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AI-ASSISTED DIFFERENTIATED INSTRUCTION AND EFL WRITING MOTIVATION: A CORRELATIONAL STUDY

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The integration of artificial intelligence (AI) for learning personalization has emerged as an approach to address diverse learner needs. This quantitative correlational study examined the relationship between the perceived value of AI-assisted differentiated instruction and task motivation (intrinsic and extrinsic) among first-year English as a Foreign Language (EFL) students at Batna-2 University. A convenience sample of 120 students participated in the study, completing a questionnaire measuring perceived value of AI-assisted differentiated instruction and task motivation in EFL writing. Descriptive statistics revealed moderate levels of perceived value and task motivation. Pearson correlation analysis indicated a significant positive correlation between perceived value of AI-assisted differentiated instruction and overall task motivation. Additionally, separate analyses showed stronger correlations with intrinsic motivation than extrinsic motivation. These findings suggest that students who perceive greater value in AI-assisted differentiated instruction demonstrate higher levels of motivation in EFL writing tasks.

Keywords: *AI-assisted instruction, differentiated instruction, intrinsic motivation, EFL writing, correlational study.*

Introduction

The integration of artificial intelligence (AI) in educational settings represents an approach to addressing diverse learning needs, especially in English as a Foreign Language (EFL) context. Given that educational institutions are adopting

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technology-enhanced pedagogical approaches, the effectiveness of AI-assisted differentiated instruction in promoting student motivation has become a critical area of investigation (Achmad et al., 2024; Chiu et al., 2023). Differentiated instruction, which tailors teaching methods and content to individual student needs, learning styles, and preferences, has been recognized as an effective pedagogical strategy (Tomlinson, 2014).

It has been argued that EFL students face challenges in developing writing competencies. These challenges are compounded by diverse learning backgrounds, varying proficiency levels, and different motivational orientations towards language learning (Alharbi, 2019). Traditional one-size-fits-all approaches to EFL writing instruction often to fail to address these individual differences, limiting student engagement and achievement (Brown, 2014; Hyland, 2019; Richards, 2015).

The advent of AI tools capable of analyzing student learning style data and generating customized lesson plans and activities presents opportunities for implementing effective differentiated instruction. However, the perceived value of such AI-assisted approaches and their relationship with student motivation seems to be underexplored, particularly in Algerian EFL contexts.

Task motivation, encompassing both intrinsic and extrinsic motivational components, plays an important role in EFL writing achievement and persistence (Ryan & Deci, 2000). Intrinsic motivation, despite stemming from inherent satisfaction and interest in the learning task itself, extrinsic motivation involves external factors such as grades, recognition, or career prospects (Ryan & Deci, 2000). The extent to which AI-assisted differentiated instruction influences these motivational dimensions requires systematic investigation. Therefore, this study aims to examine the relationship between perceived value of AI-assisted differentiated instruction and task motivation among first-year EFL students at Batna-2 University. This research seeks to answer the following primary research question: What is the relationship between perceived value of AI-assisted differentiated instruction and task motivation (intrinsic and extrinsic) in EFL writing among first-year students at Batna-2 University?

This study employed a quantitative correlational research design to examine the relationship between perceived value of AI-assisted differentiated instruction and task motivation in EFL writing. The correlational approach was selected as most appropriate for investigating the strength and direction of relationships between these variables without manipulating experimental conditions (Creswell & Creswell, 2018).

The Technology Acceptance Model (TAM) provides a theoretical basis for understanding how perceived value influences technology adoption and use in educational contexts (Davis, 1989). Perceived value encompasses both utilitarian aspects (usefulness, efficiency) and hedonic aspects (enjoyment, satisfaction) of technology use (Venkatesh et al., 2012).

Based on the reviewed literature and theoretical considerations, this study hypothesizes that perceived value of AI-assisted differentiated instruction would positively correlate with task motivation in EFL writing.

AI-assisted differentiated instruction in EFL contexts

Differentiated instruction has been documented as an effective pedagogical approach for addressing learner diversity in educational settings (Tomlinson, 2014). Recent developments in AI technology have enhanced the feasibility and precision of implementing differentiated instruction at scale. Gligorea et al. (2023) demonstrated that AI-powered systems could effectively analyze student learning preferences and generate tailored instructional materials, resulting in improved learning outcomes in language learning contexts.

In EFL writing instruction, a study conducted by Ling (2023) examined the impact of AI-mediated instruction versus traditional methods on 60 EFL university students. The research found that the group receiving AI instruction achieved higher English learning outcomes across all tested skills (including writing) and exhibited greater L2 motivation and self-regulated learning strategies compared to the control group. Qualitative data further revealed that the AI platform fostered engagement and offered personalized learning experiences, leading to the overall conclusion that AI-mediated instruction holds potential for improving language achievement, promoting motivation, and enhancing learner autonomy in EFL contexts.

Task motivation in EFL writing

Task motivation has been consistently identified as a crucial predictor of EFL writing performance and persistence (Graham & Harris, 2019). Self-Determination Theory (SDT) provides a framework for understanding motivational dynamics in educational contexts, distinguishing between intrinsic motivation (driven by inherent satisfaction) and extrinsic motivation (driven by external factors) (Ryan & Deci, 2017). Drawing on the research of Ryan and Deci (2008) regarding Self-Determination Theory, intrinsic motivation has been shown to lead to more sustained engagement and higher-quality learning outcomes than extrinsic

motivation alone. Differently put, self-determined and intrinsic behavior lead to deeper learning and persistence than behavior driven by external rewards. Nevertheless, both motivational types can be meaningful to learning when appropriately balanced and supported by effective instructional design.

The choice of instructional approaches is a critical, dynamic factor in language education that directly influences the task motivation and success of a learner (Dörnyei, 2019). Research across various EFL contexts confirms that motivation is not a fixed internal trait but rather a responsive state to the immediate learning environment. Therefore, the pedagogical decisions of a teacher, such as designing engaging activities, providing constructive feedback, or integrating collaborative work, do not simply deliver content; they, rather, shape the affective experience and willingness to persist in the learning process of the student.

Participants and sampling

The study population consisted of first-year EFL students enrolled at Batna-2 University during the 2025-2026 academic year. A convenience sampling method was employed to recruit participants. The final sample comprised 120 students (n = 120). Prior to data collection, all participants underwent a detailed orientation to ensure they were thoroughly educated on the principles, operation, and practical application of the AI-Differentiated Instruction (AI-DI) system.

Instrumentation

A two-parts Likert-Scale questionnaire was utilized for data collection:

- Perceived value of AI-assisted differentiated instruction scale (PVAIDIS): This 24-item instrument was adapted from the Technology Acceptance and the Perceived Value Scale (Davis, 1989; Venkatesh et al., 2012) to assess students' perceptions of AI-assisted differentiated instruction value. The scale employs a 5-point Likert format (1 = Strongly Disagree, 5 = Strongly Agree) and measures four dimensions: perceived usefulness (6 items), perceived ease of use (6 items), perceived enjoyment (6 items), and perceived learning effectiveness (6 items).
- Task motivation in EFL writing scale (TMEWS): The TMEWS is an 18-item instrument developed based on Self-Determination Theory principles (Ryan & Deci, 2000). The scale measures intrinsic motivation (9 items) and extrinsic motivation (9 items) using a 5-point Likert format. Intrinsic motivation items assess inherent interest, enjoyment, and satisfaction in EFL writing tasks, while extrinsic motivation items evaluate external factors such as grades, recognition, and future career benefits.

Pilot study and reliability assessment

A pilot study was conducted with 10 first-year EFL students to assess instrument reliability and clarity. Cronbach's alpha coefficients were calculated for both instruments and all subscales. The PVAIDIS demonstrated excellent internal consistency (α= .847). The TMEWS also showed strong reliability (α = .859).

Data collection procedure and analysis

Prior to data collection, informed consent was secured from all participants, with clear explanations of study purposes, voluntary participation, and confidentiality measures. Data collection occurred during regular class periods. Participants completed both instruments at an average completion time of approximately 25 minutes.

Data analysis was conducted using SPSS version 29.0 and involved three primary components: descriptive statistics, reliability analysis, and correlational analysis. Descriptive statistics including means, standard deviations, and ranges were calculated to characterize the sample and assess data distribution properties. In terms of internal reliability, it was assessed using Cronbach's alpha coefficients for all scales in the main study sample. Regarding the correlation analysis, Pearson's Product-Moment correlation coefficients were calculated to examine relationships between perceived value of AI-assisted differentiated instruction and task motivation variables.

Discussion and interpretation of results

The results of this study support a positive relationship between perceived value of AI-assisted differentiated instruction and task motivation in EFL writing. The large correlation coefficient (r = .687) suggests that students who perceive greater value in AI-assisted instructional approaches demonstrate higher levels of motivation in writing tasks. This finding aligns with theoretical expectations based on Technology Acceptance Model principles and Self-Determination Theory.

The correlations observed between perceived value and motivation subtypes offer insights into the motivational mechanisms underlying AI-assisted instruction. The stronger relationship with intrinsic motivation (r = .724) compared to extrinsic motivation (r = .523) suggests that AI-assisted differentiated instruction may be effective at fostering inherent interest and enjoyment in EFL writing tasks. This finding is consistent with Self-Determination Theory predictions that autonomy-supportive instructional approaches enhance intrinsic motivation (Ryan & Deci, 2000).

The prominence of perceived enjoyment in predicting intrinsic motivation highlights the importance of designing AI-assisted instruction that is functional, engaging, and satisfying for learners. This finding resonates with recent research emphasizing the role of positive emotions in technology-enhanced learning environments (Pekrun, 2024).

The finding that intrinsic motivation showed stronger correlations with perceived value than extrinsic motivation aligns with the study of Yoo et al. (2012). They concluded that intrinsic motivators (related to internal enjoyment and self-determination) had a more significant impact on technology acceptance than extrinsic motivators (related to external rewards or performance goals) in an e-learning context. This suggests that the immediate, positive, internal experience of using the AI-DI system drives students' perceptions of its value more than external factors.

Theoretical Implications: These findings contribute to the growing literature supporting the integration of the Technology Acceptance Model and Self-Determination Theory frameworks in educational technology research. The strong correlations observed provide empirical support for theoretical predictions that perceived value influences motivational outcomes in technology-enhanced learning environments. Furthermore, the relationships between perceived value dimensions and motivation subtypes suggest that future theoretical models should consider the multidimensional nature of both constructs. The strong relationship between perceived enjoyment and intrinsic motivation supports expanding TAM to include hedonic factors in educational contexts.

Practical implications: The findings have several important implications for educational practice and policy. The strong positive correlations suggest that investing in AI-assisted differentiated instruction technologies may yield significant motivational benefits for EFL students. However, the success of such implementations appears to depend on ensuring that students perceive genuine value in the AI-assisted approaches.

The stronger relationship with intrinsic motivation suggests that AI-assisted instruction should be designed and implemented with attention to foster inherent interest and enjoyment instead of focusing solely on external motivators. This may involve ensuring that AI-generated content is personalized, engaging, and meaningful to learners.

For educators, these findings underscore the importance of comprehensive teacher development and student orientation programs when implementing AI-assisted instruction. Students' perceptions of value appear to be crucial mediating factors in the motivational effects of such technologies.

Limitations of the study

Several limitations should be considered when interpreting these findings. First, the use of convenience sampling from a single university limits the generalizability of results to other EFL populations or educational contexts. The specific characteristics of Batna-2 University students and the implementation of AI-assisted instruction may not be representative of other settings. Second, the reliance on self-report measures gives room to biases related to social desirability, common method variance, and subjective interpretation of scale items. Future research would benefit from incorporating behavioral measures of motivation and objective indicators of engagement with AI-assisted instruction. Third, the study did not control probable confounding variables such as prior technology experience, general academic motivation, baseline writing proficiency, or individual differences in learning styles. These factors may moderate the observed relationships and call for investigation in future studies.

Conclusion

The current study confirms a strong positive relationship between perceived value of AI-assisted differentiated instruction and task motivation in EFL writing among first-year university students at Batna-2 University. The correlation with intrinsic motivation suggests that well-implemented AI-assisted instruction can foster genuine interest and enjoyment in language learning tasks, extending beyond external motivation. The findings encourage the continued development and implementation of AI-assisted differentiated instruction in EFL contexts, while highlighting the need to ensure students perceive genuine value in these approaches. The success of these technological innovations appears to depend on their technical sophistication and their ability to provide meaningful, useful, and enjoyable learning experiences for students. Since educational institutions are embracing AI-enhanced pedagogical approaches, careful attention to fostering positive student perceptions and intrinsic motivation will be essential for realizing their success.

Based on the findings of the study, the following recommendations are put forth for practice and future research:

Recommendations for practice:

- Detailed implementation planning: Thorough planning is needed, addressing technical and pedagogical aspects to maximize student perception of value.

- Teacher development: Educators require training on AI tools and strategies for promoting student appreciation of the benefits of differentiated instruction.
- Student orientation: Clear explanations of the functions and benefits of AI-assisted instruction must be provided to enhance perceived value.
- Continuous evaluation: Regular assessment of student perceptions and motivational outcomes should be integrated to ensure continued effectiveness.

Recommendation for future research:

- Experimental designs: opting for experimental methods to provide stronger evidence for causal relationships.
- Cross-cultural validation: Replicating the study in diverse cultural and educational contexts to enhance the generalizability of the findings.
- Mediational and mixed-methods analyses: Investigating underlying mechanisms and using qualitative research to gain richer insights into student experiences.

Conflict of interests

The authors declare no ethical issues or conflict of interests in this research.

Ethical standards

The authors affirm that this research does not involve human subjects.

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ԱՐՀԵՍՏԱԿԱՆ ԲԱՆԱԿԱՆՈՒԹՅԱՆ ՄԻՋՈՑՈՎ ՏԱՐԲԵՐԱԿՎԱԾ ՈՒՍՈՒՑՈՒՄ ԵՎ ԱՆԳԼԵՐԵՆ ԼԵԶՎԻ ԳՐԱՎՈՐ ԽՈՍՔԻ ՄՈՏԻՎԱՑԻԱ. ԿՈՐԵԼԱՑԻՈՆ ՀԵՏԱԶՈՏՈՒԹՅՈՒՆ

Բուշրա Սի-Մուհամեդ
Սուհիլա Հելալետ

Ուսուցման անհատականացման համատեքստում արհեստական բանականության (ԱԲ) ներդրումը դիտարկվում է որպես սովորողների բազմազան կարիքների բավարարմանն ուղղված առանցքային ռազմավարություն: Սույն կորելացիոն հետազոտությունը վերլուծում է ԱԲ-ի միջոցով իրականացվող տարբերակված ուսուցման ընկալված արժեքի և առաջադրանքի մոտիվացիայի (ներքին և արտաքին) փոխկապակցվածությունը Բատնա-2 համալսարանի՝ անգլերենը որպես օտար լեզու (EFL) ուսումնասիրող առաջին կուրսի ուսանողների շրջանում: Թվով 120 ուսանողի շրջանում իրականացված հարցումը նպատակ է ունեցել չափելու ԱԲ-ի վրա հիմնված տարբերակված ուսուցման ընկալված արժեքն ու մոտիվացիոն դրսևորումները EFL գրավոր աշխատանքներում: Նկարագրական վիճակագրության արդյունքները փաստում են ընկալված արժեքի և առաջադրանքի մոտիվացիայի չափավոր մակարդակների մասին: Պիրսոնի կորելացիոն վերլուծությունը բացահայտել է վիճակագրորեն նշանակալի դրական կապ ԱԲ-ի օգնությամբ իրականացվող տարբերակված ուսուցման ընկալված արժեքի և ընդհանուր մոտիվացիայի միջև: Ստացված տվյալները հիմնավորում են, որ ԱԲ-ի օգնությամբ իրականացվող տարբերակված ուսուցումն առավել բարձր գնահատող ուսանողները դրսևորում են մոտիվացիայի ավելի բարձր մակարդակ գրավոր առաջադրանքներ կատարելիս:

Հիմնաբառեր՝ *ԱԲ-ի օգնությամբ իրականացվող ուսուցում, տարբերակված ուսուցում, ներքին մոտիվացիա, EFL գրավոր խոսք, կորելացիոն հետազոտություն:*