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WEB-BASED INTERACTIVE STRATEGIES FOR EFFECTIVE TOEFL ITP READING SKILLS

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Abstract

The TOEFL ITP reading comprehension section poses a significant challenge for many EFL learners, necessitating innovative instructional approaches. This study aims to develop and evaluate a dedicated web-based learning platform integrating interactive strategies to enhance reading skills for the TOEFL ITP. Employing a Research and Development (R&D) design with the 4D model (Define, Design, Develop, Disseminate), the study involved 109 university students selected through purposive sampling. The platform's development included validation by English teaching and educational technology experts, followed by a limited field test. Data were collected through pre-test/post-test assessments and a usability questionnaire. The results indicated a substantial improvement in reading proficiency, with mean scores increasing from 355.88 to 423.45, a statistically significant gain of 18.98% ($Z = -9.019$, $p < .001$). Furthermore, user evaluations revealed positive feedback on the platform's accessibility, interactivity, and ability to maintain engagement. This study concludes that the purpose-built web-based platform serves as an effective intervention for improving TOEFL ITP reading skills. It contributes to the field of digital-based EFL instruction by demonstrating the efficacy of a tailored, interactive learning tool for standardized test preparation.

Keywords: *educational technology; interactive strategy; reading skills; R&D method; TOEFL ITP; web-based learning*

1. Introduction

Reading comprehension stands as a fundamental pillar of academic English proficiency, playing a crucial role in the success of non-native speakers in standardized testing contexts. The ability to comprehend complex academic texts efficiently is essential for higher education and professional advancement globally.

The Test of English as a Foreign Language (TOEFL), Institutional Testing Program (ITP), remains a critical benchmark for assessing academic English proficiency in many non-native speaking contexts, particularly in Indonesia. Its significance extends beyond the classroom, often serving as a prerequisite for graduation, scholarships, and professional advancement (Sari et al., 2021). Despite its importance, achieving a competitive score poses a considerable challenge for many test-takers. The reading comprehension section is particularly daunting, as it demands not only robust linguistic knowledge but also advanced cognitive strategies for

deconstructing complex academic texts under severe time constraints (Aeni, 2024; Fajri, 2019; Fitria, 2022).

The urgency of this problem is acutely evident at Hafshawaty Zainul Hasan University. Internal data from the 2024 academic year revealed a concerning trend: more than 80% of the student body failed to achieve the target average score of 500 on the TOEFL ITP. This widespread underperformance signals a profound deficit in academic reading skills, which are indispensable for scholarly success (Nation, 2019). Traditional pedagogical approaches, often characterized by teacher-centered instruction, a one-size-fits-all methodology, and limited opportunities for individualized feedback, appear inadequate to address this multifaceted deficit (Pratiwi & Waluyo, 2022). Consequently, students frequently report low motivation, anxiety, and a sense of being ill-prepared for the specific demands of the TOEFL ITP reading section (Sukandi, 2024; Zalha et al., 2020).

Concurrently, the ongoing digital transformation in education offers a compelling alternative. Web-based learning platforms have emerged as powerful tools capable of delivering flexible, personalized, and engaging educational experiences (Aldosari, 2020). In this study, interactive strategies refer to digitally-enhanced pedagogical approaches that include immediate automated feedback, embedded reading strategy tutorials, and progress tracking features, which differentiate from conventional static online materials. Their potential lies in providing ubiquitous access to learning materials, enabling self-paced study, and facilitating immediate, automated feedback—features that align perfectly with the needs of autonomous language learners (Rahmati et al., 2021). Previous research has demonstrated the efficacy of digital tools in enhancing general English proficiency. For instance, studies by Maisaroh and Sofia (2022) on TOEIC preparation and Sailuddin (2022) on online TOEFL courses have shown positive impacts on learning outcomes and motivation.

However, a critical gap persists in the existing literature. While previous studies have demonstrated the utility of online platforms for language learning and test preparation (Maisaroh & Sofia, 2022; Sailuddin, 2022), they predominantly utilize general-purpose Learning Management Systems (LMS) like Moodle or Google Classroom (Hidayati et al., 2025). In these cases, the innovation is often confined to the pedagogical content or curriculum design delivered through a generic platform, not in the design of the platform itself. This approach, while valuable, does not fully address the nuanced cognitive and strategic demands of the TOEFL ITP reading section, which requires specific skills like skimming, scanning, and inference under time pressure (Fitria, 2022; Nation, 2019). The feedback mechanisms in these generic systems also often lack the specificity needed to address common error patterns in TOEFL ITP questions, moving beyond simple knowledge of results to detailed knowledge of performance (Carby, 2023; Maier & Klotz, 2022). Consequently, there is a significant lack of research on the development and efficacy of a purpose-built web-based platform—one whose core architecture, interactive exercises, and automated feedback systems are intrinsically and specifically engineered from the ground up to target the unique challenges of TOEFL ITP reading comprehension, thereby bridging a critical gap between general digital learning tools and specialized test preparation needs.

The significance of this study lies in its potential to provide both practical and theoretical contributions. Practically, it offers an innovative learning tool for students and teachers. Theoretically, it contributes to understanding how web-based interactive strategies can address specific reading comprehension challenges in standardized testing contexts.

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This study aims to develop and evaluate web-based interactive strategies to enhance students' TOEFL ITP reading comprehension. The platform's innovation is its targeted design, which integrates a concentrated suite of interactive reading strategies, authentic practice questions, and automated, explanatory feedback tailored specifically to the TOEFL ITP format (Carby, 2023; Maier & Klotz, 2022). This research was guided by two central research inquiries:

1. To what degree does the resulting online platform meaningfully enhance learners' TOEFL ITP reading performance?
2. How do students perceive the platform's usability, learning value, and ability to maintain engagement?

The findings are expected to contribute both a validated technological tool for language preparation and deeper theoretical insights into the design principles of effective, domain-specific digital learning environments.

In summary, this study addresses the critical problem of low TOEFL ITP reading scores through developing web-based interactive strategies. Using a Research and Development design, this study aims to create an effective digital learning solution that bridges the gap between conventional teaching methods and the specific demands of TOEFL ITP reading comprehension

2. Literature Review

This section establishes the conceptual foundation of the study by synthesizing the theoretical and empirical literature on reading comprehension in academic contexts, the application of web-based learning in language education, and the role of interactive strategies, culminating in the identification of a specific research gap in TOEFL ITP preparation.

2.1 Theoretical Foundations of Reading Comprehension

Reading comprehension is a complex cognitive process that extends beyond mere word recognition to involve the active construction of meaning from text. In the context of academic English proficiency, this process requires readers to employ advanced strategies such as identifying main ideas, making inferences, understanding referents, and synthesizing information from complex passages (Nation, 2019). The theoretical underpinning of this study is grounded in Cognitive Load Theory (CLT) (Sweller, 2020), which posits that learning is most effective when instructional designs optimize the use of limited working memory capacity. For EFL learners facing the TOEFL ITP reading section, the combined demands of linguistic decoding, strategy application, and time pressure can induce cognitive overload, thereby hindering comprehension and performance.

2.2 Web-Based Learning as a Modern Pedagogical Tool

Web-based learning has emerged as a transformative force in education, characterized by the use of internet technologies to deliver, support, and enhance learning. It is defined by its key attributes: flexibility, accessibility, and the capacity for personalized instruction (Aldosari, 2020; Rahmati et al., 2021). In language education, these platforms facilitate learner autonomy and self-regulated learning by allowing students to access

materials and practice at their own pace and convenience (Broadbent et al., 2020). The post-pandemic educational landscape has further accelerated the adoption of such digital tools, highlighting their role as viable and often superior alternatives to traditional, teacher-centric methods, particularly for structured skill development like test preparation (Pratiwi & Waluyo, 2022).

2.3 Interactive Strategies in Digital Language Learning

A critical component of effective web-based learning is the integration of interactive strategies. For this study, interactive strategies are operationally defined as digitally-facilitated instructional techniques that prompt active mental engagement from the learner. These are not static content displays but dynamic features that respond to user input. The key strategies integrated into the developed platform include:

1. Immediate Explanatory Feedback: Moving beyond simple correct/incorrect indicators, this provides tailored explanations for errors (e.g., clarifying pronoun referents or logical inferences), transforming feedback from "knowledge of results" to "knowledge of performance" (Carby, 2023; Maier & Klotz, 2022).
2. Embedded Strategy Training: Direct instruction on specific reading strategies (e.g., skimming, scanning) is woven into the practice interface, offering "just-in-time" support that is immediately applicable (Nation, 2019).
3. Progress Tracking and Visualization: Dashboards that allow learners to monitor their performance over time, fostering metacognitive awareness and self-regulation (Chen, Hwang & Lai, 2024).

These interactive elements are designed to manage cognitive load by guiding the learner's attention and providing scaffolding, thereby making the acquisition of complex reading skills more efficient.

2.4 Synthesis of Previous Studies and Identification of the Research Gap

A substantial body of research affirms the positive impact of technology on language learning. Studies focusing on standardized test preparation, such as those for TOEIC (Maisaroh & Sofia, 2022) and TOEFL (Sailuddin, 2022), have reported significant improvements in scores and learner motivation when using digital tools. Furthermore, the inclusion of interactive and gamified elements has been shown to enhance engagement in online learning environments (Pratiwi & Waluyo, 2022). However, a critical synthesis of this literature reveals a consistent methodological limitation: the majority of these studies are conducted within the confines of general-purpose Learning Management Systems (LMS) like Moodle or Google Classroom (Hidayati et al., 2025). While these platforms are effective for content delivery, their generic nature means the pedagogical innovation is typically layered on top of the system rather than being built into its core architecture. This results in a one-size-fits-all digital framework that is not inherently optimized for the specific cognitive and strategic demands of a high-stakes task like the TOEFL ITP reading section. Consequently, a significant research gap persists: there is a lack of empirical investigation into the efficacy of a purpose-built web-based platform, whose very design and functionalities are intrinsically and specifically engineered from the ground up to target TOEFL ITP reading comprehension through integrated interactive strategies. This study is designed to fill this precise gap by developing and evaluating such a bespoke learning tool.

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3. Research Method

This study employed a Research and Development (R&D) approach utilizing the 4D framework originally introduced by Thiagarajan and Semmel. The 4D model includes four sequential phases, namely Define, Design, Develop, and Disseminate. This framework was chosen because it provides a structured pathway for creating educational products and is recognized for supporting rigorous validation and refinement during development.

3.1 Research Design and Procedure

The research procedure was executed in a systematic, multi-stage process. The stages are described as follows:

1. **Define**: Needs Analysis
   The initial stage involved a comprehensive needs analysis to establish a foundational understanding of the problem. This was conducted through a literature review on TOEFL ITP reading challenges and a survey administered to 96 students at Hafshawaty Zainul Hasan University, chosen purposively as they demonstrated an intermediate English proficiency level. The survey aimed to identify specific difficulties, learning preferences, and the technological readiness of the potential users. This step is critical in R&D to ensure the product is developed based on empirical user needs rather than assumptions.
2. **Design**: Content and Platform Design
   Based on the needs analysis, the subsequent phase involved the concurrent design of learning content and the platform's architectural blueprint. The content design focused on creating interactive materials and practice questions aligned with TOEFL ITP reading formats (Computer-integrated), integrating strategy instruction directly into the exercises. Simultaneously, the platform was designed to be user-friendly, featuring modules for structured learning, an automated scoring and feedback system, and a progress-tracking dashboard.
3. **Develop 1:** Expert Validation and Initial Revision
   The initial product design, including the content structure and platform wireframes, underwent a validation process by experts. This panel consisted of two English language teaching specialists and one educational technology expert. Their feedback focused on content accuracy, pedagogical soundness, and interface usability. The insights gained from this stage were used to revise and refine the prototype before development, enhancing its content validity and design robustness.
4. **Develop 2:** Prototype Development
   In this stage, the approved design was transformed into a functional web-based platform. The development process involved employing HTML, CSS, and JavaScript to build the user interface, while the back-end handled database functions and controlled the interactive tasks and automated feedback mechanisms.
5. **Develop 3:** Limited Field Testing and Revision
   The functional prototype was then subjected to a limited field test with a group of 27 students. The purpose was to identify any technical issues, assess the clarity of instructions, and gather initial feedback on user experience. This small-scale trial allowed the researchers to make necessary technical adjustments and final refinements

to the platform before full-scale implementation, a common practice in product development to ensure functionality.

6. **Disseminate:** Implementation and Data Collection
   The fully revised platform was implemented for the research sample over a predetermined period. Data acquisition was carried out through two primary methods:
   a. Quantitative Data: A one-group pretest-post-test experimental format was applied. A TOEFL ITP reading assessment was given to all 109 participants prior to and following the use of the platform. This design was chosen to measure the impact of the intervention by comparing the participants to themselves over time.
   b. Qualitative Data: A usability questionnaire using a 5-point Likert scale was distributed post-implementation. This instrument measured main elements of user experience, such as accessibility, material quality, interactive features, and learning motivation.

3.2 Data Analysis Techniques

The data were processed using analytical approaches aligned with the mixed-methods methodology:

1. Quantitative Analysis: The scores (both pre and post) were analysed using descriptive statistics (mean, standard deviation) to illustrate score distributions and improvements. Furthermore, the data did not meet normality criteria, as indicated by a Shapiro–Wilk test ($p < .05$) (Shapiro & Wilk, 1965), a non-parametric Wilcoxon Signed-Rank Test was employed to determine if the difference between the pre-test and post-test scores was statistically significant. The questionnaire data were analysed descriptively by calculating the mean score for each assessed aspect.
2. Qualitative Analysis: Responses from the open-ended questionnaire items were examined through thematic analysis to uncover recurring ideas, key themes, and recommendations for improvement.

This systematic and chronologically structured methodology, supported by established R&D principles and appropriate statistical techniques, ensures the scientific rigor and validity of the research findings.

4. Results and Discussion

4.1 Quantitative Results: Improvement in Reading Comprehension Skills

The use of the web-based platform resulted in a noticeable enhancement in learners' TOEFL ITP reading comprehension performance. Analysis of the pre- and post-assessment results showed considerable gains across the 109 participants.

Table 1

Descriptive Statistics of Pre and Post-test Reading Scores

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test Score	109	300	419	355.88	35.030
Post-test Score	109	312	505	423.45	45.833
Valid N (listwise)	109				

The data indicates a remarkable mean score increase of 67.57 points, representing an 18.98% improvement. The higher standard deviation in post-test scores (45.833) compared

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to pre-test (35.030) suggests varied levels of improvement among participants, indicating the platform's differential impact on students with varying initial proficiency levels.

The Wilcoxon Signed-Rank analysis verified that the improvement was statistically significant ($Z = -9.019$, $p < .001$). This statistical evidence suggests that the observed improvement is associated with the intervention, though the one-group pretest-posttest design warrants caution in making definitive causal claims.

4.2 Qualitative Results: User Experience and Platform Acceptance

The usability questionnaire provided insights into students' perceptions of the web-based platform across four critical dimensions:

Table 2

Usability Evaluation Results

Aspect	Mean Score	Std. Deviation	Interpretation
Ease of Access & Usage	3.95	0.659	Very Good
Interactivity & Feedback	3.94	0.719	Very Good
Motivation & Satisfaction	3.92	0.773	Very Good
Content Quality	3.85	0.692	Good

The results show that all aspects received positive evaluations, with "Ease of Access & Usage" achieving the highest rating (M = 3.95). This indicates that students found the platform intuitive and straightforward to navigate. The slightly lower but still positive rating for "Content Quality" (M = 3.85) suggests an area for potential enhancement in future iterations.

4.3 Comprehensive Discussion

4.3.1 Effectiveness of the Web-Based Learning Approach

The significant improvement in test scores (18.98%) strongly supports the positive impact of the online platform in improving students' TOEFL ITP reading comprehension performance. This result is consistent with Abdulrahaman et al. (2020), who reported that multimedia-supported learning environments can substantially strengthen instructional delivery and student engagement. This finding demonstrates that the purpose-built platform effectively addressed the specific reading challenges, such as complex syntactic structures and limited vocabulary, as identified by Fitria (2022). The 18.98% improvement is particularly noteworthy considering the relatively short implementation period, suggesting that focused, interactive web-based learning can accelerate reading skill development.

The platform's success can be attributed to several key factors. First, the immediate feedback system allowed students to identify and address their weaknesses promptly. Second, the structured progression from basic to complex reading tasks enabled gradual skill development. Third, the interactive elements maintained student engagement throughout the learning process, consistent with Wibowo (2023) findings on the importance of interactive learning experiences.

The platform's success can be further explained through the lens of Cognitive Load Theory (Sweller, 2020). By providing structured learning modules and integrated strategy training, the platform effectively managed intrinsic cognitive load. Furthermore, the

immediate and explanatory feedback reduced extraneous cognitive load by helping students focus on the reasoning process rather than just the answer. These results reveal that the platform's design, grounded in these principles, successfully managed intrinsic load through structured modules and reduced extraneous load through explanatory feedback, facilitating more efficient schema construction for reading comprehension tasks.

4.3.2 User Experience and Learning Motivation

The high ratings in usability aspects (M = 3.85-3.95) demonstrate the platform's success in creating a positive learning environment. The highest score in "Ease of Access & Usage" confirms that the platform's design effectively addressed potential technical barriers, making it accessible to students with varying levels of technological proficiency. This finding echoes Maisaroh and Sofia (2022) research, which highlighted the importance of user-friendly interfaces in web-based learning environments.

The strong performance in "Interactivity & Feedback" (M = 3.94) and "Motivation & Satisfaction" (M = 3.92) suggests that the platform successfully created an engaging learning experience. The automated feedback system, combined with progress tracking features, appears to have enhanced students' sense of accomplishment and motivation. This observation supports Pratiwi and Waluyo (2022) emphasis on the importance of interactive elements in maintaining learner engagement in online TOEFL preparation. These findings align with the theory of learner self-regulation (Chen, Hwang & Lai., 2024), indicating that the platform's autonomous learning environment empowered students to take control of their learning process.

4.3.3 Addressing the Research Gap and Innovation Contribution

This research fills a notable void in prior studies by creating and evaluating a dedicated online learning platform tailored for TOEFL ITP reading preparation. Unlike previous studies that utilized general-purpose learning management systems, this research demonstrates the value of a purpose-built platform tailored to the specific demands of TOEFL ITP reading comprehension.

The platform's innovative integration of strategy instruction within practice exercises represents a significant advancement over conventional preparation methods. This approach moves beyond mere practice testing to include explicit strategy training, addressing the fundamental skill deficits that hinder reading comprehension performance. The positive results validate this integrated approach and suggest its potential for application in other language learning contexts.

4.3.4 Implications for EFL Instruction and Limitations

The findings offer significant implications for EFL instruction. This study provides a validated model for integrating technology into test preparation curricula, offering educators a tool to provide differentiated instruction that addresses individual student needs in reading comprehension. The varied improvement patterns among students (evidenced by the increased standard deviation in post-test scores) highlight the platform's adaptability to different learning paces and styles. This flexibility is particularly valuable in diverse classroom settings where students may have varying initial proficiency levels and learning needs.

However, some limitations should be acknowledged. The focus on content quality as the lowest-rated aspect (though still positive) indicates room for improvement in material

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variety and authenticity. Future research could explore the integration of more diverse text types and authentic reading materials. Additionally, the study's duration limited the observation of long-term retention effects. Future studies could investigate the platform's impact on sustained skill development over extended periods. Research could also explore the platform's effectiveness across different demographic groups and educational contexts.

In conclusion, the web-based platform has proven effective in enhancing TOEFL ITP reading comprehension skills while providing a positive user experience. Its success underscores the potential of specialized digital tools in addressing specific language learning challenges and offers meaningful contributions to the expanding area of digitally supported language learning. The results confirm that the platform's innovative integration of interactive strategies and immediate feedback effectively bridges the gap between conventional teaching methods and the specific strategic demands of the TOEFL ITP reading section.

5. Conclusion

This study demonstrates the effectiveness of a purpose-built web-based platform in enhancing TOEFL ITP reading comprehension skills among EFL learners. The findings indicate a statistically significant improvement in reading performance following the implementation of the platform, alongside positive user evaluations regarding its accessibility, interactivity, and motivational value. These outcomes collectively suggest that the integration of interactive reading strategies, immediate feedback mechanisms, and structured learning modules within a tailored digital environment can effectively address the specific challenges of TOEFL ITP reading preparation.

Theoretically, this research validates the application of Cognitive Load Theory and self-regulated learning principles in the design of specialized language learning tools. Practically, it offers educators a flexible and engaging alternative to conventional test preparation methods, providing a model for technology integration that accommodates diverse learner needs and proficiency levels.

Several promising directions for future development emerge from this study. The platform could be enhanced through the incorporation of more diverse and authentic reading materials, adaptive learning features that personalize instruction based on individual performance, and expansion to include other language skills assessed in the TOEFL ITP. Future research should also investigate the long-term impact of the platform on reading skill retention and explore its applicability across different educational contexts and standardized tests.

In conclusion, this study contributes to the growing body of evidence supporting the use of tailored digital tools in language education. While the findings are context-bound to TOEFL ITP preparation in Indonesian higher education, they highlight the potential of purpose-built web-based platforms to provide effective, engaging, and accessible learning solutions that bridge the gap between conventional instruction and the specific demands of standardized testing.

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