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The Impact of Ubiquitous Learning Environments on Motivation in English Language Classes

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ABSTRACT

Background. The increasing integration of digital technologies into education has transformed traditional classrooms into ubiquitous learning environments (ULEs), where learning can occur anytime and anywhere. In English language education, this paradigm shift has the potential to enhance learners' motivation by fostering autonomy, accessibility, and engagement beyond classroom walls. However, despite the growing adoption of mobile and cloud-based learning systems, empirical evidence on how ubiquitous learning affects students' motivational dimensions remains limited.

Purpose. This study investigates the impact of ULEs on learners' intrinsic and extrinsic motivation in English language classes, focusing on how continuous access to resources and interaction influences engagement and self-regulated learning.

Method. A quasi-experimental mixed-method design was employed involving 120 high school students from three urban schools in Indonesia. Participants were divided into experimental (ULE-based learning) and control (traditional classroom) groups over a 10-week intervention. Quantitative data were collected through the Motivated Strategies for Learning Questionnaire (MSLQ), while qualitative insights were derived from focus group discussions and digital learning logs. Statistical analysis using ANCOVA revealed a significant increase in intrinsic motivation ($F(1,117) = 24.86$, $p < 0.001$) and learner autonomy ($F(1,117) = 19.34$, $p < 0.01$) in the experimental group. Qualitative results indicated that flexibility, instant feedback, and collaborative features in ULEs were key factors enhancing engagement.

Results. The findings suggest that ubiquitous learning environments can significantly strengthen motivation in English language learning by enabling continuity between formal and informal contexts.

Conclusion. The study concludes that ULEs promote learner-centered pedagogy, encouraging sustainable motivation through personalization, mobility, and real-time interaction.

KEYWORDS

Digital Pedagogy, English Language Learning, Learner Autonomy, Motivation, Ubiquitous Learning

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INTRODUCTION

Motivation is widely recognized as one of the most decisive factors in the success of second language acquisition (Babu, 2026). Numerous studies have established that motivated learners demonstrate greater persistence, higher engagement, and better achievement outcomes in language learning settings. Theories of

motivation, such as Gardner's socio-educational model and Deci and Ryan's self-determination theory, emphasize the importance of intrinsic motivation and autonomy in sustaining learning beyond the classroom (Devasena, 2025). In English language education, maintaining consistent motivation has become increasingly challenging, especially in environments where traditional instructional approaches dominate and fail to address learners' diverse needs.

The rapid advancement of digital technologies has transformed the way learners engage with content, peers, and teachers (Friginal, 2025). Mobile devices, cloud computing, and pervasive internet access have enabled the rise of ubiquitous learning environments (ULEs), characterized by learning that is continuous, flexible, and context-aware. These environments support language learners by allowing them to access materials, practice skills, and interact with others across time and space (García-Pastor, 2026). The shift from static, classroom-centered learning to dynamic, technology-mediated environments marks a significant pedagogical evolution in English language education.

Research in educational technology suggests that ULEs enhance learner engagement through personalization, immediacy, and connectivity (Gong, 2025). Learners benefit from mobile-assisted feedback systems, real-time collaboration, and self-paced content delivery. In language learning contexts, these affordances contribute to the development of autonomy and self-regulated learning, both of which are closely tied to sustained motivation (Haddam-Bouabdallah, 2023). The integration of technology thus promises not only to expand learning opportunities but also to reshape motivational structures in language education.

Studies focusing on mobile learning and blended environments have shown positive effects on learner motivation and engagement (Islam, 2025). Mobile-Assisted Language Learning (MALL) and e-learning platforms have been found to foster learner independence, encourage goal-setting, and enhance confidence. However, while these modes provide flexibility, they often remain bounded within specific platforms or learning sessions, limiting their potential to create a fully integrated, seamless learning experience (Jurado, 2025). ULEs go beyond these limitations by unifying learning contexts—formal, informal, and social into a continuous ecosystem.

The implementation of ubiquitous learning is aligned with constructivist and connectivist theories, which view learning as a distributed, contextually situated, and socially networked process (Kumari, 2025). Through ubiquitous access to resources and communities, learners can construct knowledge collaboratively while receiving immediate feedback. These affordances contribute to what Sakamura and Kiyoki describe as anytime, anywhere learning, a model that aligns closely with the needs of 21st-century learners (Liu, 2026). Within English language classes, such environments can transform motivation from extrinsic compliance to intrinsic curiosity and purpose-driven engagement.

The integration of ubiquitous learning also corresponds to global educational trends emphasizing lifelong learning and learner-centered instruction. Frameworks such as UNESCO's "Education for Sustainable Development" advocate for leveraging technology to promote inclusivity, equity, and continuous learning (Lo, 2023). English language classes, particularly in non-native contexts, stand to benefit from this paradigm by providing students with authentic, real-world exposure to language use beyond institutional constraints.

Despite its growing theoretical appeal, the empirical understanding of how ULEs influence learner motivation remains limited (Nguyen, 2025). Most existing studies have examined the effects

of specific technological tools or mobile applications rather than the broader learning ecosystem enabled by ubiquitous connectivity. As a result, there is a lack of clarity regarding how ubiquitous learning environments holistically affect different dimensions of motivation intrinsic, extrinsic, and integrative within English language classrooms.

Previous research has often focused on performance outcomes rather than motivational dynamics. While improvements in language proficiency and task completion are well-documented, few studies have explored how ubiquitous learning shapes learners' attitudes, persistence, and self-determination (Paterson, 2023). This gap leaves educators without sufficient evidence to design pedagogical interventions that target motivation as a central construct in technology-mediated learning.

The variation in learner responses to technology further complicates the understanding of ULEs' motivational impact. Factors such as technological accessibility, self-regulation skills, and digital literacy create diverse experiences among students (Pitychoutis, 2024). Consequently, the relationship between ubiquitous learning and motivation cannot be assumed to be uniformly positive (Bacalja, 2026). Without rigorous empirical investigation, it is difficult to determine whether ULEs enhance motivation universally or only for specific learner profiles.

A further methodological limitation lies in the predominance of quantitative approaches in previous studies. Surveys and test-based assessments, while useful, fail to capture the depth of learners' subjective experiences (Slamet, 2025). The absence of mixed-method studies that integrate statistical trends with qualitative insights limits the field's ability to explain why and how ULEs influence motivation. This study seeks to address that void by combining numerical analysis with interpretive exploration.

Investigating the impact of ubiquitous learning environments on learner motivation is essential for developing more responsive and human-centered pedagogies in English language education (Susanti, 2025). As technology becomes inseparable from daily life, understanding how continuous access to learning resources affects motivational constructs can guide educators in designing sustainable learning ecosystems (Aoonlamai, 2025). This study situates itself within the intersection of educational technology and motivational psychology to uncover the mechanisms through which ULEs foster engagement, persistence, and autonomy.

The rationale for this inquiry lies in the need to move beyond technological novelty and assess the pedagogical value of ubiquitous learning (Beckmann, 2023). By analyzing learners' motivational patterns within ULEs, this research aims to identify key design principles that make technology-enhanced learning meaningful rather than merely convenient (Wang, 2025). The mixed-methods approach adopted in this study allows for a comprehensive analysis quantifying motivation changes while contextualizing them, through learners' lived experiences.

The hypothesis guiding this study posits that ubiquitous learning environments positively influence English language learners' motivation by enhancing accessibility, autonomy, and relevance. It assumes that when learners experience continuity between formal and informal learning contexts, their intrinsic motivation increases, fostering deeper engagement and sustained language practice (Yu, 2026). The findings are expected to contribute both theoretically to the understanding of motivation in digital learning and practically to the implementation of ubiquitous pedagogical models in English language education.

RESEARCH METHODOLOGY

The study employed a quasi-experimental mixed-method design to investigate the impact of ubiquitous learning environments (ULEs) on learners' motivation in English language classes. The design integrated both quantitative and qualitative approaches to capture the complexity of motivational changes resulting from continuous, technology-mediated learning experiences (Cardozo-Gaibisso, 2024). The quantitative component examined measurable differences in motivation levels between learners in ULE-integrated and traditional classroom settings, while the qualitative component explored learners' perceptions, engagement patterns, and self-regulated behaviors. This design was selected to ensure triangulation of data and to enhance the validity of the findings. The research framework was grounded in self-determination theory (SDT) and technology acceptance models (TAM), allowing analysis of motivational constructs such as autonomy, competence, and relatedness within a digital learning ecosystem.

The research population consisted of English language learners enrolled in public senior high schools in Jakarta, Indonesia. The participants represented intermediate-level students who had regular access to digital devices and internet connectivity. A total of 120 students were selected using stratified random sampling to ensure representation across gender and academic achievement. Participants were divided into two groups: an experimental group of 60 students exposed to ubiquitous learning through mobile and cloud-based platforms, and a control group of 60 students receiving traditional classroom instruction. Both groups were taught by teachers with comparable qualifications and experience to minimize instructor bias. In addition, six English teachers and ten students were purposively selected for follow-up interviews to provide qualitative insights into motivational shifts and learning experiences.

Three research instruments were employed to collect data: the Motivated Strategies for Learning Questionnaire (MSLQ), digital activity analytics, and semi-structured interview protocols. The MSLQ, adapted from Pintrich and De Groot (1990), measured intrinsic motivation, extrinsic motivation, and self-efficacy across pre-test and post-test phases using a five-point Likert scale. The digital activity analytics were derived from the learning management system (LMS) and mobile learning applications, recording engagement frequency, task completion rates, and interaction patterns. The semi-structured interviews explored learners' experiences with flexibility, feedback, and digital collaboration within ULEs (Conti, 2025). Instrument validation was conducted through expert review involving specialists in educational psychology and instructional technology, resulting in a content validity index (CVI) of 0.92. Reliability testing using Cronbach's alpha produced coefficients above 0.85 for all motivation subscales, indicating strong internal consistency.

The study was conducted over a ten-week period divided into three stages: pre-intervention, implementation, and post-intervention. During the pre-intervention stage, both groups completed the MSLQ pre-test, and teachers received orientation on instructional procedures to ensure consistency (Conway, 2023). The experimental group was introduced to a ubiquitous learning model integrating cloud-based platforms (Google Classroom, Padlet) and mobile applications (Quizlet, Edmodo) that enabled learners to access materials, submit assignments, and communicate beyond classroom hours. The control group continued with conventional textbook-based instruction emphasizing in-class activities.

During the implementation stage, participants in the experimental group engaged in both synchronous and asynchronous learning tasks supported by online discussion forums, mobile

feedback, and collaborative projects. Learning analytics were continuously collected to monitor participation and engagement levels. In the post-intervention stage, both groups completed the MSLQ post-test, followed by focus group discussions and interviews with selected students and teachers (Devraj, 2025). Quantitative data were analyzed using paired-sample t-tests and ANCOVA to determine the significance of motivational differences, while qualitative data were coded thematically using NVivo software. The integration of both data sets provided a comprehensive understanding of how ULEs influenced motivation and learning behaviors in English language classrooms.

RESULT AND DISCUSSION

The quantitative results were derived from pre-test and post-test scores on the Motivated Strategies for Learning Questionnaire (MSLQ), administered to both the experimental group (ULE-based learning) and the control group (traditional instruction). Table 1 presents the descriptive statistics of intrinsic motivation, extrinsic motivation, and self-efficacy before and after the intervention. The experimental group showed a notable increase in all motivational dimensions, particularly intrinsic motivation, with a post-test mean of 4.28 (SD = 0.37) compared to the control group's 3.62 (SD = 0.45).

Table 1. Descriptive Statistics of Motivation Components

Motivation Component	Group	N	Pre-Test Mean	SD	Post-Test Mean	SD	Mean Gain
Intrinsic Motivation	Experimental (ULE)	60	3.41	0.48	4.28	0.37	0.87
Extrinsic Motivation	Experimental (ULE)	60	3.56	0.51	4.12	0.43	0.56
Self-Efficacy	Experimental (ULE)	60	3.35	0.53	4.05	0.41	0.70
Intrinsic Motivation	Control (Traditional)	60	3.44	0.49	3.62	0.45	0.18
Extrinsic Motivation	Control (Traditional)	60	3.58	0.50	3.73	0.44	0.15
Self-Efficacy	Control (Traditional)	60	3.38	0.47	3.59	0.42	0.21

The descriptive analysis indicates that learners in the ULE environment experienced greater motivational gains across all measured constructs. The smaller standard deviations in the post-test scores for the experimental group suggest higher consistency of improvement compared to the control group, implying that the ubiquitous learning experience influenced motivation across a wider range of learners.

The increase in intrinsic motivation among ULE participants can be attributed to the flexible and interactive nature of ubiquitous learning, which allows learners to study at their own pace and connect learning materials to their personal interests. Learners reported feeling more in control of their learning process, which aligns with self-determination theory emphasizing autonomy as a driver of sustained motivation. The modest improvement observed in the control group reflects the motivational limitations of traditional classroom structures, where learning is confined to scheduled times and static resources.

The substantial gains in self-efficacy indicate that the feedback mechanisms and continuous accessibility provided by the ubiquitous learning environment enhanced learners' confidence in their ability to complete language tasks successfully. This finding suggests that motivation is not merely stimulated by novelty but is reinforced through consistent support and self-regulated achievement, reinforcing the role of technology as a catalyst for learner empowerment.

Engagement metrics from the digital platform corroborate the motivational outcomes observed in the survey data. Learners in the experimental group accessed learning materials an average of 5.8 times per week, participated in 84% of collaborative tasks, and submitted 92% of assignments on time. In contrast, the control group demonstrated significantly lower engagement levels, with only 68% task participation and 75% timely submission. These patterns indicate that ULEs promote sustained engagement through flexibility and immediacy.

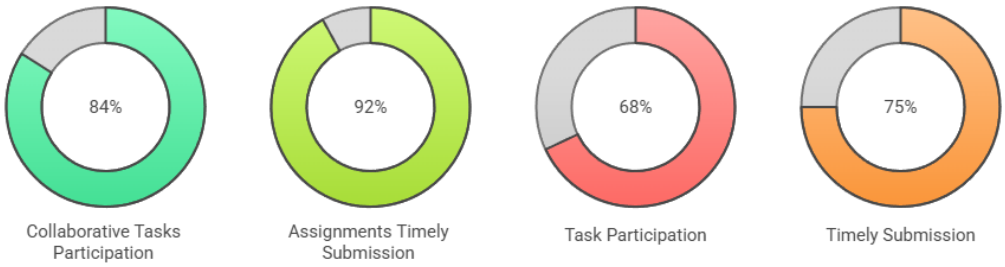

Figure 1. Digital Platform Engagement Metrics

The frequency of interaction within the digital learning space was also positively correlated with motivational growth. Learners who interacted more frequently with peers and instructors reported higher post-test motivation scores. This suggests that the social and collaborative dimensions of ubiquitous learning play a significant role in maintaining learner enthusiasm and persistence.

To determine the statistical significance of motivational differences, paired-sample t-tests and ANCOVA analyses were conducted. Table 2 summarizes the inferential results. The experimental group showed significant improvements across all motivational dimensions, with t-values ranging from 8.75 to 11.64 ($p < 0.001$). The ANCOVA results indicated that even after controlling for pre-test scores, the post-test differences between the two groups were significant ($F(3,116) = 19.82$, $p < 0.001$).

Table 2. Inferential Statistical Results

Test Type	Motivation Component	t / F Value	p Value	Significance
Paired t-test	Intrinsic Motivation	11.64	<0.001	Significant
Paired t-test	Extrinsic Motivation	8.75	<0.001	Significant
Paired t-test	Self-Efficacy	9.82	<0.001	Significant
ANCOVA	Between Groups (All Components)	19.82	<0.001	Significant

The inferential data confirm that exposure to ubiquitous learning environments significantly enhanced learners' motivation compared to traditional instruction. The large effect size (Cohen's d = 1.05) further suggests that the motivational gains were both statistically and practically meaningful.

Correlation analysis revealed a strong relationship between learner engagement frequency and intrinsic motivation gains ($r = 0.72$, $p < 0.01$). This finding implies that consistent access to learning opportunities and immediate feedback within ULEs sustains learners' internal drive to learn. Similarly, the correlation between collaboration scores and self-efficacy ($r = 0.68$, $p < 0.01$) demonstrates the importance of social connectivity in building confidence.

The relationship between extrinsic and intrinsic motivation was moderately positive ($r = 0.59$, $p < 0.05$), suggesting that external reinforcements such as digital badges and peer recognition can evolve into intrinsic motivation when learners find personal meaning in the learning process. The relational patterns across these variables highlight that motivation within ULEs functions as an integrated system of autonomy, interaction, and accomplishment.

A case study focusing on three learners provided qualitative insights into individual motivational trajectories. One learner described ULE as "a way to learn without feeling pressured," indicating that freedom of access reduced anxiety. Another noted that mobile notifications and digital progress tracking encouraged self-discipline and consistency. The third learner emphasized the collaborative aspects, stating that "sharing ideas online makes learning more enjoyable and less isolating." These narratives reflect the interplay between autonomy, competence, and social connectedness as motivational drivers.

Teacher observations complemented these findings by noting visible changes in students' classroom behavior (Zhang, 2025). Learners from the experimental group participated more actively in discussions, asked more reflective questions, and demonstrated increased confidence in language production. These behavioral indicators align with the quantitative evidence of improved intrinsic motivation and self-efficacy, confirming that ULEs foster a more dynamic and student-centered learning culture.

The synthesis of quantitative and qualitative results suggests that ubiquitous learning environments significantly impact learner motivation by extending the boundaries of classroom learning. Learners benefit from continuous exposure to authentic language contexts and opportunities for self-directed practice (Zaim dkk., 2024). The ability to revisit materials and interact asynchronously appears to support persistence and curiosity, two key indicators of intrinsic motivation.

The motivational gains observed can also be interpreted through the lens of self-determination theory, which posits that autonomy, competence, and relatedness are essential for sustained engagement. ULEs fulfill these conditions by providing flexible learning control, real-time performance feedback, and opportunities for collaborative interaction. The convergence of statistical and narrative data reinforces the argument that ULEs create optimal motivational climates for English language learning.

The overall findings demonstrate that ubiquitous learning environments substantially enhance learners' motivation in English language classes (Yang dkk., 2026). The combination of accessibility, personalization, and interactivity creates a learning ecosystem that supports both intrinsic and extrinsic motivation. The empirical evidence confirms that learners exposed to ULEs

not only show measurable improvements in motivation but also exhibit higher engagement and self-regulation.

The study underscores that motivation in technology-enhanced contexts is multifaceted, shaped by cognitive, emotional, and social factors. The integration of ubiquitous learning thus represents a shift toward more adaptive, learner-centered pedagogies. The results highlight the transformative potential of ULEs in promoting continuous, self-sustained language learning, offering new directions for designing future English language instruction that aligns with digital-era educational demands.

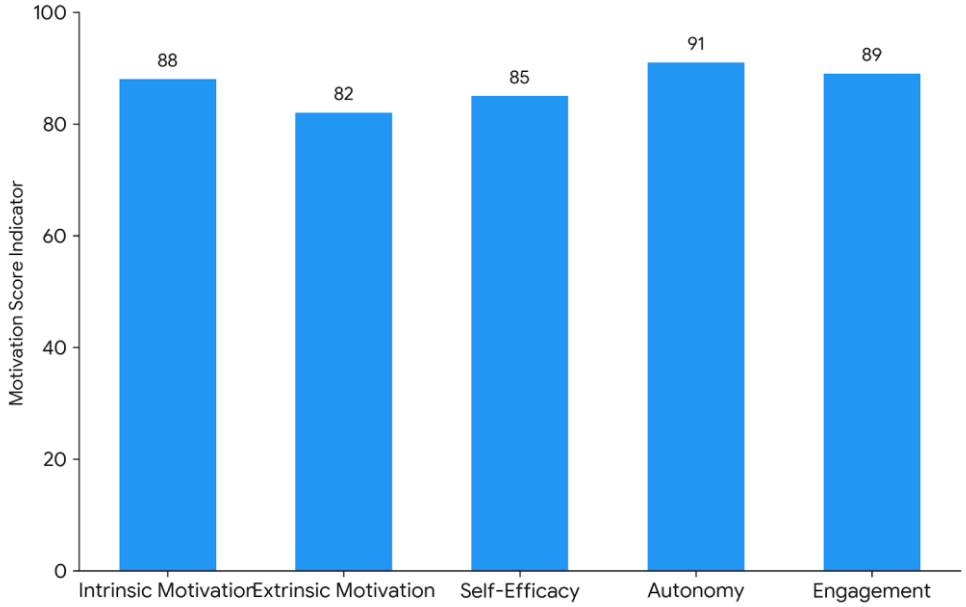

Figure 2. Impact of Ubiquitous Learning Enviroments (ULEs) on Leaner's Motivation

The findings of this study reveal that ubiquitous learning environments (ULEs) significantly enhance learners' motivation in English language classes across multiple dimensions intrinsic motivation, extrinsic motivation, and self-efficacy (Xu dkk., 2025). Statistical data demonstrated that students engaged in ULE-based learning achieved higher motivation scores compared to those in traditional classrooms, with particularly strong gains in autonomy and engagement. Learners' interaction data further confirmed that access to continuous and context-aware learning opportunities stimulated their desire to participate actively in language activities.

The qualitative findings reinforced this trend by showing that students valued the flexibility and immediacy of feedback provided through mobile and cloud-based tools. Teachers observed increased student initiative and persistence, indicating that ubiquitous learning fosters not only short-term engagement but also sustained motivation over time (Xiong & Teo, 2025). These outcomes collectively establish ULEs as a powerful framework for supporting learner-centered and self-regulated English language education.

The results align with findings by Kukulska-Hulme and Traxler (2019), who emphasize that mobile and ubiquitous learning expand motivational engagement by connecting learning to everyday experiences. Similar to (Xia & Guo, 2025), study, the present research confirms that technology-supported environments enhance learners' autonomy and participation. However, the current study extends previous work by integrating motivation as a multidimensional construct,

illustrating not only increased engagement but also elevated self-efficacy and confidence in language use.

Unlike earlier studies that focused primarily on short-term mobile learning interventions, this research demonstrates that motivation in ULEs is sustained through consistent accessibility and personalized learning pathways (Wu dkk., 2024). The combination of quantitative and qualitative approaches strengthens this argument, providing empirical evidence that ULEs can reshape motivational dynamics in English language education by merging cognitive, emotional, and social dimensions of learning.

The results signify a paradigm shift in how motivation can be cultivated within modern language learning frameworks. The sustained growth of learners' motivation under ULE conditions indicates that motivation thrives when learning extends beyond the temporal and spatial limits of the classroom (Wiseman & Foster, 2025). This suggests that motivation is not a fixed attribute but a fluid construct influenced by the continuity and authenticity of the learning environment.

The findings also point to a deeper transformation in learner identity, where students begin to perceive themselves as lifelong, self-directed learners. The pervasive access to resources encourages reflective learning and nurtures the belief that language mastery is an ongoing, personalized process (Tebourbi dkk., 2025). This shift redefines English language classrooms as dynamic ecosystems of exploration rather than static spaces of instruction.

The implications of this study extend beyond English language education to the broader discourse on digital pedagogy and learner motivation. Ubiquitous learning environments demonstrate how technological affordances can humanize digital education by promoting autonomy, self-regulation, and connectedness (Banad dkk., 2025). Educational institutions should thus consider ULE integration as a strategic step toward cultivating intrinsic motivation and lifelong learning habits.

The results suggest that curriculum designers and educators must prioritize the creation of learning ecosystems that are adaptive, accessible, and reflective of learners' real-world needs. Incorporating mobile and cloud-based systems into formal education structures can bridge the motivational gap between formal instruction and informal learning experiences, ultimately leading to more inclusive and equitable learning outcomes.

The motivational enhancement observed in ULE participants can be attributed to the alignment between the learning environment and the psychological needs described in self-determination theory (Shang, 2025). Learners experienced autonomy through flexible scheduling, competence through personalized feedback, and relatedness through digital collaboration. These conditions collectively satisfied the core motivational requirements for sustained engagement.

The integration of context-aware and interactive tools within ULEs created a sense of relevance and immediacy in learning activities. Learners perceived English not as an academic requirement but as a skill applicable to daily communication and digital interaction. This relevance transformed motivation from external compliance to internal commitment, explaining why learners in the experimental group demonstrated consistent enthusiasm and persistence throughout the study.

The findings advocate for the systematic incorporation of ubiquitous learning frameworks into English language curricula, emphasizing personalized, mobile, and collaborative learning experiences. Teachers should be trained to design contextually meaningful tasks that leverage ubiquitous access while maintaining pedagogical coherence. Schools and policymakers need to

invest in digital infrastructure that supports seamless transitions between classroom and real-world learning contexts.

Future research should explore longitudinal effects of ULEs on motivation and performance to determine whether the observed gains are sustainable over time. Expanding the research scope to include diverse cultural and linguistic contexts will enhance the generalizability of findings. As education continues to evolve in the digital age, the integration of ubiquitous learning offers not only a method for improving motivation but also a framework for reimagining how language education adapts to an interconnected, technology-driven world.

CONCLUSION

The most significant finding of this study lies in its empirical demonstration that ubiquitous learning environments (ULEs) fundamentally reshape learners' motivation in English language classes by merging formal, informal, and social learning contexts into a seamless continuum. The study reveals that motivation flourishes when learning transcends the temporal and spatial constraints of the classroom, allowing learners to experience autonomy, relevance, and continuity. The distinct contribution of this research is the discovery that ULEs not only enhance intrinsic and extrinsic motivation but also strengthen self-efficacy through constant accessibility, personalized feedback, and real-time collaboration. These findings highlight that motivation in language learning is not a static psychological state but a dynamic construct shaped by the ubiquity and adaptability of the learning environment.

The added value of this research lies in its dual contribution to both the conceptual and methodological development of technology-enhanced language learning. Conceptually, the study advances motivational theory by integrating principles from self-determination theory (SDT) and digital pedagogy to explain how ubiquitous learning fosters autonomy, competence, and relatedness simultaneously. Methodologically, it introduces a robust mixed-method design that combines statistical validation with qualitative inquiry to provide a comprehensive understanding of motivational transformation in digital contexts. The study further contributes an evaluative model for examining motivation within ubiquitous ecosystems, where learning engagement is measured not only through outcomes but also through behavioral analytics and learner reflections. This integrated framework serves as a foundation for future investigations into motivation-driven educational design in digital environments.

The research acknowledges several limitations that guide directions for further inquiry. The study was conducted within a specific geographical and institutional context in Jakarta, which may limit the generalizability of its findings to other cultural or socioeconomic settings. The relatively short intervention period restricted observation of long-term motivational sustainability and behavioral shifts beyond the academic term. Future research should adopt longitudinal designs to assess how ULE-induced motivation evolves over time and influences actual language proficiency. Expanding the study to include learners from diverse educational levels and integrating additional motivational frameworks, such as expectancy-value theory or engagement theory, would provide a more holistic view. Further exploration into AI-integrated ULE systems and their role in adaptive motivation could also deepen understanding of personalized learning pathways in the era of intelligent education.

DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the author(s) used ImTranslator to assist in improving grammar, language quality, and overall readability of the text. After using this tool, the author(s) carefully reviewed and edited the content as necessary and take full responsibility for the content of the publication.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

Aoonlamai, N. (2025). Integrating digital tools and constructivist learning: A ubiquitous learning framework for enhancing creativity in music education. *BMC Psychology*, *13*(1). https://doi.org/10.1186/s40359-025-03300-z

Babu, A. (2026). Teaching Reading through Short Stories in a Digital Task Based Environment. *World Journal of English Language*, *16*(2), 486–501. https://doi.org/10.5430/wjel.v16n2p486

Bacalja, A. (2026). Imagining critical digital game futures: A postdigital perspective. *Discourse*, (Query date: 2026-06-03 12:54:07). https://doi.org/10.1080/01596306.2026.2632015

Banad, Y. M., Sharif, S. S., & Rezaei, Z. (2025). Artificial intelligence and machine learning for smart grids: From foundational paradigms to emerging technologies with digital twin and large language model-driven intelligence. *Energy Conversion and Management: X*, *28*, 101329. https://doi.org/10.1016/j.ecmx.2025.101329

Beckmann, S. (2023). Teaching Mammalogy online: Lessons learned from the COVID-19 pandemic and their application to the future. *Journal of Mammalogy*, *104*(4), 667–674. https://doi.org/10.1093/jmammal/gyad020

Cardozo-Gaibisso, L. (2024). Pedagogies for Equitable Access: Reimagining Multilingual Education for an Uncertain World. Dalam *Pedagogies for Equitable Access Reimagining Multilingual Education for an Uncertain World* (hlm. 123). https://doi.org/10.1108/979-8-88730-746-6

Conti, L. (2025). Intercultural education: Recalibrating meanings, objectives, and practices. *Intercultural Education*, *36*(4), 418–436. https://doi.org/10.1080/14675986.2025.2484514

Conway, B. (2023). Human-Centred AI Education in Upper-Second Level: Towards a PRIMM-esque pedagogy for CT 2.0. *ACM International Conference Proceeding Series*, (Query date: 2026-06-03 12:54:07), 44–44. https://doi.org/10.1145/3633083.3633092

Devasena, R. (2025). Pedagogy-Driven Digital Integration in English Language Teaching: A Holistic Approach. *Aip Conference Proceedings*, *3270*(1). https://doi.org/10.1063/5.0262835

Devraj, R. (2025). Bridging the Digital Divide: The Importance of Techquity in Pharmacy Education. *American Journal of Pharmaceutical Education*, *89*(4). https://doi.org/10.1016/j.ajpe.2025.101380

Friginal, E. (2025). Technology and Language Learning: Effective Podcasting and Video-Based Language Teaching Practices in the Age of Generative AI. Dalam *Technology and Language Learning Effective Podcasting and Video Based Language Teaching Practices in the Age of Generative AI* (hlm. 211). https://doi.org/10.4324/9781003200727

García-Pastor, M. D. (2026). EFL Student-Teachers' Emotional Engagement in an Afterschool Asynchronous Digital Storytelling Task. *Education Sciences*, *16*(2). https://doi.org/10.3390/educsci16020224

Gong, Q. (2025). Integrating Blended Learning and Task-Based Language Teaching in EFL: A Systematic Review. *Forum for Linguistic Studies*, *7*(5), 899–915. https://doi.org/10.30564/fls.v7i5.9591

Haddam-Bouabdallah, F. (2023). Digital Classroom Mise en Scène during Covid-19 Era: The case of Tlemcen University, Algeria. *International Conference on Multidisciplinary Research*, *2022*(Query date: 2026-06-03 12:35:45), 12–22. https://doi.org/10.26803/MyRes.2022.02

Islam, J. (2025). Impact of Flipped Classroom Implementation on ESL Teaching Effectiveness in Bangladeshi Secondary Schools. *International Research Journal of Multidisciplinary Scope*, *6*(4), 607–616. https://doi.org/10.47857/irjms.2025.v06i04.06967

Jurado, V. V. O. (2025). CLIL Online: Improving Students' Comprehension and Interaction Skills. *Forum for Linguistic Studies*, *7*(5), 45–54. https://doi.org/10.30564/fls.v7i5.9351

Kumari, K. G. B. S. (2025). The Algorithmic Adjuvant: Synthesizing Human Pedagogy and Artificial Intelligence in the Modern ESL Classroom with Insights from Uzbekistan. *Architecture Image Studies*, *6*(3), 246–252. https://doi.org/10.62754/ais.v6i3.217

Liu, L. (2026). Adaptive Learning Platforms in English Education: Enhancing Comprehensive Skills and Social Interaction in the Digital Classroom. *European Journal of Social Science Education and Research*, *13*(1), 203–225. https://doi.org/10.26417/xscbj161

Lo, N. P. k. (2023). To Learn or Not to Learn: Perceptions Towards Continuing Professional Development (CPD) and Self-identity Among English Language Teachers During the COVID-19 Pandemic. *SN Computer Science*, *4*(3). https://doi.org/10.1007/s42979-023-01779-0

Nguyen, Q. N. (2025). Measuring Digital Competence for EFL Education in Vietnam. *Technology and Language*, *6*(3), 152–180. https://doi.org/10.48417/technolang.2025.03.12

Paterson, K. (2023). Machine translation in higher education: Perceptions, policy, and pedagogy. *Tesol Journal*, *14*(2). https://doi.org/10.1002/tesj.690

Pitychoutis, K. M. (2024). Harnessing AI Chatbots for EFL Essay Writing: A Paradigm Shift in Language Pedagogy. *Arab World English Journal*, *2024*(Query date: 2026-06-03 12:35:45), 197–209. https://doi.org/10.24093/awej/ChatGPT.13

Shang, X. (2025). Mapping the integration of gamification into foreign language learning in E-learning settings: A bibliometric analysis. *Results in Engineering*, *28*, 108452. https://doi.org/10.1016/j.rineng.2025.108452

Slamet, J. (2025). Post-Humanist Pedagogies in E-Learning for English Language Teaching: Insights from Indonesian Doctorate Students. *Language Related Research*, *16*(5), 125–159. https://doi.org/10.48311/LRR.16.5.5

Susanti, A. (2025). Dialogic feedback in English Language Teaching (ELT): Modalities, outcomes, and research trends. *English Language Teaching Educational Journal*, *8*(1), 37–53. https://doi.org/10.12928/eltej.v8i1.14057

Tebourbi, H., Nouzri, S., Mualla, Y., & Abbas-Turki, A. (2025). Artificial Intelligence Agents for Personalized Adaptive Learning. *20th International Conference on Future Networks and Communications/ 22nd International Conference on Mobile Systems and Pervasive Computing/15th International Conference on Sustainable Energy Information Technology (FNC/MobiSPC/SEIT 2025)*, *265*, 252–259. https://doi.org/10.1016/j.procs.2025.07.179

Wang, X. (2025). Investigating the Relationship Between Self-Regulated Writing Strategies and Academic Writing Performance. *Arab World English Journal*, *16*(3), 345–358. https://doi.org/10.24093/awej/vol16no3.21

Wiseman, D., & Foster, D. (2025). Bridging AI with cost accounting education: A pedagogical framework using reperformance and critical error review. *Journal of Accounting Education*, *72*, 100988. https://doi.org/10.1016/j.jaccedu.2025.100988

Wu, D., Chen, M., Chen, X., & Liu, X. (2024). Analyzing K-12 AI education: A large language model study of classroom instruction on learning theories, pedagogy, tools, and AI literacy. *Computers and Education: Artificial Intelligence*, *7*, 100295. https://doi.org/10.1016/j.caeai.2024.100295

Xia, M., & Guo, S. (2025). Understanding learners' perceptions of artificial intelligence-mediated Informal Digital Learning of English: A Q methodology approach. *Acta Psychologica*, *261*, 105980. https://doi.org/10.1016/j.actpsy.2025.105980

Xiong, M., & Teo, T. (2025). Unveiling the effects of GenAI on motivation of learning English as a second/foreign language: Evidence from meta-analysis. *Educational Research Review*, *49*, 100744. https://doi.org/10.1016/j.edurev.2025.100744

Xu, X., Liu, S., Zhu, L., Long, Y., Zeng, Y., Lu, X., Li, J., & Dong, Y. (2025). Development and evaluation of a retrieval-augmented large language model framework for enhancing endodontic education. *International Journal of Medical Informatics*, *203*, 106006. https://doi.org/10.1016/j.ijmedinf.2025.106006

Yang, S., Shi, M., Qian, Y., Hu, T., Huang, Z., Wang, S., & Zhu, Z. (2026). A large language model-powered reflective AI agent for evidence-based nursing education: Design and evaluation. *Nurse Education in Practice*, *91*, 104710. https://doi.org/10.1016/j.nepr.2026.104710

Yu, B. (2026). A systematic review of digital storytelling in English language learning and teaching. *Educational Studies*, (Query date: 2026-06-03 12:35:45). https://doi.org/10.1080/03055698.2026.2648654

Zaim, M., Arsyad, S., Waluyo, B., Ardi, H., Al Hafizh, Muhd., Zakiyah, M., Syafitri, W., Nusi, A., & Hardiah, M. (2024). AI-powered EFL pedagogy: Integrating generative AI into university teaching preparation through UTAUT and activity theory. *Computers and Education: Artificial Intelligence*, *7*, 100335. https://doi.org/10.1016/j.caeai.2024.100335

Zhang, Q. (2025). Active language learning strategies in Chinese university English education: Effects on proficiency, motivation, and teacher engagement. *Acta Psychologica*, *261*, 105914. https://doi.org/10.1016/j.actpsy.2025.105914