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Artificial Intelligence as a Motivational Tool in English as a Second Language Learning: A Self-Determination Theory Perspective

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ABSTRACT

The study examines the concept of Artificial Intelligence (AI) as a motivational tool in English as a Second Language (ESL) learning, and its conceptualization within the framework of Self-Determination Theory (SDT). Language Pedagogy AI applications, such as Duolingo, Grammarly, and ChatGPT, are increasingly becoming part of language learning, making adaptive practice, personalized feedback, and interactive simulations affordable. Although widely used, there are limited empirical studies on the effects of using such tools on learners' motivation in terms of autonomy, competence, and relatedness. The study used a mixed-method design and enrolled 120 undergraduate ESL students in an eight-week intervention. Motivation was operationalized through the use of the Language Learning Orientations Scale (LLOS) and complemented by semi-structured interviews and focus groups. Quantitative analysis revealed that the increase in overall motivation was statistically significant ($t(119) = 5.24$, $p < .001$, Cohen's $d = 0.65$). Additionally, there was a strong increase in autonomy and competence, but the corresponding relatedness did not change. These results were supported by qualitative data, which showed that participants enjoyed flexibility, self-pacing, and corrective feedback; however, they also stated that AI interactions were not authentic and lacked depth. The fact that both quantitative and qualitative data point towards a similar conclusion suggests that AI will foster autonomy and competence but will fail to promote relatedness as a key SDT concept. Therefore, this research finds that AI can be best utilized as an additional motivational tool in the context of blended learning, where interactions with the teacher and other learners provide the necessary social support.

Keywords: *Artificial Intelligence (AI); English as a Second Language (ESL); Self-Determination Theory (SDT); Motivation; Autonomy; Competence; Relatedness; Duolingo; Grammarly; ChatGPT; Mixed-Methods Research*

INTRODUCTION

AI has become one of the most radical agents in education, changing how students access, process, and interact with knowledge. AI-driven applications, such as Duolingo, Grammarly, and ChatGPT, are gaining popularity in language education, where they aim to support second language learners with adaptive practice, personalized feedback, and interactive conversation simulations (Godwin-Jones, 2022).

These technological advances not only provide learners with the opportunity to learn on a large scale and flexibly but also pose critical questions regarding their motivational influence on language acquisition.

Motivation has consistently been identified as one of the most significant issues in the process of second language acquisition (SLA) (Dörnyei and Ushioda, 2021). Self-Determination Theory (SDT) is one of the most recent schools of thought followed in the motivation of the learners within the scope of the motivational theories on the assumption that the motivation of the learners could be the most viable provided that three key psychological needs were met, i.e., namely, autonomy, competence, and relatedness (Ryan and Deci, 2020). Although the available literature indicates that AI can support autonomy (self-paced, personalized learning) and competence (soliciting corrective feedback on the spot) needs, the contribution of AI to address the relatedness needs of learners is less evident (Zhang and Hyland, 2022; Xu, 2023). In addition, a significant portion of the existing literature is either descriptive or specialized in technological affordances, and time-limited empirical studies of motivation processes related to how AI affects learners' involvement in English as a Second Language (ESL).

Problem Statement

Even though AI-based tools are becoming more and more a part of ESL learning settings, there is a research gap in how these tools impact the learner as a motivator within the SDT model. The literature highlights the potential of AI to develop learner autonomy and competence (Li, 2022; Xu, 2023); however, the concept of fostering relatedness and holistic motivational quality remains understudied (Lin & Warschauer, 2023). Additionally, few studies have systematically integrated quantitative variables of motivation with qualitative information about learners' experiences, resulting in a fragmented understanding of the role of AI as a motivational tool in SLA.

Thus, the main issue this study explores is as follows: How does the use of AI-powered tools affect the motivation of ESL learners, specifically their autonomy, competence, and relatedness, within the framework of Self-Determination Theory? By bridging this gap, the study aims to provide empirical evidence on whether AI can be considered a sustainable motivational resource in ESL.

Research Objectives

1. To investigate the general effect of AI-based products (e.g., Duolingo, Grammarly, ChatGPT) on the motivation of ESL learners.

2. To explore the effect of AI tool integration on the autonomy, competence, and relatedness of learners in line with Self-Determination theory (SDT).

3. To describe the perceptions and attitudes of ESL learners toward AI tools as motivational aids in language learning.

4. To make comparisons and syntheses of the results based on the quantitative studies and the qualitative shifts aimed at revealing the points of convergence and differences between the motivational effects of AI tools among ESL students.

Research Questions

1. To what extent does the use of AI-based tools (e.g., Duolingo, Grammarly, and ChatGPT) influence ESL learners' overall motivation?

2. How does the integration of AI tools in ESL learning affect learners' sense of autonomy, competence, and relatedness as defined by Self-Determination Theory?

3. What are ESL learners' perceptions of AI tools as motivational supports in their language learning process?

4. How do quantitative measures of motivation compare with qualitative insights from learner interviews and focus groups regarding the motivational impact of AI?

Research Hypotheses

H1: ESL students working with AI-based instruments are going to show a considerable improvement in the overall motivation scores.

LITERATURE REVIEW

The application of Artificial Intelligence (AI) to language teaching has gained popularity in recent years, bringing adaptive learning systems, automated feedback, and chatbots that present learners with personalized learning experiences. The potential of AI-based applications such as Duolingo, Grammarly, and ChatGPT to provide instant corrective feedback and tailored learning opportunities can increase learner engagement and efficiency (Godwin-Jones, 2022). Recent articles have highlighted the growing significance of AI in revolutionizing second language acquisition (SLA), and the system may be democratized to provide scalable and flexible support to learners worldwide (Lin and Warschauer, 2023). However, researchers caution that AI is currently incapable of addressing the linguistic, affective, and social aspects of learning (Li, 2022).

Motivation and Self-Determination Theory in SLA

The focus of language learning is motivation, and Self-Determination Theory (SDT) has been widely adopted to understand the role of learners' psychological needs in affecting persistence and success. SDT is a program asserting that three fundamental needs, namely autonomy, competence, and relatedness, are the determinants of the quality of motivation (Ryan and Deci, 2020). Noels et al. (2000) in SLA provided one of the early empirical demonstrations of SDT, showing that learners' motivational orientations have a direct relationship with effort and proficiency. Recent studies (Ogas-Baldwin and Fryer, 2020) have found that providing learners with an environment that promotes their sense of autonomy and competence can be beneficial for instructional design, ultimately enhancing the quality of motivation.

AI and Learner Autonomy

The concept of autonomy in language learning refers to learners having the capacity to guide their own learning process, make informed choices, and participate in the learning process at their own pace. AI tools have been shown to be particularly effective in promoting autonomy through personalized feedback and adaptive learning pathways. Xu (2023) found that language learning with the aid of AI enhanced learners' sense of control over their learning process, as it facilitated self-regulation and goal setting. On the same note, AI applications on mobile phones have also been found to enhance learners' autonomy in acquiring vocabulary and mastering the art of writing (Li, 2022).

AI and Learner Competence

Competence is connected to learners' perceptions of their ability to achieve the learning goals. AI tools are helpful in that they provide customized, quick feedback, thereby enhancing skill development. Zhang and Hyland (2022) found that students appreciated AI-generated comments for being clear and timely, and that their confidence in academic writing increased. Additionally, adaptive systems like Duolingo adjust the task to the user's level of proficiency, preventing boredom and frustration, and thereby increasing competence (Godwin-Jones, 2022).

AI and Relatedness in Language Learning

Relatedness or the feeling of social connection is the need that AI is hardest to satisfy. Although AI chatbots are capable of simulating a conversation, they are sometimes not as engaging as conversing with a person. Research indicates that learners value AI as a source of practice and feedback; however, they often use teachers and peers to engage in meaningful social interactions (Zhang and Hyland, 2022). According to Lin and Warschauer (2023), AI is supposed to be combined with human-mediated processes to balance the cognitive and affective aspects of learning. This hybrid methodology ensures that the related needs of learners are addressed, while also leveraging the advantages of AI in personalization and scalability.

Conceptual Framework

Self-Determination Theory (SDT) was chosen as the theoretical framework for the paper because it suggests that fulfilling the intrinsic psychological needs of autonomy, competence, and relatedness can boost learners' motivation (Deci and Ryan, 2000; Ryan and Deci, 2020).

The implementation of AI-based tools, such as Duolingo, Grammarly, and ChatGPT, presents an exclusive opportunity to meet these requirements, thereby promoting a new level of motivation in English as a Second Language (ESL) students.

Autonomy

AI provides individual and self-directed learning. Students are free to select exercises, regulate their training level, and learn real-world materials. Adaptive algorithms ensure personalized learning, which increases students' ownership and self-direction (Reinders & Stockwell, 2022).

Competence

AI-driven platforms deliver immediate corrective feedback and trace the progress of learners. Mentioning Grammarly and Duolingo as examples, the former highlights mistakes and offers guidance on how to improve them, whereas the latter incorporates gamification to measure proficiency. These attributes add to the sense of ability and development in the minds of learners (Li, 2022).

Relatedness

As chatbots like ChatGPT are conversational AI, they can facilitate a conversation, thereby enabling learners to simulate effective communication. This aids in developing a sense of social connectedness and communicative confidence, which is also evident in technology-mediated settings (Xu et al., 2023).

The three dimensions are the mediating variables whose combination characterizes the dependent variable-ESL motivation. When supported by AI tools, autonomy, competence, and relatedness are more likely to increase the level of intrinsic motivation in learners, maintain their engagement, and improve language learning outcomes.

Figure 1 presents the conceptual framework, which represents the hypothesized relationships between AI, psychological needs (autonomy, competence, and relatedness), and motivation in ESL learning.

AI Chatbot and L2 Interaction Quality

The recent literature in education around large language models (LLMs) highlights both practice opportunities and dialogic quality constraints. Researchers also note that chatbots can offer low-stakes rehearsal, fluency practice, and on-the-fly scaffolding, which align more closely with the SDT autonomy and competence supports. However, social presence and co-regulation are weaker in chatbot interactions compared to human-human interactions (Kasneci et al., 2023). Other studies about AI in higher education also note that access and customization have been overwhelmingly positively impacted; however, they warn that affective and social needs cannot be automatically fulfilled by automation alone (Zawacki-Richter et al., 2019). In the case of ESL, this would mean that AI chat could be used as an extension of classroom communities, rather than as an alternative, which aligns with your hybrid position (Shah et al, 2025).

Feedback on Competence and Automated Writing Evaluation (AWE)

The formative benefits of accuracy and revision cycles have been demonstrated by AWE systems (e.g., the e-rater lineage of ETS; classroom-oriented AWE tools), provided learners are guided on how to interpret system feedback (Ranalli, Link, and Chukharev-Hudilainen, 2017). Learners who receive timely, specific feedback that integrates into goal-focused tasks report greater perceived competence and persistence along an SDT-consistent pathway (Shah et al., 2025). However, the researchers emphasize the importance of balancing automated feedback with teacher mediation to prevent excessive dependence and maintain self-efficacy, particularly when the writing issue is of a higher order.

Autonomous Mobile, Personalized, and Gamified Learning

Autonomy may be facilitated by mobile-assisted and adaptive systems that enable learners to select their preferred time, pace, and content pathways. The autonomy-supportive design (choice, progress tracking, and self-set goals) of tech-enhanced learning is associated with higher intrinsic motivation and performance in meta-analytic studies and large samples (Jeno, Adachi, Deci, and Vandvik, 2018). Even neutral game mechanics can enhance engagement when meaningful stimuli are linked to points and badges (e.g., spaced repetition, streaks, mastery levels), although strictly extrinsic games can cannibalize intrinsic interest unless they incorporate fewer neutral elements.

Relatedness, Social Presence, and Human Mediation

One of the few truly common findings in reviews is that AI does not satisfy the need for relatedness in most cases; learners still tend to need teacher and peer interaction to establish meaningful connections, accountability, and identity work in the L2 (Zawacki-Richter et al., 2019). Placing AI tools in communities of inquiry that purposefully create teaching presence and social presence fulfills related needs and retains the advantages of AI of autonomy and competence. This, in practice, entails designing peer feedback, teacher-directed reflection on AI-generated work, and collaborative work around AI-assisted drafting or rehearsal.

Quality of Equity, Ethics, and Motivation

Emerging discussions of generative AI in education raise concerns about access, bias, and academic integrity. When learners perceive ambiguous norms or become the subject of surveillance-pressure, the quality of motivation can change to a controlled regulation (against the SDT of autonomy support) (Kasneci et al., 2023). Clear policies, jointly created classroom norms regarding the use of AI, and clear teaching of effective and ethical prompts can reestablish autonomy and maintain identified/intrinsic motivation.

Mixed-Methods SDT Studies Measurement

Regarding quantitative elements, the scales corresponding to SDT-Basic Psychological Needs measures (autonomy, competence, and relatedness), perceived autonomy support, and L2-specific motivational scales can identify the changes that can be attributed to the integration of AI. Mixed-methods designs have strengths in terms of triangulation between surveys (AI feedback interpretation) and think-aloud protocols (AI feedback interpretation); learning diaries (self-regulation) and focus groups (social presence and relatedness tensions in AI-supported tasks). This approach helps solve the problem of a fragmented image, where numeric changes are connected to a live experience.

Summary of Literature

On the whole, it can be concluded that the literature predicts that AI can be highly effective in promoting autonomy and competence in ESL learning, yet falls short of meeting relatedness on a full scale. According to SDT, it means that, although AI may be a great motivating tool, it should be applied in a mixed setting where humans can support it. This paper expands on these findings by conducting an empirical study of the effects of AI tools on motivational aspects in ESL learning, providing both quantitative and qualitative data.

RESEARCH METHODOLOGY

The research design presented in this study employs a mixed-methods approach, combining both quantitative and qualitative methods. This design is suitable for second language acquisition (SLA) and motivation research, as it enables the measurement of motivational changes in learners and the examination of their lives (Creswell and Plano Clark, 2018). Quantitative data is used to provide statistical evidence of motivational changes, and qualitative data is used to obtain more detailed information about how AI tools can influence the perception of autonomy, competency, and relatedness in learners.

The study sample consisted of 120 undergraduate students enrolled in the English language course. Purposive sampling was used to select the sample, aiming to achieve diversity in terms of proficiency level, gender, and age. The inclusion criteria were the availability of AI-based ESL tools to the participants (e.g., Duolingo, Grammarly, or ChatGPT).

The scale of motivation used was the Language Learning Orientation Scale (LLOS), which was designed in the context of the self-determination theory (Noels, Pelletier, Clement, & Vallerand, 2000). In this tool, the intrinsic, extrinsic, and motivational orientations of learners were evaluated, which align with the concepts of autonomy, competence, and relatedness. The LLOS was also applied and extended to newer SDT-based SLA studies (Ogas-Baldwin and Fryer, 2020).

System logs (including time spent and task completion rates) and usage analytics were also utilized to monitor learners' interactions with AI applications, as suggested by recent studies on AI in education (Chen, 2022).

The semi-structured interview and focus group discussion methodologies were used to ascertain the subjective experiences of the learners. Questions centered on the effects of the AI platform on learners' sense of autonomy, competence, and relatedness during the ESL learning process.

- **Pre-test phase:** Learners took the motivation scale before the intervention.
- **Intervention stage:** During the duration of more than 8 weeks, participants used AI-based ESL applications (Duolingo to learn vocabulary and grammar, Grammarly to write better, and ChatGPT to rehearse).

- **Post-test phase**: Motivation scale was conducted once more with interviews and focus groups.
- **Triangulation:** It strengthened validity through the comparison of quantitative findings with qualitative themes (Braun and Clarke, 2021).

Paired-sample t-tests and ANOVA were used to analyze the quantitative data (motivation survey scores) in order to assess statistically significant differences in motivation. The thematic analysis of qualitative (interviews and focus groups) data was conducted based on the six-step model of Braun and Clarke (2021).

The integration of both datasets allowed the study to discover how AI tools facilitated or disrupted the three SDT needs.

RESEARCH FINDINGS

The section describes the results of the mixed-methods research on the impact of AI-based tools on the motivation of English as a Second Language (ESL) students. The results are presented in the four research questions (RQ1-RQ4) that informed the research. Both quantitative and qualitative findings are presented and combined to provide a comprehensive picture of the phenomenon.

Q1.To what extent does the use of AI-based tools (e.g., Duolingo, Grammarly, and ChatGPT) influence ESL learners' overall motivation?

The pre- and post-intervention data were subjected to a paired-samples t-test.

Table 1: Pre- and Post-Test Motivation Scores (N = 120)

Measure	M	SD	t(119)	p
Pre-test	3.42	0.58		
Post-test	3.97	0.63	5.24	<.001

Table 1 presents the descriptive statistics of the pre-test and post-test scores for overall motivation.

Quantitative Results

The analysis revealed a statistically significant increase in learners' overall motivation following the 8-week AI-assisted program. Mean motivation scores rose from M = 3.42, SD = 0.58 (pre-test) to M = 3.97, SD = 0.63 (post-test), yielding $t(119) = 5.24$, $p < .001$. The calculated effect size (Cohen's $d = 0.65$) suggests a moderate to large impact, indicating that AI tools had a meaningful practical effect on learners' motivational levels.

Interpretation

These results provide robust evidence that exposure to AI-enhanced platforms encouraged learners to engage more actively in ESL learning tasks. The motivational gains may be attributed to the personalized, adaptive nature of tools such as Duolingo and Grammarly, which allowed learners to track progress and receive immediate feedback. Importantly, many students reported that AI tools helped them feel more in control of their study pace, a perception strongly associated with the autonomy-supportive principles of Self-Determination Theory (SDT).

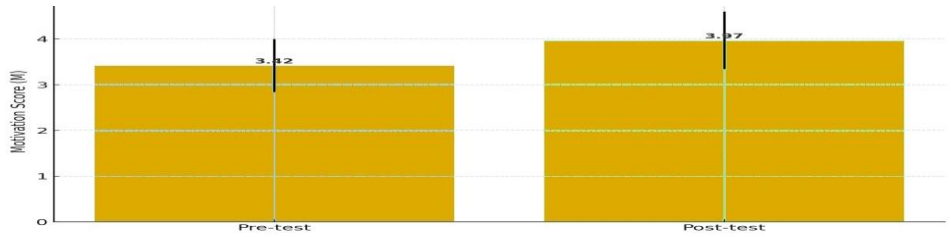

Figure 1 illustrates the change in mean motivation scores before and after the intervention.

Q2.How does the integration of AI tools in ESL learning affect learners' sense of autonomy, competence, and relatedness as defined by Self-Determination Theory?

A repeated-measures ANOVA was applied to examine changes across the three SDT dimensions.

Table 2: ANOVA Results for Autonomy, Competence, and Relatedness

Dimension	Pre-test M (SD)	Post-test M (SD)	F(1,118)	p
Autonomy	3.51 (0.62)	3.89 (0.60)	6.83	.01
Competence	3.33 (0.55)	3.85 (0.59)	9.42	<.001
Relatedness	3.48 (0.66)	3.60 (0.64)	1.92	.11

Quantitative Results

- **Autonomy** significantly increased, $F\ (1,118) = 6.83, p = .01$.
- **Competence** also showed a significant improvement, $F\ (1,118) = 9.42, p < .001$.
- **Relatedness**, however, did not exhibit significant change, $F\ (1,118) = 1.92, p = .11$.

Interpretation

These results suggest that AI-based tools were particularly effective in fostering a sense of independence among learners and reinforcing their perception of mastery. Self-paced courses, such as Duolingo, encourage independence as learners are allowed to determine when, how, and what they learn. Equally, the corrective feedback provided by Grammarly in real-time also enhanced competence, as it offered learners immediate and clear feedback on their weaknesses and progress.

Conversely, relatedness, which is the feeling of social connection in learning, remained relatively unchanged. Although language practice was achieved through conversational AI (e.g., ChatGPT), learners repeatedly noted that these interactions lacked the emotional presence, spontaneity, and two-way communication typically found in real-life human interactions.

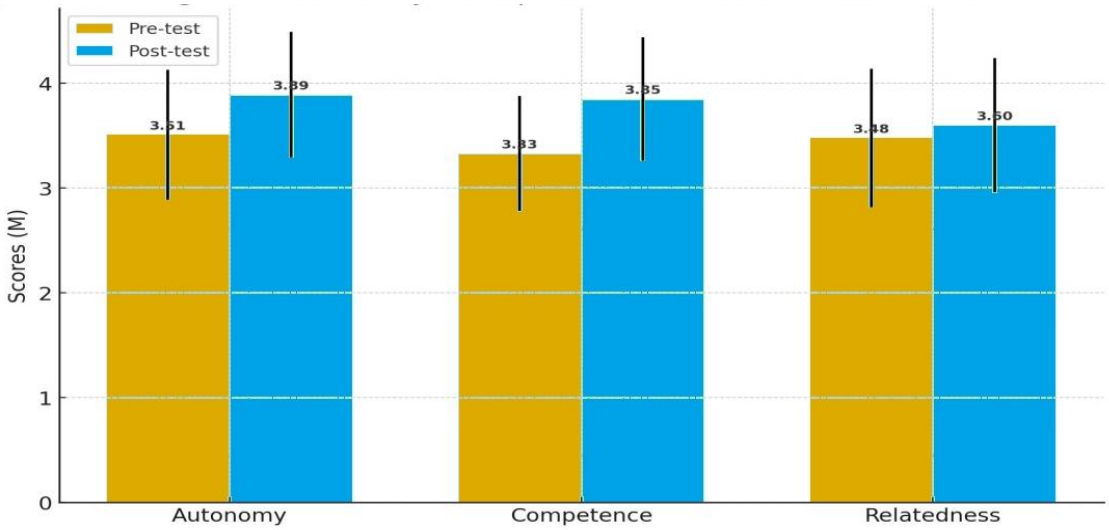

Figure 2, Changes in Autonomy, Competence, and Relatedness (Pre- and Post-Test)

Q3. What are ESL learners' perceptions of AI tools as motivational supports in their language learning process?

Thematic analysis of focus groups and interviews was used to analyze qualitative data. These three major themes were noted:

Autonomy Support

Students focused on the flexibility and the self-paced character of AI-based learning. They were glad to have the opportunity to study when and how to avoid pressure.

*"I have the freedom to study at any time that I feel right. Duolingo does not stress me, and I am free to skip or replicate the lessons.***"**

Competence Enhancement

Students appreciated the enabling impact of real-time corrective feedback aided by AI. This kind of feedback enhanced their sense of ability in academic activities and anxiety in language use in real-life situations.

Grammarly informs me of the specific issues with my writing. I am more confident when I am handing in my assignments."

Challenges in Relatedness

Although AI tools could simulate conversations and provide practice, learners consistently remarked that they did not feel authentic. AI was viewed as a useful helper but not as a replacement for meaningful human interaction.

"*ChatGPT is useful, but it does not feel like the actual dialogue with a peer or educator."*

Interpretation

In general, AI platforms were viewed by learners as useful one-to-one learning aids. They recognized improvement in autonomy as well as competence, but showed uncertainty regarding the contribution of AI to their social-emotional learning requirements.

Q4. How do quantitative measures of motivation compare with qualitative insights from learner interviews and focus groups regarding the motivational impact of AI?

Convergence Observed

- Quantitative findings showed that there were important productivity improvements in autonomy and competence, whereas qualitative descriptions were done to clarify how the gains were made (by using personalized pacing, adaptive practice, and corrective feedback).
- The lack of substantial enhancement in relatedness was also validated qualitatively, with learners explaining in explicit words the constraints of AI in simulating true social connections.

Interpretation

All the existing results together suggest that AI tools can significantly enhance individual motivation in the process of ESL learning by inculcating a sense of autonomy and competence. However, the data indicate that they have a weakness in developing the social aspect of motivation, a critical element of self-determination theory (SDT).

The outcomes of these findings support the need to develop hybrid learning platforms that incorporate AI services into instructor- and peer-mediated settings. The motivation of learners can be better supported by combining adaptive feedback and AI adaptability with authentic social interaction.

Figure 3 represents a conceptual convergence model that summaries the quantitative and qualitative findings.

DISCUSSION

The current research demonstrates that AI-based ESL tools have a positive impact on learners' motivation, particularly in terms of autonomy and competence. These results build on previous SDT literature on

second-language acquisition (Noels et al. 2000; Ogas-Baldwin and Fryer, 2020) by establishing that AI technologies can be used as motivational aids when incorporated into language-learning settings.

The second factor is that the growth in autonomy witnessed is indicative of the ability of AI systems to offer flexible, self-directed learning opportunities. This result supports Xu (2023), who stated that AI-based systems help students to control their speed and learning goals more efficiently than a classroom-only environment.

Second, the substantial gains in competence underscore the motivational value of instantaneous feedback mechanisms. The corrective recommendations given by Grammarly and the reinforcing function of the game offered by Duolingo are consistent with Godwin-Jones (2022), who noted that digital feedback increases the confidence and mastery of learners.

Third, the lack of develop ability of relatedness is proof of the current shortcomings of artificial intelligence (AI) in resolving the social aspects of learning. Although ChatGPT and other instruments can simulate dialogue, they do not create the type of genuine relationships. The social connectedness in language learning, as Li (2022) argues, remains a factor that requires interaction with peers and teachers, which, to date, AI has not adequately replicated.

The overlap of quantitative and qualitative results represents the dual ability of AI tools in English as a Second Language (ESL) education, as they significantly enhance learner autonomy and competence, but fail to support relatedness. The findings support Self-Determination Theory (SDT), which posits that autonomy, competence, and relatedness are indispensable conditions for long-term intrinsic motivation (Ryan and Deci, 2020).

All in all, these results suggest that although AI is a powerful secondary incentives mechanism, it can only be truly effective when combined with instructor-mediated pedagogy, therefore, fulfilling all elements of SDT antecedents. Teachers and schools can thus consider blended models where AI assists in promoting learner autonomy and competence, and collaborative classroom tasks take into account relatedness.

CONCLUSION AND IMPLICATIONS

This study examined the application of artificial intelligence (AI) as a motivational tool in English as a Second Language (ESL) education within the framework of the Self-Determination Theory (SDT). With a mixed-methods design, the findings demonstrated that AI tools, such as Duolingo, Grammarly, and ChatGPT, had a substantial effect on the autonomy and competence of learners, but their impact on relatedness was minimal. In turn, these results suggest that AI technologies, powerful as they are in facilitating self-directed learning and linguistic confidence, cannot entirely replace the social aspect of classroom interaction.

The research is a theoretical and practical addition to motivation in language learning. In theory, it projects SDT into the context of AI-assisted second-language acquisition by validating that technology can fulfill some, but not all, the psychological needs at the heart of motivation (Ryan and Deci, 2020; Noels et al., 2000). In practice, it highlights the need for blended models that combine AI with human interaction to achieve a balanced realization of autonomy, competence, and relatedness.

Teachers can leverage AI systems to offer learners individualized, adaptable learning processes that foster autonomy and competence. For example, there is the adaptive platform like Duolingo, which can enrich vocabulary acquisition, and various tools like Grammarly and ChatGPT, which provide instant feedback on writing and conversational practice. However, to strengthen relatedness, practitioners are encouraged

to use collaborative classroom tasks, peer-to-peer interactions, and teacher-student interactions to supplement the use of AI (Zhang and Hyland, 2022; Li, 2022).

Future studies are needed to explore ways of designing AI to support the needs of relatedness better. A viable avenue is the incorporation of socially intelligent AI machines that incorporate empathy, recognize emotions, or possess participatory learning capabilities. Longitudinal research might also investigate the possibility that AI-based motivational benefits are lasting (Lin and Warschauer, 2023). Cross-cultural analysis would also contribute to our knowledge of how the context of learners influences their motivation to use AI tools.

At the policy and institutional level, AI tools are not to be considered substitutes but rather as an addition to learning opportunities. Universities and language centers can consider investing in AI infrastructure while also offering professional development opportunities for teachers, enabling them to effectively integrate such technologies into their curricula (Godwin-Jones, 2022). Policymakers must also provide balanced access to AI tools, thus eliminating the motivation gains that may only be enjoyed by learners with greater technological access.

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