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THE EFFECTIVENESS OF WEB-BASED APPLICATIONS IN ENHANCING ENGLISH LANGUAGE SKILLS FOR MEDICAL STUDENTS

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Abstract: *This study investigates how well web-based tools can help medical students' English language proficiency. Given the significance of English in clinical communication and medical research, medical students must become highly proficient in the language. Students improved their medical English vocabulary, grammar, and communication skills during a six-week period by using programs like Lingvist, Meducation, and BabelMed. Surveys, instructor feedback, and pre- and post-assessments were used to collect data. The findings showed notable gains in clinical communication abilities, reading comprehension, and word retention. Additionally, students said they felt more comfortable using medical English in clinical and academic contexts. The study comes to the conclusion that web-based applications are useful resources for enhancing conventional language training because they provide individualized learning opportunities that aid in students' language development in a medical setting.*

Key words: *Web-based applications, Medical English, Digital tools for language learning, Medical terminology, Lingvist, Meducation, BabelMed*

Introduction: The proficiency of English language skills is paramount for medical students, as English serves as the primary language for medical research, communication, and academic publishing. Medical students need a strong command of English not only to understand complex medical texts but also to communicate effectively in clinical and professional settings. Traditional methods of language learning often fail to engage students and provide sufficient practice in medical contexts. Therefore, web-based applications have emerged as a promising alternative,

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offering a dynamic and interactive way for students to develop their language skills. Recent advancements in technology have provided an array of digital tools designed to enhance language learning, including apps that specifically cater to the needs of medical students. Applications like Lingoda, Health Education English, and MedLexicon offer a variety of features such as tailored vocabulary, grammar exercises, and interactive content that address the challenges medical students face in mastering medical English. These apps utilize techniques like spaced repetition, gamification, and real-world scenarios to ensure learners gain both theoretical knowledge and practical communication skills.

Web-based platforms have the advantage of providing flexibility, allowing students to learn at their own pace and access material whenever necessary. Studies have suggested that such digital tools not only improve vocabulary acquisition and retention but also promote independent learning and enhance students' confidence in using the language in professional contexts (Gonzalez & Jimenez, 2015). The interactive nature of these applications further encourages active engagement, making language learning an enjoyable and efficient process. While there is growing recognition of the benefits of using digital tools for language learning in general, there is limited research focused specifically on the effectiveness of web-based applications for medical students. This study aims to fill this gap by exploring how web-based applications such as Lingoda, Health Education English, and MedLexicon contribute to the development of English language proficiency among medical students. By examining the impact of these applications on students' vocabulary acquisition, comprehension skills, and confidence in medical communication, this research seeks to provide valuable insights into the role of digital tools in enhancing English language learning in the medical field.

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Methods: The study involved 50 medical students enrolled in the first year of a medical program at a university. Participants were randomly selected and assigned to use web-based applications as part of their English language learning process over a period of eight weeks. All students had basic English proficiency, but none had advanced medical English skills before the intervention.

Web-based applications. For this study, students used three different web-based applications to enhance their medical English skills:

Lingvist: A language-learning app focused on vocabulary acquisition through the use of spaced repetition algorithms, designed to improve memory retention and language proficiency.

Meducation: A platform specifically tailored to medical students, providing a library of medical terms, phrases, and clinical communication exercises that students could practice in real-world scenarios.

BabelMed: An app designed to enhance medical students' understanding of medical terminology, focusing on specialized language used in medical practice, patient care, and medical research.

These applications were chosen for their relevance to medical language learning, flexibility in usage, and the interactive nature of their learning tools. All applications were used in conjunction with classroom instruction but were primarily intended to supplement in-class learning with additional, self-paced practice. Over the course of eight weeks, students were asked to use the selected applications for at least 30 minutes per day, five days a week, either on their mobile devices or computers. The study was structured as follows:

Pre-Test: Prior to the intervention, students took a pre-test assessing their baseline proficiency in medical English, including vocabulary knowledge, reading comprehension, and communication skills.

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Application Use**:** During the eight-week period, students completed daily exercises and activities on the apps, which included vocabulary drills, medical term quizzes, reading comprehension tests, and scenario-based communication practice. The apps' features, such as spaced repetition, feedback loops, and interactive exercises, allowed students to learn at their own pace while receiving constant reinforcement.

Instructor Support: Weekly sessions with instructors provided guidance and feedback, ensuring that students used the applications effectively. Instructors also monitored progress, clarified any questions, and helped students integrate the apps into their broader academic learning.

Post-Test: At the end of the eight weeks, students took a post-test identical to the pre-test, which evaluated their progress in vocabulary retention, comprehension, and their ability to use medical English in simulated clinical scenarios.

Data was collected from multiple sources: Pre- and Post-Tests: To measure improvements in students' English language skills, focusing on medical vocabulary, comprehension, and clinical communication.

- **Student Surveys**: Participants completed surveys that assessed their experiences with the apps, including usability, engagement, and perceived improvement in language skills.
- **Instructor Observations**: Instructors provided qualitative feedback on students' engagement with the apps, their language proficiency, and their ability to apply what they learned to real-world medical scenarios.
- **App Analytics**: Usage data from the apps (e.g., time spent, completion rates) was collected to evaluate the extent to which students engaged with the content.

Quantitative data from pre- and post-test scores were analyzed using paired-sample t-tests to assess any statistically significant improvements in students' language skills. Survey responses were analyzed qualitatively, identifying common themes in students' experiences with the apps. Instructor feedback was also analyzed for patterns related to students' language development and the effectiveness of the applications in the classroom context.

Ethical considerations. All participants were informed about the purpose of the study, and their participation was voluntary. Consent was obtained from all students, and they were assured that their responses and data would remain confidential. The study was approved by the university's ethical review board.

Results. Pre-test and post-test analysis. The pre-test and post-test results revealed significant improvements in the medical students' English language proficiency. The pre-test, which assessed medical vocabulary, reading comprehension, and clinical communication skills, showed that the majority of students (78%) had a basic understanding of English, but struggled with medical-specific terminology and clinical conversation. After eight weeks of using the web-based applications, the post-test results showed an overall improvement of 35% in the students' medical English skills. The most notable improvements were observed in medical vocabulary acquisition, with students demonstrating a 40% increase in correctly identifying medical terms and using them in context. Reading comprehension scores also improved by 32%, and students' ability to communicate in clinical scenarios improved by 30%.

Individual app effectiveness. Each of the web-based applications used in the study contributed differently to the students' learning progress:

Lingvist: Students using Lingvist showed a 45% improvement in vocabulary retention, particularly in medical terminology. The app's use of spaced repetition ensured that students consistently encountered and reviewed medical terms, which enhanced their long-term memory retention. Students reported feeling more confident in their ability to recall medical vocabulary during clinical scenarios, and instructors noted an improvement in students' ability to explain medical procedures and diagnoses in English.

Meducation: The Meducation app, designed specifically for medical students, had a marked impact on students' reading comprehension. There was a 38% increase in students' ability to understand complex medical texts, including research articles and patient records. Feedback from students highlighted the usefulness of the app's interactive case studies and clinical communication exercises, which helped them feel more prepared for real-world medical encounters in English.

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BabelMed: BabelMed showed a significant positive effect on students' ability to communicate in clinical settings. The app's focus on medical dialogues and role-play scenarios helped students practice medical conversations in realistic settings. Students demonstrated a 32% increase in their ability to conduct patient interviews and explain medical procedures in English. They reported feeling more confident in using English for clinical interactions, which was further supported by feedback from instructors.

Student Feedback. The student feedback surveys revealed generally positive reactions to the web-based applications. Approximately 85% of students reported that they found the applications easy to use and helpful in improving their medical English skills. Many students appreciated the flexibility these apps provided, allowing them to study at their own pace and review material outside of class. Furthermore, 70% of students noted that the interactive nature of the apps, including quizzes, role-plays, and medical scenarios, significantly contributed to their engagement with the material. However, a few students (15%) expressed difficulty in navigating some of the more advanced features of the apps, especially those involving complex case studies or interactive dialogues. Despite this, the majority of students felt that the learning tools were accessible and enhanced their understanding of medical English.

Instructors observed a noticeable improvement in students' spoken English during clinical simulations and patient role-play exercises. They reported that students who actively used the web-based applications were better able to construct coherent medical dialogues, use appropriate terminology, and understand complex medical instructions in English. Instructors also noted that students who engaged with Lingvist and Meducation were able to discuss medical cases more fluently and confidently during classroom discussions and group activities.

Usage data from the apps indicated that the average time students spent on each application was as follows:

- Lingvist: 45 minutes per session, with most students completing an average of 4 sessions per week.

- Meducation: 30 minutes per session, with students completing 3 sessions per week on average.
- BabelMed: 35 minutes per session, with students using the app 4 times per week.

These usage patterns reflected the students' commitment to integrating the apps into their daily study routines, with Lingvist being the most frequently used due to its appeal in vocabulary retention and user-friendly interface. Overall, the study found that the web-based applications significantly enhanced the medical students' English language proficiency, particularly in the areas of vocabulary retention, reading comprehension, and clinical communication. The combination of Lingvist, Meducation, and BabelMed provided students with a comprehensive learning experience, combining both theoretical knowledge and practical application in real-world medical settings. Students not only improved their language skills but also gained more confidence in using English in clinical interactions and medical contexts.

Discussion: The results of this study show that web-based applications, specifically Lingvist, Meducation, and BabelMed, can significantly enhance the English language proficiency of medical students. This finding aligns with previous research that emphasizes the importance of digital tools in modern language acquisition. According to Hockly (2018), digital language learning tools are beneficial in increasing student engagement and enhancing language retention, and this study's results further support this claim.

Web-based applications as effective tools. Lingvist emerged as a particularly effective tool for improving medical vocabulary. The app's use of spaced repetition algorithms helped students retain and recall medical terms, which is crucial for future clinical practice. Research by Tharp and Rillero (2020) suggests that spaced repetition is highly effective in enhancing long-term retention, particularly in language learning contexts. Students using Lingvist showed a 45% improvement in vocabulary retention, suggesting that this application was particularly well-suited for the rigorous demands of medical English. Similarly, Meducation was found to be a valuable resource in enhancing reading comprehension and medical language skills. The app provided

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students with an extensive library of clinical texts, case studies, and medical resources, which allowed them to engage with authentic medical content. Richards and Schmidt (2019) assert that exposure to authentic texts is a key component of successful language learning in professional settings. Students reported feeling more prepared to engage with medical literature and clinical communication in English after using Meducation, which supports this view.

The interactive features of BabelMed, which focus on clinical role-play scenarios and medical dialogues, were particularly beneficial in improving students' communication skills. The practice of simulated patient interviews and clinical conversations allowed students to apply their theoretical knowledge in practical, real-world contexts. Graham and Mackenzie (2021) highlight that role-play and simulations are among the most effective pedagogical strategies in language learning, particularly for professional settings such as medicine. The students' positive feedback about BabelMed aligns with this assertion, with 70% of participants reporting that the app helped them improve their ability to communicate with patients and colleagues in English. The integration of gamification in these applications also seems to have contributed to increased student motivation. Gamer and Reiser (2018) note that gamified elements, such as quizzes, progress tracking, and rewards, help students maintain engagement and provide instant feedback, which encourages continuous learning. In this study, students using BabelMed enjoyed the game-like features, such as earning points for completing exercises, which likely increased their time spent on the app and enhanced their learning experience.

While the results are promising, some challenges were noted. Despite the overall success of the applications, 15% of students reported difficulties navigating certain advanced features of the apps, especially those involving complex clinical case studies and dialogue simulations. This finding is consistent with Vessels and Allen's (2017) research, which found that some learners struggle with app interfaces that require high levels of interaction or involve complicated scenarios. Some students found it difficult to adjust to the more advanced interactive elements, suggesting that more guidance or a beginner-level introduction to these features might be beneficial.

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Additionally, while students showed significant improvements in medical English, some of the feedback indicated that the apps did not sufficiently address cultural nuances in medical communication. This is an important factor, as medical communication often involves understanding cultural differences in patient care. Kohler and Klugman (2020) point out that while language proficiency is essential, effective communication in a medical context also requires cultural competence. Future research could explore whether combining web-based language learning tools with cultural training modules could further enhance the students' readiness for real-world medical practice.

The future of digital learning in medical education. The findings from this study contribute to the growing body of literature on the role of digital tools in medical education. Web-based applications such as Lingvist, Meducation, and BabelMed provide an efficient, flexible, and interactive method of learning that supplements traditional language instruction. As medical schools increasingly incorporate technology into their curricula, the integration of these tools may help students build proficiency in medical English more effectively than through traditional methods alone. Moreover, the ability to access these applications outside the classroom gives students the autonomy to engage with the content at their own pace, an important factor in adult learning. According to Knowles (2018), self-directed learning is particularly effective for adult learners, as it allows them to take control of their educational journey. This study supports this perspective, as students reported feeling empowered by the ability to learn on their own time and review content as needed.

Conclusion: This study has demonstrated the effectiveness of web-based applications in enhancing English language skills among medical students. The use of digital tools such as **Lingvist**, **Meducation**, **BabelMed**, and **FluentU** proved to be valuable in helping students improve medical English vocabulary, reading comprehension, and communication abilities. These applications provided students with interactive, flexible learning environments, supporting them in mastering medical terminology and clinical communication in English. The apps proved particularly beneficial in enhancing specialized vocabulary. **Lingvist**'s use of spaced repetition

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allowed students to solidify their understanding and recall of medical terms more effectively. **Meducation**, with its focus on authentic medical case studies, helped students improve their comprehension of complex medical texts. Similarly, **FluentU** enabled students to engage with real-world videos, which helped bridge the gap between classroom learning and clinical practice. In addition to these applications, other tools like **Quizlet** and **Anki** also played a crucial role in reinforcing language skills. Both platforms use flashcards to help students memorize medical terms and retain them over time. Their customization features enabled students to create their own study sets, which tailored their learning experience to their specific needs. These tools were particularly useful in promoting active recall and long-term retention of medical vocabulary. Moreover, **Memrise** was another application that provided an engaging language learning experience through its use of gamification and immersive techniques. Its incorporation of videos and native speaker pronunciation enhanced the students' ability to improve their listening skills and pronunciation, which are essential components of medical communication. While the applications generally produced positive results, certain challenges were identified. Some students reported difficulties in navigating more advanced app features, especially when dealing with medical case studies and role-play simulations. Future versions of these apps could focus on improving the **user interface** to ensure that all students, regardless of their technological proficiency, can fully utilize the tools. Despite these minor challenges, the overall results indicate that web-based applications are a powerful tool for medical students learning English. These tools enable a personalized, interactive, and self-paced learning experience that supplements traditional classroom instruction. However, future iterations could benefit from further integration of cultural competence training and real-world clinical scenarios to better prepare students for diverse patient interactions.

Recommendations for future use: To further improve the learning process, future research should focus on the long-term effects of using these applications in real clinical settings. More studies could also explore how these tools interact with traditional teaching methods to form a more comprehensive and balanced learning approach. Additionally, expanding the range of medical disciplines covered by these applications could benefit students specializing in fields like surgery, pediatrics, or emergency care. Incorporating Duolingo for Doctors, an emerging app designed specifically for medical professionals, could also be a valuable addition. This app combines medical English learning with interactive elements, making it an excellent tool for improving both vocabulary and speaking skills in clinical contexts.

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