known to enhance engagement (Sailer & Homner, 2020), empirical research integrating section-by-section level unlocking with multi-metric learning analytics to foster SRL in vocational language education remains limited. To bridge this gap, students require intervention through a level-based self-practice feature (Part 1–7) incorporating a level-unlocking mechanism. This allows deep mastery of specific strategies in each section of the test before progressing to the next stage (Sailer & Homner, 2020). Technically, the development of this feature adheres to software engineering principles that emphasize system functionality and scalability (Aprianto, 2025). The implementation of the level-unlocking mechanism serves as a gamification element aimed at increasing user engagement through instant feedback and structured challenges (Saputra et al., 2024). An intuitive interface design ensures that human-computer interaction facilitates cognitive processes without technical burden (Harumsari et al., 2024). With this adaptive approach, the platform serves as a digital assistant that adjusts content presentation according to user competence progress in real-time (Damuri, n.d.).

Based on these considerations, the study develops and evaluates a level-based self-study feature within a web-based system TOEIC Preparation designed to support the development of students' Self-Regulated Learning (SRL) skills. The proposed system combines a sequential level-unlocking mechanism with learning analytics to facilitate continuous self-monitoring and self-evaluation, thereby providing a more adaptive learning environment for TOEIC preparation. By improving English language proficiency and TOEIC readiness through structured self-directed learning, the proposed system is expected to better prepare vocational graduates for careers in the tourism and hospitality industries, where effective English communication is an essential competency. This contribution also supports the development of a skilled workforce capable of meeting the demands of sustainable tourism and global service industries.

## 2 Methodology

Research and Development (R&D) methodology was employed to develop a web-based TOEIC preparation system incorporating Self-Regulated Learning (SRL) principles into its learning framework. This approach was selected because the study not only aimed to develop a software application but also to evaluate the effectiveness of the system in supporting students' self-directed learning. The system was developed by incorporating a level-based self-study feature designed to enhance students' self-regulation skills in preparing for the TOEIC examination. The development process consisted of the stages illustrated in Figure 1.



**Figure 1.** Research Method

Figure 1 illustrates the research stages based on the Waterfall methodology, which are described in detail below:

### 1) Requirements Analysis

First stage identifying user requirements for self-study feature in the TOEIC Preparation system through literature review, observation of the existing Try Out TOEIC system, and consultations with the Language Center at Politeknik Negeri Bali. The TOEIC test structure (Parts 1–7) was also analyzed to define the non-functional and functional requirements for system.

### 2) System Design

This stage focused on designing the system architecture, database, and user interface. The relational database is organized to capture user interactions, where

user profiles are linked to self\_study\_attempts to log individual practice sessions and track state-machine progression. These logs evaluate performance on TOEIC components structured into question\_banks and test\_sections, which relate directly to multiple-choice questions and their associated multimedia (audio and images). Furthermore, system progression across TOEIC Parts 1-7 follows a deterministic state machine: Part 1 is unlocked by default, whereas the next section unlocks upon the completion of the previous part, regardless of the score. However, a warning is triggered if the student achieves below a 70% threshold. Unlimited re-attempts are allowed to support mastery learning, with performance analytics calculated continuously to track the first, best, last, and average scores.

#### **3) System Development**

System implemented with the Laravel framework, PHP, and MySQL. The main modules developed include the level-based self-study module, the unlock level mechanism, and the practice history module, resulting in a web-based TOEIC Preparation system.

#### **4) System Testing**

The developed system was evaluated through black-box testing to verify functional requirements across 7 core test scenario. These evaluations ensured that the system operated correctly and met user expectations.

#### **5) Self Regulated Learning (SRL) Evaluation**

The final stage evaluated the impact of the level-based self-study feature on students' Self-Regulated Learning (SRL) using a pretest–posttest design (N = 24). Student activity data, including practice frequency, level progression, and practice scores, were analyzed alongside a 10-item SRL to evaluate changes in self-monitoring and self-evaluation capabilities.

### **3 Result and Discussion**

#### **3.1 Result**

Based on the findings of the needs analysis and discussions with the Language Center of Politeknik Negeri Bali, a web-based self-study feature was developed for the TOEIC Preparation system using the Laravel framework as the proposed solution. The system was designed to enable students to practice each TOEIC section (Parts 1–7), requiring completion of the previous section before accessing the next through an unlock level mechanism. In addition, the system provides a practice progress dashboard that allows students to monitor their learning performance. Overall, the system aims to facilitate comprehensive TOEIC preparation by providing accessible practice materials and supporting independent learning. The self-study system involves two types of users with different roles (see Table 1).

| Table 1. Access Rights |                                                                                                                                                                                                         |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Role                   | Access Rights                                                                                                                                                                                           |
| Administrator/Staff    | <ul style="list-style-type: none"><li>• Log in</li><li>• Manage the question bank</li></ul>                                                                                                             |
| Student                | <ul style="list-style-type: none"><li>• Log in</li><li>• Edit profile</li><li>• TOEIC try-out test</li><li>• View try-out results</li><li>• Self-study test</li><li>• View self-study results</li></ul> |

Figure 2 presents the use case diagram developed to illustrate the system interactions. It defines the functions accessible to each actor—Administrator (staff) and Student—in accordance with their designated access rights.

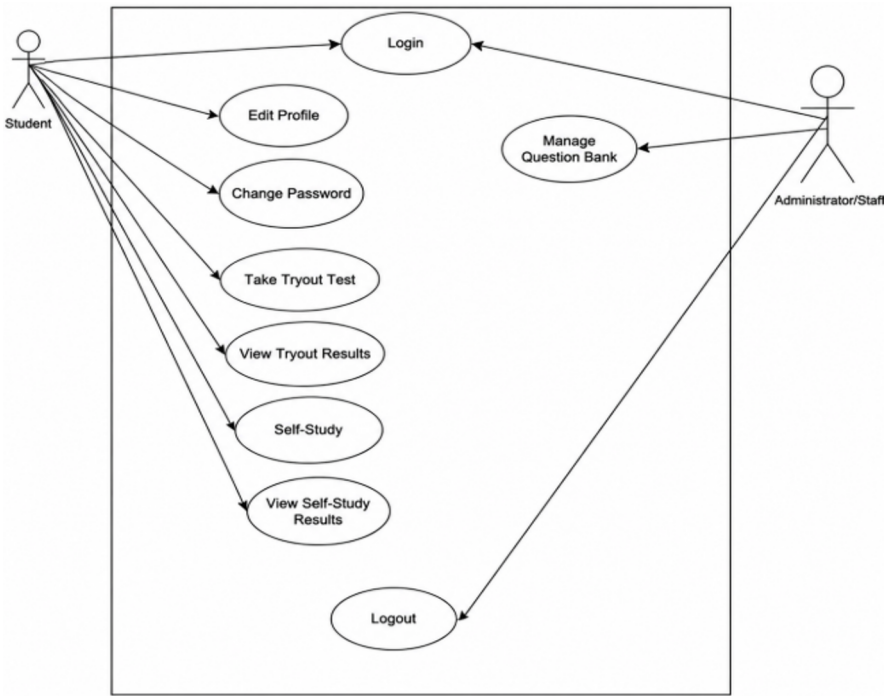


Figure 2. Use Case

After the system design was completed, the implementation phase was carried out to develop the application based on the proposed design using the Laravel framework. This stage involved implementing the core system modules, including the level-based self-study module, the unlock level mechanism, and the practice history module. Figure 3 presents the workflow of the proposed level-based self-study mechanism. Students complete the TOEIC sections sequentially from Part 1 to Part 7. After each practice session, the system automatically evaluates the score. If the score reaches the minimum

passing threshold of 70%, the next section is unlocked and the student's progress is recorded on the dashboard. Otherwise, a warning message is displayed, and the student must repeat the current section before progressing to the next level.

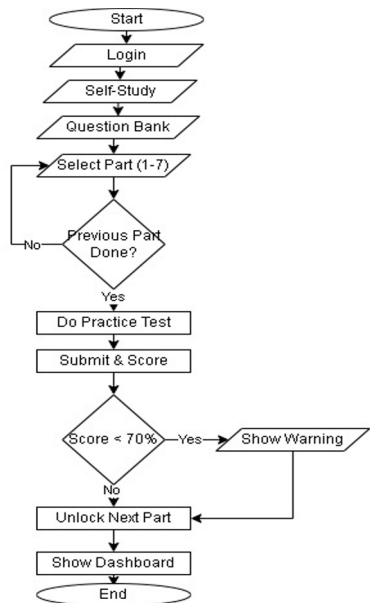


Figure 3. Flowchart Architecture

Figure 4 presents the student main menu, where students can choose between the TOEIC Try Out and the self-study module. The question bank used in the TOEIC Preparation system is managed and maintained by the administrator.

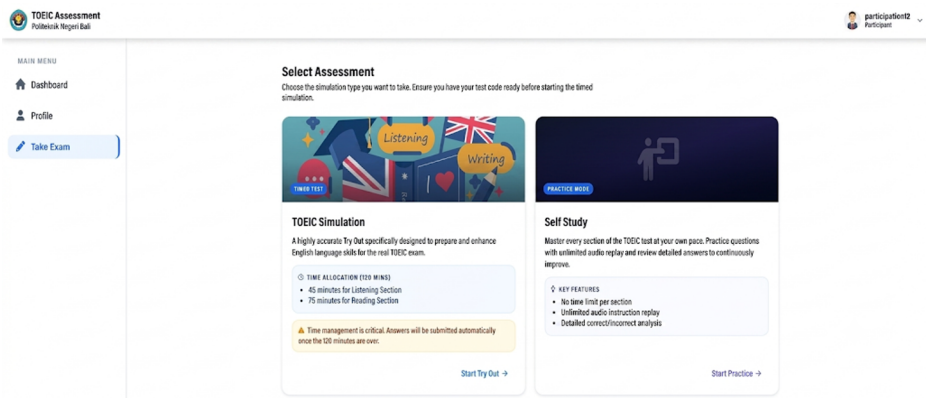


Figure 4. Student Main Menu Page

Figure 5 shows the level selection page, where students can choose TOEIC Parts 1–7 for self-study. Access to each part follows the unlock level mechanism, requiring students to complete the previous part before proceeding to the next.

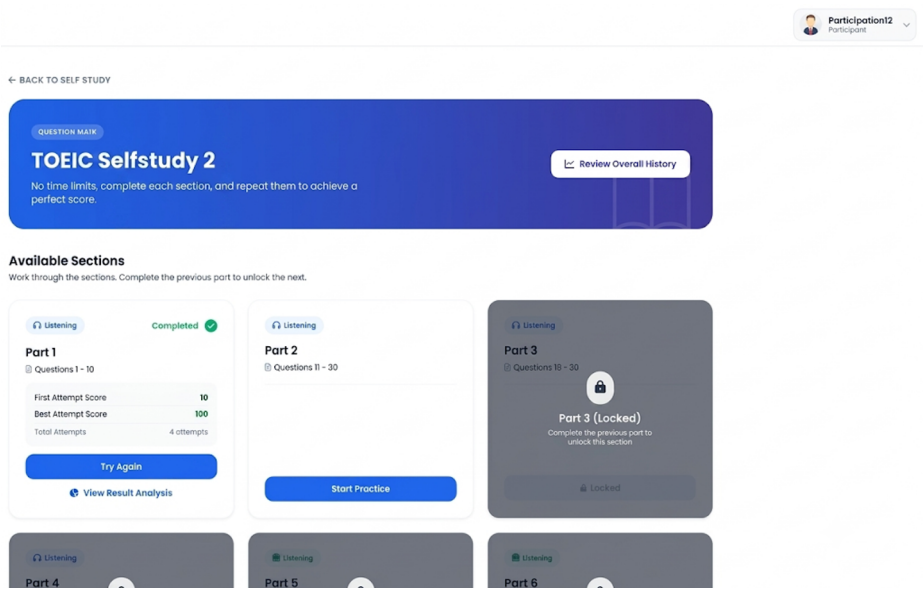


Figure 5. Self Study Questions Part Page

Figure 6 presents the practice interface, where students answer questions from the selected TOEIC part. Unlike the TOEIC Try Out module, the self-study module is not time-limited, allowing students to practice repeatedly across both the Listening and Reading sections.

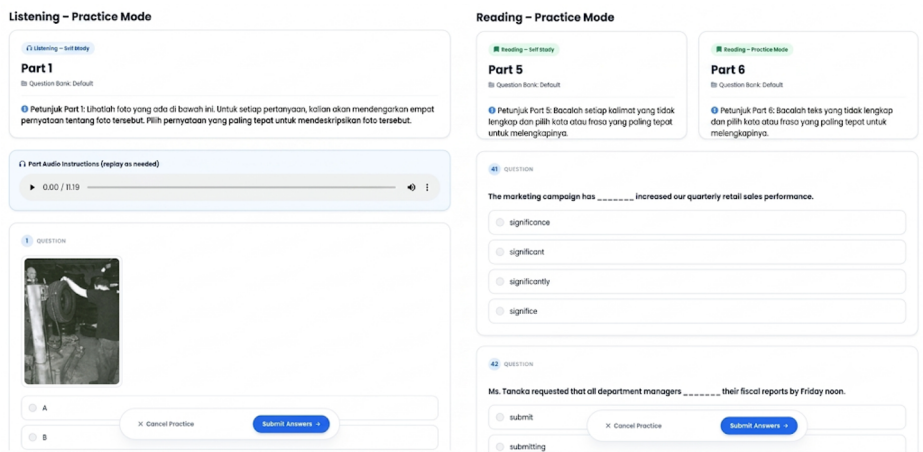


Figure 6. Questions Page

Figure 7 presents the self-study results page. In addition to displaying scores for each TOEIC part, the system also provides an overall performance summary, enabling students to monitor their progress across all test sections.

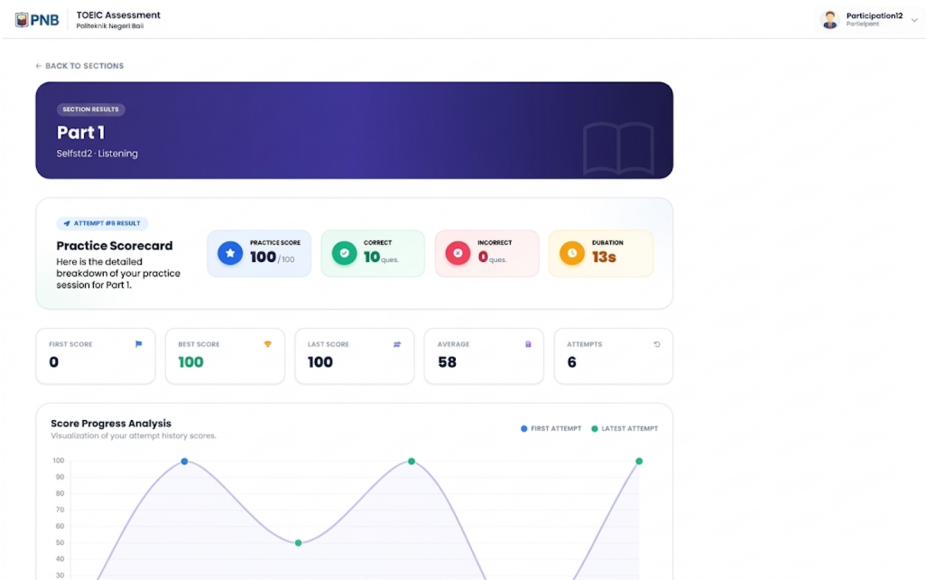


Figure 7. Self-Study Results Page

### 3.2 Discussion

This stage involved evaluating the developed system to ensure that all functionalities operated according to the specified requirements. The evaluation consisted of black-box testing to verify the functionality of all system features and an evaluation of Self-Regulated Learning (SRL) to examine the impact of the level-based self-study feature on students' learning regulation. The results of the black-box testing demonstrate that all implemented system features operated correctly in accordance with the specified functional requirements presented in Table 2.

Table 2. Black Box Testing

| No. | Tested Page              | Action                                                                     | Expected Result                                                         | Status |
|-----|--------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------|--------|
| 1   | Admin and Student Login  | Input a valid username and password.                                       | The user is successfully logged into the system.                        | Passed |
|     |                          | Input an invalid username or password.                                     | An message is displayed, and the user is prompted to log in again.      | Passed |
| 2   | Question Bank Management | Create, read, update, and delete (CRUD) on the question bank and assign it | The question bank is successfully created, updated, or deleted, and its | Passed |

|   |                      |                                                                                                                  |                                                                                                                                                                   |        |
|---|----------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|   |                      | as either a TOEIC Try Out or self-study question bank.                                                           | category is correctly assigned.                                                                                                                                   |        |
| 3 | Profile and Password | Update personal information (name, student ID, study program) and password.                                      | The profile information is updated.                                                                                                                               | Passed |
| 4 | TOEIC Try Out        | Select Take Exam, choose TOEIC Simulation, enter the test code, and complete the Listening and Reading sections. | The system presents the test questions, stores participants' responses, records the assessment results, and provides the option to download the generated report. | Passed |
| 5 | Try Out Results      | Select Download Result.                                                                                          | The test result is successfully downloaded.                                                                                                                       | Passed |
| 6 | Self-Study           | Select Take Exam, choose Self-Study, and complete the Listening and Reading practice.                            | TOEIC Parts 1–7 are displayed for practice.                                                                                                                       | Passed |
| 7 | Self-Study Results   | Complete the self-study session.                                                                                 | The system displays scores for each TOEIC part as well as an overall score to monitor learning progress.                                                          | Passed |

The evaluation of students' Self-Regulated Learning (SRL) was conducted using a Likert-scale questionnaire developed based on the self-evaluation and self-monitoring constructs of the Self-Regulated Learning framework proposed by (Zimmerman, 2002). The assessment employed a one-group pretest–posttest design involving 24 students ( $N = 24$ ). The instrument consisted of 10 items rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), resulting in a total possible score ranging from 10 to 50, where higher scores indicate higher levels of Self-Regulated Learning. The mean SRL score increased from 37.58 ( $SD = 7.89$ , range = 23–49) in the pretest to 42.83 ( $SD = 6.01$ , range = 29–50) in the posttest, representing an average improvement of 5.25 points ( $SD$  of differences = 7.02). A paired-samples  $t$ -test indicated that this increase was statistically significant,  $t(23) = 3.662$ ,  $p = 0.0013$ .

These findings suggest that the use of the developed level-based TOEIC Preparation system was associated with improvements in students' self-monitoring and self-evaluation during TOEIC preparation. Nevertheless, the findings should be interpreted with caution because the study utilized a one-group pretest–posttest design and did not include a control group. Consequently, the observed increase cannot be attributed solely to the intervention, as other factors, including practice and maturation effects, may have contributed to the results. Further research should employ a larger sample and incorporate a control group to obtain more robust evidence concerning the effectiveness of the developed system in supporting students' Self-Regulated Learning.

## 4 Conclusion

This study successfully developed a web-based TOEIC Preparation system featuring a level-based self-study module to support TOEIC examination preparation among students at Politeknik Negeri Bali. Developed using the Laravel framework, the system incorporates a progressive level-unlocking mechanism that guides students through each TOEIC section while enabling them to monitor their learning progress.

The results of the black-box testing confirmed that all implemented system features operated correctly and fulfilled the specified functional requirements. Furthermore, the evaluation of Self-Regulated Learning (SRL) demonstrated a statistically significant positive association between system usage and improvements in students' SRL capabilities. The average SRL score increased from 37.58 (SD = 7.89) to 42.83 (SD = 6.01), and a paired-samples t-test confirmed a statistically significant improvement,  $t(23) = 3.662$ ,  $p = 0.0013$ . These findings suggest that the level-based self-study feature supports students' self-monitoring and self-evaluation during the TOEIC preparation process.

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