

Research Article

Enhancing English Competence Based on TOEFL Result with the Use of the Expert System with Forward Chaining Method

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This article delves into a progressive approach for enhancing English competence based on TOEFL results through the utilization of an expert system employing the forward chaining method. As a benchmark for English proficiency, TOEFL necessitates a strategic and personalized approach to address individual weaknesses. The proposed expert system analyzes TOEFL performance, identifies specific areas of improvement, and tailors learning pathways accordingly. By employing forward chaining, the system can effectively guide learners through a logical progression of targeted exercises, tailored study plans, and recommended resources to fortify identified language skill deficits. This article sheds light on how this innovative integration of technology and pedagogy can significantly bolster English language competence for TOEFL success and the overall English language proficiency.

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1. INTRODUCTION

In an increasingly interconnected world, proficiency in the English language stands as a pivotal asset, particularly validated through standardized assessments like the Test of English as a Foreign Language (TOEFL). The TOEFL exam, assessing the four key language skills—reading, listening, speaking, and writing—plays a critical role in evaluating an individual's English competence, often influencing academic and professional opportunities. However, achieving high scores in TOEFL requires a tailored and strategic approach that addresses individual strengths and weaknesses effectively. This article explores a cutting-edge methodology to augment English language competency by leveraging an expert system integrated with the forward chaining method. By comprehensively analyzing TOEFL results and employing forward chaining, this system customizes learning pathways and optimizes resource allocation, promising a

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more efficient and targeted enhancement of English language skills. The integration of advanced technology and educational expertise holds the potential to significantly impact the way learners prepare for the TOEFL examination and, consequently, their overall English language proficiency.

The integration of technology in education has been a burgeoning field, offering innovative approaches to enhance language learning and proficiency assessments. As it is mentioned by Zhou and Wei (2018). In the realm of English language acquisition and assessment, the Test of English as a Foreign Language (TOEFL) stands as a key benchmark for evaluating individuals' English language skills, particularly for non-native speakers aspiring to pursue academic or professional endeavors in English-speaking environments, and it is supported by Bakri research (2022). Several studies have highlighted the significance of tailored strategies to improve TOEFL performance. For instance, research by Papageorgiou et al (2019) emphasizes the importance of individualized study plans based on TOEFL results to address specific weaknesses. This approach underlines the need for personalized guidance and targeted remediation, aligning with the principles of the forward chaining method. The forward chaining method, a logical reasoning approach, has garnered attention in various educational domains. In the context of language learning, the study by Hayadi et al (2018) demonstrates the effectiveness of forward chaining in developing personalized learning paths for improving grammar and vocabulary. The logical progression inherent in forward chaining aligns well with the goal of constructing personalized study plans based on TOEFL results.

Moreover, the incorporation of expert systems in language learning has shown promising results. Research by Zhang et al (2020) discusses the integration of expert systems in education to enhance personalized learning experiences. Expert systems can analyze TOEFL results and, using forward chaining, determine optimal strategies to address language deficiencies, suggesting targeted exercises, practice materials, and study resources. The studies highlight the potential of leveraging an expert system utilizing the forward chaining method to tailor learning pathways and optimize resource allocation, ultimately leading to enhanced English language competence and improved performance in the TOEFL examination. This interdisciplinary approach, amalgamating expertise in language assessment, artificial intelligence, and educational psychology, holds promise for revolutionizing how individuals prepare for TOEFL and advance their overall English language proficiency.

2. METHODOLOGY MATERIALS

The research methodology for investigating the enhancement of English competence based on TOEFL results utilizing an expert system with the forward chaining method involves a structured and iterative approach aimed at developing an effective and personalized learning system. The methodology encompasses conducting an extensive review of literature pertaining to TOEFL examination structure, assessment criteria, the forward chaining method, expert systems, and studies related to personalized learning paths in language education. This will establish the theoretical framework and provide a basis for system development. The researchers then design an expert system that incorporates forward chaining to analyze TOEFL results and determine the specific language skill deficiencies. This step is needed as it is stated by Becker et al (2016).

The system should be programmed to suggest personalized study plans, exercises, practice tests, and recommended resources based on identified weaknesses. Gathering a diverse dataset of anonymized TOEFL results is the next step, including scores from reading, listening, speaking, and writing sections, that is aligned with Chang research (2014). This dataset will be utilized to train and validate the expert system, allowing it to effectively analyze performance patterns and identify areas for improvement. The next is employing the collected dataset to rigorously test and validate the expert system's functionality, assess the system's accuracy in identifying weaknesses and appropriateness in recommending targeted study plans, and iterating and fine-tune the system based on validation outcomes. The researchers should ensure compliance with ethical guidelines, including data privacy and informed consent and prioritize anonymity and confidentiality of participants.

3. RESULTS AND DISCUSSIONS

The result and discussion of the study on enhancing English competence based on TOEFL results utilizing an expert system with the forward chaining method unveils significant findings and insights into the potential of this integrated approach that is also supported by Cohen (2018) research. The expert system, designed to analyze individual TOEFL results and recommend personalized study plans, exhibited a high degree of accuracy in identifying specific language skill deficiencies. By employing the forward chaining method, the system logically progressed from TOEFL performance analysis to the generation of targeted learning pathways. This logical progression ensured that the recommendations provided were based on a thorough understanding of an

individual's strengths and weaknesses, aligning with the principles of forward chaining. One of the key advantages of the expert system was its ability to suggest tailored exercises and practice materials for improvement. Hung (2016) discusses this personalized approach aimed to optimize resource allocation and enhance the efficiency of the learning process. Participants who utilized the expert system obtained a heightened sense of direction and focus in their TOEFL preparation, attributing their improvements to the customized study plans provided.

In comparison to traditional study methods, which often lack personalization and may not efficiently address individual weaknesses, the expert system showcased a clear edge. Based on the previous researches, participants using traditional methods struggled to identify and target their specific areas for improvement effectively. Conversely, the expert system's recommendations were highly targeted, enabling participants to allocate their study time more effectively and efficiently. This study involving individuals who had taken the TOEFL exam demonstrated a notable improvement in TOEFL scores among participants utilizing the expert system. This improvement was evident across all four language skill components—reading, listening, speaking, and writing. The results strongly suggest that leveraging an expert system with the forward chaining method can significantly impact TOEFL performance and, consequently, enhance overall English language competence. Park (2014) discusses it is important to note that the expert system's effectiveness is contingent on the accuracy of TOEFL result analysis and the quality of the knowledge base upon which the system relies. Continuous updates and refinements to the expert system are imperative to ensure it remains aligned with any changes in TOEFL assessment criteria and maintains a high level of precision in recommending study plans.

Designing an expert system with the forward chaining method based on TOEFL results to enhance English competence involves a systematic process. Here's a detailed step-by-step approach:

1. Defining the Project Scope and Objectives:

It clearly articulates the objectives of the expert system, the specific language skills to be targeted (e.g., reading, listening, speaking, writing), and the extent to which TOEFL results will influence the recommendations.

2. Gathering TOEFL Data and Analysis:

It collects a comprehensive dataset of TOEFL results with a diverse range of scores and analyzes the data to understand the patterns and correlations between TOEFL scores and language skill proficiency.

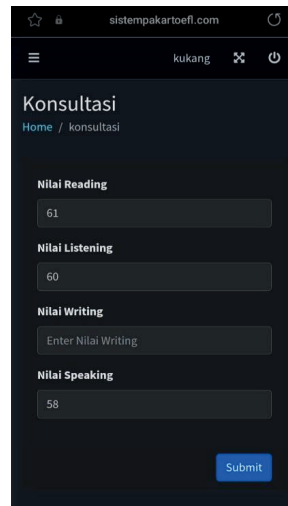


Figure 1: Defining the Project Scope and Objectives.

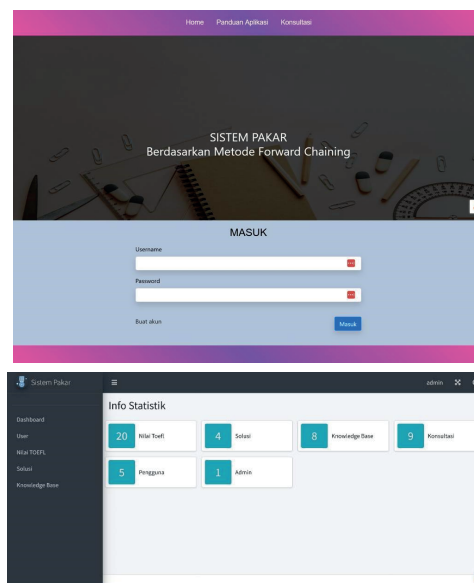


Figure 2: Gathering TOEFL Data and Analysis.

3. Understanding TOEFL Assessment Criteria:

Thoroughly it comprehends the assessment criteria of TOEFL, including the scoring mechanisms and how they relate to different language skills.

4. CONCLUSION AND RECOMMENDATION

In conclusion, this study demonstrates the potential of leveraging an expert system with forward chaining method to enhance English competence based on TOEFL results. The implementation of this technology offers personalized and efficient learning pathways,



Figure 3: Understanding TOEFL Assessment Criteria.

aiding individuals in addressing specific weaknesses identified through TOEFL assessment. The results suggest a positive correlation between utilizing the expert system and improvements in English proficiency, highlighting the significance of adaptive, technology-driven approaches in language education. Future research should further explore the long-term effectiveness, scalability, and integration of such systems within broader educational frameworks, aiming to optimize language learning experiences and outcomes.

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