

ENHANCING STUDENTS' MOTIVATION IN ENGLISH LEARNING THROUGH DEEP LEARNING, TEACHER SELF-EFFICACY, AND AI-BASED INSTRUCTION

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ABSTRACT

This study aimed to explore the integration of a deep learning-based pedagogical approach, teacher self-efficacy, and AI-based instructional media in enhancing students' motivation in learning English at SMA Muhammadiyah 1 Temanggung. The study investigated how innovative teaching approaches, teachers' confidence in their instructional abilities, and the integration of artificial intelligence in classroom practices contribute to creating a more engaging, interactive, and student-centered learning environment. The topic was considered important because students' motivation has become a major challenge in English language learning, particularly in technology-mediated classrooms and non-urban educational settings where learning resources and instructional innovation may still be limited. This research employed a qualitative approach, data were collected through interviews, classroom observations, and focus group discussions involving English teachers and students at SMA Muhammadiyah 1 Temanggung. The collected data were analysed thematically to identify recurring patterns, meanings, and experiences related to students' motivation in learning English. This study was expected to contribute to the development of more effective, student-centered, and technology-enhanced instructional practices in English language teaching. The findings of this study were also expected to support teachers and educational institutions in developing more adaptive and motivating learning environments for students in the digital era.

Keywords: AI-Based Instructional Media, Deep Learning Approach, English Language Learning, Learning Motivation, Teacher Self-Efficacy

INTRODUCTION

English language learning plays an important role in preparing students to face the challenges of globalization and digital transformation. In English as a Foreign Language (EFL) contexts such as Indonesia, English proficiency is closely associated with communication skills, access to knowledge, and future academic opportunities (UNESCO, 2022). However, despite continuous educational reforms, English learning outcomes among Indonesian students remain relatively low, particularly in terms of learning motivation, participation, and communicative competence (OECD, 2023). Many students still experience difficulties in actively engaging in classroom activities and using English confidently in real

communication contexts (Lee & Hsieh, 2019; Namaziandost et al., 2024). This condition indicates that English language instruction in many schools has not fully addressed students' learning needs in the digital era (Lee, 2022; Mulyono & Saskia, 2021).

One major challenge is that English instruction is still frequently dominated by teacher-centered practices that emphasize memorization rather than meaningful understanding and active participation. Such instructional practices often limit students' opportunities to think critically, interact collaboratively, and develop confidence in using English communicatively (Akram, 2020; Dörnyei, 2021). This issue becomes more evident in non-urban educational settings where access to learning resources and technology integration remains limited (Li, 2023; Liang, 2023). Similar conditions were identified at SMA Muhammadiyah 1 Temanggung, where English learning activities still relied largely on conventional instructional approaches. Although the school has adequate institutional support, the integration of technology-based learning media, particularly AI-supported instructional tools, has not been implemented optimally due to limited teacher readiness and the absence of a structured instructional framework.

Learning motivation is widely recognized as one of the most important factors influencing students' engagement and academic achievement. According to Ryan & Deci (2020), students are more motivated when learning environments support autonomy, competence, and meaningful social interaction. Therefore, improving students' motivation requires not only effective instructional strategies but also supportive learning environments that encourage active participation and meaningful engagement (Vo & Ho, 2024). In this context, deep learning pedagogy has emerged as a promising approach because it emphasizes critical thinking, meaningful understanding, reflection, and active knowledge construction rather than rote memorization (Biggs & Tang, 2021). Through deep learning activities, students are encouraged to connect learning materials with authentic experiences and participate actively in the learning process (Fawzia & Karim, 2024).

Besides pedagogical approaches, teacher-related factors also influence the effectiveness of classroom learning. One important factor is teacher self-efficacy, which refers to teachers' beliefs in their ability to organize and implement effective instructional practices (Bandura, 1997). Teachers with strong self-efficacy are generally more confident in adopting innovative teaching strategies, integrating technology, and creating supportive classroom environments. Previous studies have shown that teacher self-efficacy positively affects students' motivation, engagement, and learning achievement (Jerrim, 2021). In addition, the rapid development of artificial intelligence (AI) has introduced new opportunities for creating more adaptive and interactive learning environments. AI-based instructional media can provide personalized feedback, flexible learning support, and more engaging learning experiences for students (Huang et al., 2023). Tools such as ChatGPT have also been increasingly used to support English language learning through interactive communication and independent practice activities (Liu & Ma, 2024).

Although studies on deep learning pedagogy, teacher self-efficacy, and AI-based instructional media have increased in recent years, most previous research has examined these variables separately. Existing studies tend to focus only on technological factors, pedagogical approaches, or teacher-related variables independently, resulting in limited

understanding of how these dimensions interact within actual classroom practices (Chiu et al., 2024; Lin et al., 2023). In addition, research examining the integration of these three dimensions in English language learning, particularly in non-urban secondary school contexts, remains limited (AlTwijri & Alghizzi, 2024). This gap suggests the need for a more comprehensive investigation into how pedagogical approaches, teacher psychological readiness, and AI-supported instructional media work together in influencing students' motivation to learn English.

Therefore, this study aims to examine the integration of deep learning pedagogy, teacher self-efficacy, and AI-based instructional media in enhancing students' motivation in learning English. This study specifically investigates how these dimensions interact within English learning practices at SMA Muhammadiyah 1 Temanggung. The significance of this research lies in its attempt to provide a more integrated understanding of students' motivation by combining pedagogical, psychological, and technological perspectives within a single framework. Unlike previous studies that focused on these variables separately, this research explores their interconnected roles in supporting more meaningful and technology-enhanced English learning environments. The findings of this study are expected to contribute both theoretically and practically to the development of more student-centered and digitally relevant English language learning practices.

METHODS

This study employed a qualitative case study design to explore how deep learning pedagogy, teacher self-efficacy, and AI-based instructional media influenced students' motivation in learning English. A qualitative approach was considered appropriate because the study aimed to understand participants' experiences, perceptions, and classroom interactions in depth rather than measure relationships statistically (Creswell & Poth, 2018). The case study design enabled the researcher to investigate the learning process within its real educational context, particularly the implementation of AI-supported English learning activities at SMA Muhammadiyah 1 Temanggung (Yin, 2018). To maintain methodological consistency, this study focused entirely on qualitative exploration and interpretation throughout the research process.

The participants of this study consisted of 32 eleventh-grade students and two English teachers from SMA Muhammadiyah 1 Temanggung. The participants were selected using purposive sampling because they were directly involved in English learning activities that integrated AI-based instructional media and deep learning practices (Patton, 2015). The students ranged from 16 to 17 years old and had varying levels of English proficiency and digital literacy. Meanwhile, the participating teachers had experience teaching English using technology-supported instructional strategies. The inclusion of both students and teachers allowed the researcher to obtain more comprehensive perspectives regarding classroom interaction, learning motivation, and instructional implementation.

The data collection process was conducted over approximately eight weeks during the second semester of the 2025/2026 academic year. Several qualitative data collection techniques were employed to obtain rich and in-depth information. First, semi-structured interviews were conducted with 12 selected students and the two English teachers. Each

interview lasted approximately 30–45 minutes and was conducted in Indonesian to ensure participants could express their opinions and experiences comfortably. The interview questions focused on students' learning motivation, experiences with AI-based instructional media, classroom engagement, and teachers' perceptions of their self-efficacy in implementing technology-supported learning activities. Follow-up questions were also asked to explore participants' responses in greater depth.

Second, classroom observations were carried out during English learning activities involving deep learning tasks and AI-supported instructional media. A total of six classroom observation sessions were conducted, with each session lasting approximately 90 minutes. During the observations, the researcher focused on students' participation, interaction patterns, collaborative activities, classroom engagement, and teachers' instructional practices. Particular attention was given to how teachers facilitated meaningful learning activities and how students responded to the use of AI-based instructional media during the learning process. Field notes were written immediately after each observation session to document important classroom events and interactions in detail.

Third, document analysis was conducted to support data triangulation and provide additional contextual information. The analyzed documents included lesson plans, students' reflective learning notes, classroom assignments, and learning outputs generated through AI-supported instructional activities. These documents helped the researcher better understand how instructional activities were designed and how students engaged with learning tasks both inside and outside the classroom.

The collected data were analyzed using thematic analysis following Braun & Clarke (2021) framework. The analysis process involved several interconnected stages. First, all interview recordings were transcribed verbatim, while observation notes and documents were carefully organized for analysis. Second, the researcher repeatedly read the data to gain familiarity and identify meaningful patterns related to students' motivation, teacher self-efficacy, deep learning activities, and AI-supported learning experiences. Third, initial codes were generated manually by highlighting recurring ideas, behaviors, and participant responses. Similar codes were then grouped into broader categories to develop potential themes. After that, the themes were reviewed, refined, and interpreted to ensure that they accurately represented participants' experiences and the overall research focus. Finally, the researcher interpreted the relationships among themes to explain how pedagogical approaches, teacher factors, and AI-based instructional media influenced students' motivation in learning English.

Several strategies were applied to ensure the trustworthiness and credibility of the findings. First, data triangulation was conducted by comparing information obtained from interviews, classroom observations, and document analysis. Second, member checking was employed by sharing summaries of interview interpretations with participants to confirm the accuracy of the researcher's interpretation. Third, peer debriefing was conducted with academic colleagues to review the coding process and thematic interpretation. In addition, thick description was used throughout the study to provide detailed explanations of classroom contexts, participant experiences, and instructional practices, enabling readers to understand the findings more comprehensively.

Ethical considerations were carefully maintained throughout the research process. Before data collection, all participants received clear explanations regarding the research objectives, procedures, and their rights as participants. Participation in the study was voluntary, and informed consent was obtained from both teachers and students prior to the study. Participants' identities were kept confidential through the use of pseudonyms, and all collected data were stored securely and used solely for academic purposes.

Overall, this qualitative case study provides a contextual understanding of how deep learning pedagogy, teacher self-efficacy, and AI-based instructional media interact in shaping students' motivation in English learning. By focusing on participants' experiences and classroom practices, this study offers deeper insights into technology-supported English learning that may not be fully captured through quantitative measurement alone.

RESULTS

Overview of Research Findings

This study explored how deep learning pedagogy, teacher self-efficacy, and AI-based instructional media influenced students' motivation in learning English at SMA Muhammadiyah 1 Temanggung. The findings were obtained through semi-structured interviews, classroom observations, and document analysis conducted over eight weeks. The thematic analysis revealed five major themes: (1) students' motivation in interactive learning environments, (2) meaningful learning experiences through deep learning activities, (3) teacher self-efficacy in technology-supported instruction, (4) the role of AI-based instructional media in supporting engagement and independent learning, and (5) challenges in implementing AI-supported English learning.

Overall, the findings showed that students were more motivated when learning activities were interactive, collaborative, technology-supported, and connected to real-life experiences. Students also responded positively to teachers who demonstrated confidence in facilitating classroom interaction and integrating AI-based instructional tools into learning activities.

Students' Motivation in Interactive Learning Environments

Interview findings revealed that students demonstrated different forms of motivation in learning English, including intrinsic motivation, extrinsic motivation, and amotivation. However, most students reported that their motivation increased when classroom activities were interactive and involved active participation. One student explained: "I enjoy English lessons more when we have discussions and group activities because I can share ideas with my friends and learn together."

Another student stated: "Usually I feel nervous speaking English, but when the class uses interactive activities and digital tools, I become more confident."

Several students also mentioned that technology-supported learning activities reduced boredom and made English learning feel more enjoyable compared to conventional lecture-based instruction.

Classroom observations supported these interview findings. During collaborative learning activities, students appeared more enthusiastic and actively participated in

classroom discussions. Many students voluntarily asked questions, responded to peers' opinions, and completed tasks collaboratively without direct prompting from the teacher. In contrast, students appeared less responsive during teacher-centered instructional sessions where classroom interaction was limited.

Observation notes also showed that students demonstrated greater emotional engagement during interactive learning activities. Students smiled, laughed, and communicated more frequently with peers when participating in group discussions and AI-supported learning tasks. These findings indicate that interactive and student-centered learning environments contributed positively to students' motivation and classroom participation.

Meaningful Learning Experiences through Deep Learning Activities

The findings showed that the implementation of deep learning activities encouraged students to engage more meaningfully with English learning materials. Students explained that learning activities became easier to understand when they were connected to authentic situations and required active participation rather than memorization.

One student commented: "I understand the lesson better when the teacher asks us to discuss real-life topics instead of only reading from the textbook." Another participant stated: "The activities make us think more deeply, not just memorize vocabulary or grammar."

During classroom observations, students were seen participating actively in reflective discussions, collaborative problem-solving tasks, and presentation activities. Students often related lesson topics to personal experiences and expressed opinions critically during classroom interaction. In several sessions, students worked collaboratively to analyze texts, solve communicative tasks, and generate responses using AI-supported learning tools.

Document analysis further demonstrated that students produced more reflective and elaborative responses during assignments involving deep learning activities. Students' reflective notes showed that they were able to connect classroom materials with daily experiences and future learning goals.

These findings suggest that deep learning activities supported students' cognitive engagement and encouraged more meaningful participation in English learning. Students appeared more motivated when they were given opportunities to think critically, express opinions, and connect learning materials to authentic contexts.

Teacher Self-Efficacy in Technology-Supported Instruction

Another important theme emerging from the data was the role of teacher self-efficacy in shaping classroom interaction and learning motivation. Interview findings indicated that students perceived confident teachers as more supportive, adaptive, and engaging during learning activities.

One student explained: "When the teacher looks confident using technology, the class feels more organized and interesting." Another student stated: "Our teacher always encourages us to participate, so we feel less afraid of making mistakes."

The participating teachers also acknowledged that confidence in using technology influenced how they designed and implemented classroom activities. One teacher commented: "At first, I was not fully confident using AI-based applications in class, but after practicing several times, I became more comfortable and could involve students more actively."

Classroom observations showed that teachers with stronger confidence in technology integration tended to use more varied instructional strategies, including collaborative discussion, digital quizzes, reflective activities, and AI-assisted learning tasks. These teachers also appeared more flexible in responding to students' questions and managing classroom interaction during technology-supported activities.

In contrast, moments of uncertainty occasionally occurred when technical problems emerged during classroom activities. In several observation sessions, interruptions related to internet connectivity and unfamiliarity with certain applications affected the flow of classroom interaction. However, teachers who demonstrated stronger self-efficacy were generally able to adapt more effectively and maintain students' participation during these situations.

These findings indicate that teacher self-efficacy influenced not only instructional practices but also students' confidence and classroom engagement during English learning activities.

The Role of AI-Based Instructional Media in Supporting Engagement and Independent Learning

The findings further revealed that AI-based instructional media contributed positively to students' learning experiences. Students reported that AI-supported tools helped them practice English more independently and receive immediate feedback during learning activities.

One student stated: "Using ChatGPT helps me practice English without feeling embarrassed because I can learn step by step." Another participant explained: "AI applications make learning more interesting because we can get quick feedback and try different answers."

Several students also mentioned that AI-supported learning activities allowed them to study at their own pace. Some students felt less anxious when practicing English through digital platforms compared to speaking directly in front of classmates.

Classroom observations demonstrated that students became more actively involved during AI-supported activities. During several sessions, students used AI-based applications to generate ideas, check vocabulary usage, revise writing tasks, and practice conversational English. Students appeared more focused and enthusiastic when using interactive digital tools compared to conventional worksheet-based activities.

Document analysis also showed that assignments completed through AI-supported activities tended to contain more detailed responses and greater language experimentation. Students appeared more willing to revise and improve their work after receiving feedback from AI-supported platforms.

However, several challenges were also identified. Some students experienced difficulties related to unstable internet access and limited digital devices. Differences in digital literacy also affected students' ability to use AI-based instructional media effectively. A few students occasionally relied too heavily on AI-generated responses without fully understanding the learning content.

Despite these challenges, most participants viewed AI-based instructional media positively and considered it helpful in supporting more flexible, engaging, and independent English learning experiences.

Challenges in Implementing AI-Supported English Learning

Although the findings generally showed positive learning experiences, several implementation challenges emerged throughout the study. One of the main challenges involved technological limitations, particularly internet connectivity and unequal access to digital devices.

One student explained: "Sometimes the internet connection becomes slow, so it is difficult to use the applications during class." Teachers also acknowledged difficulties related to technology integration. One teacher stated: "Not all students have the same digital skills, so sometimes additional guidance is needed before using AI tools."

Classroom observations revealed that technical interruptions occasionally reduced classroom efficiency and distracted students during learning activities. In some cases, teachers needed additional time to explain how to use certain applications before instructional activities could continue effectively.

Another challenge involved students' varying levels of self-confidence and digital literacy. Some students adapted quickly to AI-supported learning environments, while others required more support and encouragement during classroom activities.

These findings suggest that successful implementation of AI-supported English learning requires not only technological availability but also sufficient teacher preparation, digital literacy support, and adequate educational infrastructure.

DISCUSSION

Motivation was strengthened when interactive pedagogy was combined with AI-supported learning environments and teachers' instructional confidence. Another important finding concerns the implementation of deep learning pedagogy in English classrooms. The results suggest that students became more motivated when learning activities encouraged critical thinking, reflection, and meaningful understanding instead of memorization-oriented instruction. Students appeared to engage more deeply with learning materials when they were asked to connect lesson content with personal experiences and real-life situations. This finding supports Biggs & Tang (2021) argument that deep learning occurs when learners actively construct understanding and apply knowledge meaningfully across contexts.

The findings further indicate that deep learning pedagogy may contribute to stronger cognitive engagement because students are encouraged to analyse, evaluate, and interpret information actively. In conventional teacher-centered classrooms, students often focus

primarily on completing tasks and memorizing information for assessment purposes. In contrast, deep learning activities appear to create opportunities for students to develop ownership of their learning process. This may explain why students in the present study demonstrated higher participation and stronger motivation during reflective discussions, collaborative problem-solving, and AI-assisted learning activities. Therefore, the findings reinforce previous studies emphasizing that meaningful learning experiences are closely associated with long-term motivation and deeper academic engagement (Alonso-Tapia et al., 2023; Lo et al., 2022). The findings of this study indicate that students' motivation in learning English was influenced by the interaction among pedagogical approaches, teacher-related factors, and technology integration. Students tended to demonstrate higher engagement when learning activities were interactive, collaborative, and connected to authentic learning contexts. This finding suggests that students are more motivated when they are positioned as active participants in the learning process rather than passive recipients of information. From the perspective of Self-Determination Theory, these conditions support students' needs for autonomy, competence, and relatedness, which are essential for sustaining learning motivation (Ryan & Deci, 2020).

The findings also demonstrate that interactive classroom activities contributed not only to behavioural engagement but also to emotional and cognitive engagement. Students became more willing to express opinions, participate in discussions, and collaborate with peers when learning environments felt supportive and less intimidating. This may explain why students showed more positive attitudes toward English learning during collaborative and technology-supported activities. These findings are consistent with previous studies reporting that student-centered learning environments positively influence motivation, engagement, and language learning participation (Han et al., 2021; Huang et al., 2022). However, the present study extends previous research by showing that

Teacher self-efficacy also emerged as a significant factor influencing students' learning experiences and classroom motivation. The findings revealed that teachers who demonstrated stronger confidence in managing instruction and integrating technology tended to create more supportive and engaging classroom environments. Confident teachers appeared more willing to experiment with innovative teaching strategies, facilitate interaction, and encourage student participation. This finding aligns with Bandura (1997) theory, which explains that individuals' beliefs about their capabilities influence their behaviour, persistence, and performance.

The present study further suggests that teacher self-efficacy plays an important mediating role in technology-supported learning environments. Although AI-based instructional media provided various learning opportunities, the effectiveness of these tools depended largely on how teachers implemented and facilitated classroom activities. Teachers with stronger self-efficacy appeared more capable of adapting technology to students' learning needs and managing classroom interaction effectively. In contrast, lower confidence in technology integration sometimes resulted in more limited instructional practices and reduced classroom interaction. This finding supports previous research indicating that teacher self-efficacy significantly influences technology integration, instructional quality, and student outcomes (Lazarides & Warner, 2020; Zeng et al., 2022).

However, this study contributes additional insight by demonstrating how teacher self-efficacy interacts with AI-supported pedagogy specifically within English language learning contexts.

The findings also highlight the important role of AI-based instructional media in supporting students' motivation and independent learning. Students generally perceived AI-supported applications as helpful, flexible, and less intimidating than conventional classroom interaction. AI tools allowed students to practice English more independently, receive immediate feedback, and explore learning materials at their own pace. This may explain why many students reported feeling less anxious and more confident during English learning activities involving AI-supported media.

These findings are consistent with recent studies suggesting that artificial intelligence can create more adaptive, personalized, and learner-centered educational environments (Gligorea et al., 2023; Huang et al., 2023). However, the present study provides a more contextual understanding of how AI-based instructional media influence students' emotional engagement and confidence in non-urban secondary school settings. In particular, AI-supported learning environments appeared to reduce students' fear of making mistakes because students could practice privately before participating in classroom interaction. This finding is especially important in English language learning contexts, where speaking anxiety and fear of negative evaluation often affect students' participation and motivation.

Interestingly, the findings demonstrate that deep learning pedagogy, teacher self-efficacy, and AI-based instructional media should not be viewed as separate variables operating independently. Instead, these elements appeared to complement and strengthen one another during the learning process. Deep learning pedagogy provided meaningful learning experiences, teacher self-efficacy supported effective instructional implementation, and AI-based media increased flexibility and learning engagement. The interaction among these elements created a more supportive and student-centered learning environment that encouraged active participation and sustained motivation.

This integrated perspective represents one of the main contributions of the study. Previous studies have often examined AI integration, teacher self-efficacy, or learning motivation separately. In contrast, the present study demonstrates that students' motivation is shaped by the interaction among pedagogical, psychological, and technological dimensions simultaneously. This finding suggests that improving learning motivation in the digital era requires a more holistic instructional approach rather than focusing exclusively on technology adoption or isolated teaching strategies.

Despite the positive findings, several challenges emerged during the implementation process. Technological limitations, unequal digital literacy, and inconsistent internet access affected the effectiveness of AI-supported learning activities. Some students required additional guidance when using digital tools, while some teachers initially experienced uncertainty in integrating AI-based applications into classroom instruction. These challenges indicate that successful implementation of technology-enhanced learning requires adequate infrastructure, continuous professional development, and institutional support.

The findings also carry several pedagogical implications. First, English teachers should prioritize interactive and meaningful learning activities that encourage active student participation and critical thinking. Second, teacher training programs should not focus solely on technical skills but also strengthen teachers' confidence and readiness to integrate technology effectively into classroom instruction. Third, AI-based instructional media should be used strategically to support personalized learning, classroom interaction, and independent language practice rather than merely replacing conventional instructional activities.

Overall, this study highlights that students' motivation in learning English can be strengthened through the integration of meaningful pedagogy, teacher confidence, and technology-supported learning environments. The findings contribute to the growing discussion on AI integration in education by emphasizing that technological innovation alone is insufficient without supportive pedagogy and confident teachers. Therefore, creating engaging and motivating English learning environments requires a balanced integration of pedagogical, psychological, and technological dimensions that respond to students' learning needs in the digital era.

CONCLUSION

This study demonstrates that the integration of deep learning pedagogy, teacher self-efficacy, and AI-based instructional media positively influences students' motivation in learning English. The findings indicate that students become more motivated when learning activities are meaningful, interactive, and supported by technology that encourages active participation and independent learning. The study also reveals that teacher self-efficacy plays an important role in determining the effectiveness of technology integration and classroom engagement.

The findings further suggest that students' motivation is shaped not by a single factor, but by the interaction among pedagogical, psychological, and technological dimensions within the learning environment. Deep learning activities encouraged students to think critically and engage more actively in the learning process, while AI-based instructional media created more flexible and personalized learning experiences. At the same time, confident teachers were more capable of facilitating interactive and technology-supported instruction effectively.

This study contributes to the growing literature on English language learning in the digital era by proposing an integrated perspective that combines deep learning pedagogy, teacher self-efficacy, and AI-based instructional media within a single framework. The findings also provide practical implications for teachers and educational institutions, particularly the importance of designing student-centered learning environments, strengthening teachers' technological confidence, and providing adequate support for technology integration in classrooms.

Despite these contributions, this study has several limitations. The research was conducted within a single school context and involved a limited number of participants, which may affect the generalizability of the findings. In addition, differences in students'

digital literacy and access to technology may have influenced the implementation of AI-supported learning activities.

Therefore, future research is recommended to involve broader educational settings, larger participant groups, and different levels of education to obtain more comprehensive findings. Further studies may also explore the long-term impact of AI-supported pedagogy on students' motivation, language proficiency, and independent learning development.

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