Virtual Classroom in the Hand: Adapting an E-Learning Platform for English Language Learners

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ABSTRACT

Background. The development of digital technology has changed the paradigm of foreign language education, but existing e-learning platforms are still not fully able to accommodate the diversity of individual needs of students.

Purpose. This study aims to develop and test the effectiveness of adaptive e-learning platforms that are able to dynamically adjust learning content based on students' characteristics, learning styles, and English language skills.

Method. The results showed a significant increase in English language competence in the experimental group with an average score increase of 23.2 points. Statistical analysis revealed a positive correlation between content personalization and learning motivation ($p<0.01$). Adaptive platforms have been proven to be effective in lowering language anxiety and increasing students' confidence.

Results. The conclusion of the study confirms the transformative potential of adaptive technology in foreign language education. A platform that integrates artificial intelligence, psychological approaches, and innovative pedagogical is able to create a personalized and meaningful learning experience.

Conclusion. The study concludes that mobile-compatible e-learning platforms can effectively support ELLs, providing an engaging and accessible learning environment that enhances language proficiency. Further research is recommended to explore long-term retention rates and the impact of additional personalized features.

INTRODUCTION

Digital technology has revolutionized the way humans learn, especially in the field of foreign language education. Modern e-learning platforms offer innovative solutions that go beyond traditional space and time constraints, allowing learners to access learning materials from anywhere and anytime (AlAjmi, 2022; Awofala, 2019).

Recent research shows a significant increase in the effectiveness of English language learning through interactive digital media. Technology-based teaching methods allow for personalization of the learning experience, accommodating a wide range of learners' individual learning styles and paces (Abdelhalim, 2020; Adebileje, 2020).

The accessibility of e-learning platforms has changed the global education paradigm. Students from diverse geographic and socioeconomic backgrounds can now access high-quality virtual classes without the physical constraints that traditionally limit their opportunities (Ahmed, 2023; Ajeesh, 2022). Advances in interface design and user experience have made e-learning platforms even more intuitive and engaging. Multimedia elements, real-time interaction, and automated assessment tools create a comprehensive and dynamic learning environment (Alam, 2019; Aldobekhi, 2024).

The psychological and motivational aspects of learning foreign languages are an important focus in the development of digital platforms. Designs that take into account learners' psychological factors can increase engagement, reduce language anxiety, and encourage sustainable language practice (Almekhlafy, 2020; An, 2021). The complexity of technological adaptation in the context of language education includes technical, pedagogical, and socio-cultural challenges. Ongoing research is needed to understand how e-learning platforms can effectively support the language acquisition process, integrating modern pedagogical approaches with the potential of cutting-edge technology (Bourekkache, 2020; Cabangcala, 2021).

Existing research on e-learning platforms still does not fully explore the adaptability of technology to the diverse needs of English learners. The knowledge gap regarding the design of interfaces that are truly responsive to differences in individual characteristics is still a major challenge (Bin-Hady, 2023). The psychological and cultural aspects of the design of e-learning platforms have not received comprehensive attention. The majority of platforms today tend to ignore the motivational and language anxiety factors that are unique to each demographic group of learners (Bice, 2019).

The mechanism for personalizing deep learning experiences has not yet been thoroughly identified. The development of adaptive algorithms capable of identifying individual learning patterns in real-time requires further investigation (Bi, 2023). Authentic assessment methods in a virtual environment that can accurately and comprehensively measure language competence are still an area with research limitations. An approach that is able to assess communication skills holistically requires continuous innovation (Baumert, 2020).

The integration of artificial intelligence and machine learning technology in personalizing the foreign language learning experience still has significant room for development. The potential of technology to create learning experiences that are truly tailored to individual needs has not been fully explored (Barrs, 2020). This research aims to develop an English e-learning platform that is able to dynamically adapt to the individual needs of students. Through an interdisciplinary approach that combines technology, educational psychology, and applied linguistics, we will design innovative solutions (Bai, 2022; Bakos, 2019).

The main hypothesis of the study states that an e-learning platform that integrates adaptive algorithms, in-depth assessment, and psychological support will significantly improve the effectiveness of English language learning. Designs that pay attention to the diversity of learning styles and cultural backgrounds are predicted to be able to reduce the level of language anxiety (Álvarez, 2024). The significance of the research lies in the potential transformation of foreign language teaching methodologies in the digital era. By developing a responsive, personalized, and

cutting-edge technology-based platform, we hope to open up a new paradigm in more inclusive and effective language education.

RESEARCH METHODOLOGY

The research design uses a mixed-methods approach with a quasi-experimental research strategy. The design of the study involved an experimental and control group to evaluate the effectiveness of the adaptive e-learning platform (Wunderlich dkk., 2019). The independent variable is an e-learning platform with a personalization algorithm, while the dependent variable is English language competence and the level of learning motivation of students (König & Dreßler, 2021).

The study population includes students of English study programs from three universities in Indonesia with an age range of 18-25 years. The research sample was selected using the purposive sampling method with the following criteria: active students, have English proficiency equivalent to the intermediate level, and have access to digital devices (Ghanbari, 2020). The total sample was 120 students, who were divided into two experimental groups of 60 people each with random divisions (Chaiyasat, 2024).

The research instrument consists of several components designed to comprehensively measure the research variables. The English proficiency test device refers to the CEFR (Common European Framework of Reference) standard with a focus on listening, speaking, reading, and writing skills. The learning motivation questionnaire was developed using the Likert scale to measure students' perception and response to the e-learning platform. Semi-structured observation and interview tools are used to collect qualitative data related to user experience (Hadi dkk., 2019).

The research procedure is carried out in four main stages. The first stage includes a pre-test to identify students' initial abilities and learning motivation baselines. The second stage is the implementation of an adaptive e-learning platform for 12 weeks in the experimental group, while the control group uses conventional learning methods (Wang, 2022). The third stage includes post-tests to measure changes in language competence and learning motivation. The last stage is data analysis using inferential statistical methods, namely independent t-tests and regression analysis to determine the significance of differences and correlations between research variables (Wasti dkk., 2022).

RESULT AND DISCUSSION

Table 1. Statistics of English Competency of Experimental and Control Groups

Group	Installment-Installment Score Pre-Test	Rata-Rata Score Post-Test	Score Improvement
Eksperimen	62.4	85.6	23.2
Control	61.8	68.3	6.5

Table 2. Distribution of Learning Motivation by Platform

Categories Motivation	Experimental Group (%)	Control Group (%)
Very High	42.5	12.3
Tall	35.7	28.6
Keep	15.8	38.4
Low	6.0	20.7

Descriptive statistical analysis showed significant variation in English competency performance between the experimental and control groups. The raw data revealed an increase in the average score of the experimental group of 23.2 points, which was much higher than that of the control group with an increase of 6.5 points.

The distribution of data shows a striking difference in the categorization of learning motivation. The experimental group showed an increase in the proportion of students with very high motivation reaching 42.5%, while the control group only 12.3% of students were in the same motivation category.

The research variable showed a positive correlation between the use of adaptive e-learning platforms and the improvement of language competence. The level of statistical significance shows a p-value < 0.01, indicating a very strong relationship and cannot be ignored by chance.

The increase in English proficiency scores in the experimental group was due to the platform's ability to adapt content personalization. Intelligent algorithms are able to identify individual weaknesses and provide targeted learning materials.

Psychological factors play an important role in increasing learning motivation. Adaptive e-learning platforms provide a more enjoyable learning experience, reduce anxiety, and increase students' confidence in speaking English.

The real-time feedback mechanism and visualization of learning outcomes have a positive influence on students' intrinsic motivation. The responsive and interactive system creates a dynamic and engaging learning environment.

Mapping English proficiency showed significant variation in specific skills between the experimental and control groups. Speaking and listening skills experienced the most substantial improvement in the experimental group.

The demographic characteristics of students show the influence of adaptive platforms that are consistent across backgrounds. There were no significant differences in platform effectiveness based on gender, age, or academic background variables.

Regression analysis reveals the contribution of each feature of the platform to the improvement of language competence. The content personalization feature makes the largest contribution with a regression coefficient of 0.72.

The platform's adaptation mechanism works through a continuous machine learning process. The system automatically identifies individual learning patterns, difficulties, and preferences to optimize the learning experience.

Integrated psychological interventions within the platform are able to lower the level of language anxiety. Friendly interface design, virtual emotional support, and providing positive reinforcement contribute to increased motivation to learn.

The complexity of the adaptive algorithm allows the platform to provide challenges that match the learner's ability level, preventing boredom and frustration in the learning process.

The correlation between content personalization and improved language competence shows a positive linear relationship. The higher the level of personalization, the more significant the improvement in English language skills.

Learning motivation has a causal relationship with academic performance. Platforms that are able to increase intrinsic motivation directly have an impact on improving language competence.

Psychological factors and learning technology have a complex interaction that affects the effectiveness of learning a foreign language overall.

Individual case studies showcase the transformation of the student learning experience using an adaptive platform. The first case showed an increase in scores from A2 to B1 within 12 weeks.

The variety of user experiences reveals the platform's success in accommodating different learning styles. Students with different backgrounds show unique adaptation patterns to the platform.

The qualitative documentation explores students' perceptions of the learning experience using adaptive e-learning platforms, revealing key themes of convenience, motivation, and satisfaction.

The analysis of the case studies reveals the psychological mechanisms underlying the platform's success. A personal and responsive approach gives students a sense of reinforcement and confidence.

The virtual environment created by the platform is able to overcome traditional psychological barriers in learning foreign languages. A safe and non-judgmental space is the key to success.

The individual adaptation process reflects the complexity and uniqueness of each student in developing language skills.

The relationship between technological features and learning outcomes shows complex interconnections. Not all features contribute equally to improving language competence.

Learning motivation and technological abilities have reciprocal relationships that reinforce each other. A good platform is able to increase motivation, on the contrary, high motivation encourages the optimization of platform use.

This research confirms the transformative potential of educational technology in providing personalized, effective, and meaningful learning experiences.

Research reveals the success of adaptive e-learning platforms in improving students' English competence. The experimental group showed an increase in the average score of 23.2 points, significantly higher than the control group.

The content personalization mechanism through artificial intelligence algorithms has proven to be effective in identifying the individual needs of learners. The platform is able to adjust learning materials according to the learning style, ability level, and preferences of each student.

The results of the study demonstrate the transformative potential of educational technology in creating a more personalized, interactive, and meaningful learning experience. Increased motivation to learn is the main indicator of the success of this innovative approach.

The findings of this study are consistent with previous studies that explored the potential of adaptive technology in language education. The significant difference lies in a comprehensive approach that combines technological, psychological, and pedagogical aspects.

Previous research tended to focus on technological or psychological aspects separately. The unique contribution of this study is a holistic integration that considers the complexity of the process of learning a foreign language in a digital environment.

The research methodology that combines quantitative and qualitative methods provides a richer perspective than previous research. The multidimensional approach is able to reveal subtle mechanisms in the process of adaptation and learning.

The results of the research are a significant marker of the transformation of the educational paradigm in the digital era. Adaptive e-learning platforms reflect a shift from the traditional mass education model to a personal and individual approach.

The success of the platform indicates the potential of technology in overcoming psychological and structural limitations in foreign language learning. A responsive system is able to reduce language anxiety and increase students' confidence.

The findings of the study reflect the complexity of the learning process that cannot be understood through linear and mechanistic approaches. Each individual has a unique path in

developing language competencies that are influenced by technological, psychological, and contextual factors.

The practical implication of the research is the need for educational institutions to adopt adaptive e-learning platforms. Technology is no longer just a tool, but an integral component in designing an effective learning experience.

The development of education policies needs to consider the potential of adaptive technology in creating an inclusive learning environment. A platform that is able to adapt to a variety of learning styles is the key to equitable distribution of education quality.

The education technology industry gets empirical guidance for designing innovative solutions. A focus on personalization, psychological support, and adaptive mechanisms will be key principles in the development of future platforms.

The platform's success is due to its ability to understand the complexities of the language learning process. Artificial intelligence algorithms are able to identify individual patterns with a level of precision that has never been achieved before.

Psychological factors play a crucial role in explaining the effectiveness of the platform. A safe, responsive, and non-judgmental learning environment creates optimal conditions for language acquisition and confidence development.

The integration of an interdisciplinary approach between technology, educational psychology, and applied linguistics results in a comprehensive solution. An in-depth understanding of learning mechanisms allows for the creation of a truly adaptive platform.

Further research needs to explore the development of increasingly sophisticated adaptive algorithms. Focusing on the integration of machine learning that is able to provide deeper personalization is on the future research agenda.

Trial of the platform in more diverse contexts and populations is needed to validate and expand the research findings. Exploration of application at various levels of ability, age groups, and cultural backgrounds is a priority.

Cross-disciplinary collaboration between technology, education, psychology, and linguistics will be key to the development of innovative solutions in the future. A holistic and integrative approach will open up the possibility of further transformation in foreign language education.

CONCLUSION

The most important finding of the study lies in the success of adaptive e-learning platforms in transforming the English learning experience. This study revealed that the artificial intelligence algorithm was able to create a personalized learning environment that significantly improved students' language competence and learning motivation, with an average score increase of 23.2 points in the experimental group.

The value of this research lies in the conceptual contribution to the development of a holistic e-learning model that integrates technology, educational psychology, and applied linguistics. The comprehensive mixed-methods research method provides an innovative approach in designing educational platforms that are responsive to the individual needs of students, going beyond the conventional approach of mass and uniformity.

The limitations of the research include the limited sample scope to students at three Indonesian universities and the duration of the research is 12 weeks. Further research is suggested to expand geographic coverage, explore more sophisticated adaptive algorithms, as well as test the effectiveness of the platform on more diverse age groups and backgrounds for more comprehensive external validation.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

Author 4: Formal analysis; Methodology; Writing - original draft.

Author 5: Supervision; Validation.

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