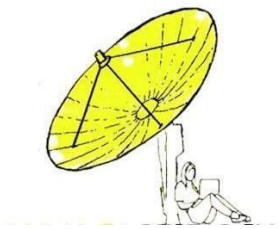

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Assessing the Influence of AI-Supported Learning Methods on Instructional Quality in Higher Education

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Abstract

Ensuring high instructional quality in higher education remains a significant challenge, particularly in language instruction for Year One undergraduate students transitioning from secondary to tertiary learning environments. In English–French programmes, learners often face difficulties related to limited individualised feedback, varying language proficiency levels, and reduced engagement, which can hinder effective learning. With the growing integration of Artificial Intelligence (AI)-supported learning methods in higher education, there is a need for empirical evidence on their contribution to instructional quality, especially in early undergraduate French language courses. This study employed a quantitative descriptive–correlational research design to investigate the impact of AI-supported learning methods on perceived instructional quality among 43 Year One undergraduate students enrolled in English–French (French modules) programmes. Data were collected using a structured 5-point Likert-scale questionnaire and analysed using descriptive statistics, Pearson correlation, and simple linear regression analysis. The findings revealed a strong and statistically significant positive relationship between AI-supported learning methods and instructional quality ($r = 0.68$, $p < 0.001$). Regression results further indicated that AI-supported learning methods significantly predicted instructional quality ($\beta = 0.64$, $p < 0.001$), accounting for 46% of the variance. These results demonstrate that AI-supported learning methods play a substantial role in enhancing teaching clarity, feedback quality, learner engagement, and overall instructional effectiveness in higher education French language instruction. The study concludes that integrating AI technologies can meaningfully improve instructional quality and supports their informed adoption in tertiary language education.

Keywords: Artificial Intelligence-supported learning; Instructional quality; Higher education; French language instruction.

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Introduction

In higher education, particularly in language instruction, ensuring high instructional quality remains a persistent challenge, especially for First-Year undergraduate students transitioning from secondary to tertiary learning environments. In English–French programmes, students often encounter difficulties related to limited individualised feedback, varying language proficiency levels, and reduced learner engagement, which can negatively impact the quality of instruction and learning outcomes. Although traditional teaching approaches continue to dominate French language instruction, they may not adequately address the diverse learning needs of early-stage undergraduate learners.

With the rapid advancement and increasing availability of Artificial Intelligence (AI)-supported learning methods, higher education institutions are beginning to integrate tools such as AI-assisted feedback systems, adaptive learning platforms, and language support applications into their teaching and learning processes. Despite this growing adoption, there is limited empirical quantitative evidence on the extent to which these AI-supported learning methods influence perceived instructional quality, particularly among English–French students in their first year of university study.

Motivated by this gap, the present study pursues to quantitatively examine the influence of AI-supported learning methods on instructional quality in higher education French language courses. By focusing on a relatively homogeneous cohort of Year One undergraduate students, the study aims to provide evidence-based insights into whether and how AI-supported learning enhances teaching clarity, feedback effectiveness, learner engagement, and overall instructional quality. The findings are intended to inform educators, curriculum designers, and policy makers on the pedagogical value of integrating AI technologies in higher education language instruction.

Research on AI-supported learning methods in higher education suggests that these technologies can significantly improve perceived instructional quality. Studies have shown that AI tools, including adaptive learning platforms, automated feedback systems, and language-support applications, offer personalised learning experiences that enhance student engagement and comprehension. For instance, the integration of AI-based instructional tools in language courses enabled learners to receive immediate, individualised feedback, which increased their participation and satisfaction with the instructional delivery (Jegede, 2024). Similarly, AI-enhanced learning environments improved the clarity of instruction, responsiveness of teaching, and overall student perception of instructional quality, particularly in communication and language-focused modules (Kassem, 2024). These findings suggest that AI-supported learning methods are effective in addressing common instructional challenges, such as variability in language proficiency and limited individualised feedback, thereby promoting higher instructional quality.

Furthermore, AI-supported learning methods facilitate interactive and learner-centred approaches, which are increasingly recognised as essential for improving instructional outcomes in higher education. According to Vashishth et al. (2024), AI technologies can actively engage students through tailored learning paths, automated assessments, and real-time feedback mechanisms, thereby enhancing the perceived effectiveness of instruction. In the context of language education, students exposed to AI-assisted tools demonstrated higher engagement and perceived teaching effectiveness compared to peers in traditional learning settings (Sng et al., 2024). Collectively, these studies provide empirical support for the current research finding that AI-supported learning methods have a strong and positive relationship with perceived instructional quality among English–French undergraduate students, highlighting their potential to transform teaching and learning in tertiary language programs.

Methods

Research design

This study employed a quantitative research design, grounded in a descriptive–correlational approach. The design was suitable for examining the extent to which AI-supported learning methods influence perceived instructional quality and for determining the predictive power of these methods on instructional quality among undergraduate students. Importantly, the study did not merely evaluate existing practices but incorporated a short, structured instructional intervention in which AI tools were deliberately embedded into French language instruction. The quantitative approach enabled the collection of measurable data and the application of statistical techniques to establish relationships between variables.

Population, sample, and sampling techniques

The study involved a sample of 43 Year One undergraduate students enrolled in English–French programmes (French modules) in higher education. This research was conducted as a case study at a single private university in Rwanda. *The site was purposively selected because AI-supported learning tools had been formally introduced into French language instruction as part of routine teaching practice.* Participants were selected because they were actively engaged in these AI-supported instructional activities. Focusing on Year One students ensured homogeneity in academic level and minimised variations related to prior university learning experiences.

Data collection instruments

Data were collected using a structured questionnaire developed specifically for this study to capture students' experiences with AI-supported learning and their perceptions of instructional quality. The instrument consisted of two main sections, comprising a total of 18 items.

Section A (AI-Supported Learning Methods, nine items) measured students' engagement with AI tools such as generative AI chatbots and writing assistants. Sample items included: "I used AI tools to check French grammar and sentence structure," "AI tools helped me generate vocabulary and example sentences," and "AI-based feedback helped me revise my French writing." Section B (Instructional Quality, 9 items) assessed students' perceptions of instructional clarity, engagement, and the quality of feedback. Sample items included: "Lessons were clearer when AI tools were integrated," "AI-supported activities increased my participation," and "Feedback provided through AI tools was timely and useful." Responses were measured on a 5-point Likert scale ranging from 1 (Very Low) to 5 (Very High).

Data collection followed a two-week instructional intervention, during which AI-supported learning was intentionally integrated into French modules. The intervention involved guided and supervised use of generative AI tools (e.g., AI chatbots and AI-based writing assistants) for lesson explanation, grammar and vocabulary practice, short writing tasks, and formative feedback. The lecturers remained central in designing tasks, moderating the use of AI, and validating outputs, ensuring that AI functioned as a pedagogical support rather than a replacement for instruction.

The questionnaire was administered at the end of the intervention period, once students had sufficient exposure to the AI-supported activities. Participation was voluntary, and participants maintained anonymity and confidentiality.

Data analysis

The collected data were analysed using descriptive and inferential statistical techniques. Descriptive statistics (means and standard deviations) were used to summarise students' perceptions of AI-supported

learning methods and instructional quality. To address Research Question 1, Pearson Product–Moment Correlation analysis was conducted to determine the strength and direction of the relationship between the two variables. To address Research Question 2, simple linear regression analysis was employed to examine whether AI-supported learning methods significantly predicted instructional quality. Statistical significance was tested at the 0.05 level.

Ethical considerations

Ethical principles were strictly observed throughout the study. Participants provided informed consent prior to data collection, and no personal identifiers were collected. The study ensured voluntary participation, confidentiality of responses, and the right of participants to withdraw at any stage without penalty.

Results and discussions

The study involved 43 Year One undergraduate students enrolled in English–French programmes. Regarding sex, the majority of participants were male (n = 24, 55.8%), while female students accounted for 19 (44.2%) of the sample. In terms of age, most respondents were within the typical university entry age range. Specifically, 26 students (60.5%) were aged between 18 and 20 years, 14 students (32.6%) were aged 21 to 23 years, and 3 students (6.9%) were above 23 years. The demographic distribution indicates a relatively young and homogeneous cohort, appropriate for examining early undergraduate learning experiences. Most participants reported at least moderate prior exposure to AI tools, which allowed the study to focus not on initial familiarity but on pedagogical integration and perceived instructional impact.

Research Question 1: To what extent do AI-supported learning methods influence perceived instructional quality among English–French students studying French in higher education?

To address this research question, descriptive statistics were first computed to summarise students' perceptions of AI-supported learning methods and instructional quality. These statistics provide an overview of the central tendency and variability of the key study variables, as presented in *Tables 1* and 2.

Table 1: Descriptive Statistics

Variable	Mean (M)	Standard Deviation (SD)
AI-Supported Learning Methods	3.98	0.61
Instructional Quality	4.12	0.57

Table 2: Pearson Correlation

Variables	r	p-value
AI-Supported Learning Methods vs. Instructional Quality	0.68	< 0.001

Descriptive statistics revealed relatively high mean scores for both AI-supported learning methods (M = 3.98, SD = 0.61) and instructional quality (M = 4.12, SD = 0.57). Item-level analysis showed that students rated AI-assisted grammar correction, vocabulary generation, and writing feedback as the most influential components of AI-supported learning.

The results of the study indicate a strong and statistically significant positive relationship between AI-supported learning methods and perceived instructional quality ($r = 0.68$, $p < 0.001$). This relationship suggests that it was not merely the presence of AI tools, but students' active engagement with specific AI-supported instructional functions that shaped their perceptions of instructional quality.

While these findings align with prior studies (e.g., Kassem, 2024; Sng et al., 2024), the novelty of the present study lies in its contextual specificity and pedagogical framing. Unlike many studies conducted in technologically advanced contexts, this research demonstrates that even a short, low-cost, lecturer-guided AI intervention in a resource-constrained private university in Rwanda can meaningfully enhance perceived instructional quality. This highlights AI's potential as a pedagogical equaliser rather than merely a high-end technological innovation.

Research Question 2: Do AI-supported learning methods significantly predict instructional quality among English–French students in French courses?

To address Research Question 2, a simple linear regression analysis was conducted to examine whether AI-supported learning methods significantly predict instructional quality among English–French students enrolled in French courses. The results of the regression analysis are presented in Tables 3 and 4.

Table 3: **Regression Results**

Predictor	**β**	**T**	**p-value**
AI-Supported Learning Methods	0.64	5.78	< 0.001

Table 4: **Model Summary**

R	**R^2**	**Adjusted R^2**
0.68	0.46	0.44

The regression analysis revealed that AI-supported learning methods significantly predict instructional quality ($\beta = 0.64$, $p < 0.001$), accounting for 46% of the variance. This indicates a substantial predictive effect, suggesting that nearly half of students' perceptions of instructional quality can be attributed to how AI tools were pedagogically integrated during instruction.

Consistent with Vashishth et al. (2024) and Jegede (2024), AI-supported learning emerged as a strong predictor of instructional effectiveness. However, the present study extends the existing literature by demonstrating that instructional quality gains are most strongly associated with AI's formative feedback and scaffolding functions, rather than automation or content delivery alone. This finding challenges technologically deterministic views of AI and underscores the importance of intentional pedagogical mediation by lecturers.

Overall, the findings demonstrate that AI-supported learning methods exert a strong, positive, and statistically significant influence on instructional quality among undergraduate French language learners. The key contribution of this study lies not in proving that AI 'works,' but in demonstrating how modest, well-scaffolded AI use within a brief intervention can transform students' instructional experiences in a developing higher education context. This positions AI-supported learning as a pedagogical strategy, not merely a technological enhancement, and offers practical insights for institutions seeking cost-effective ways to improve instructional quality.

Conclusion and Recommendation

Conclusion

The findings of this study indicate that AI-supported learning methods have a strong, positive, and statistically significant influence on perceived instructional quality among English–French undergraduate students studying French. The significant correlation ($r = 0.68$, $p < 0.001$) suggests that increased integration of AI tools is associated with improvements in teaching effectiveness, clarity of instruction, quality of feedback, and student engagement. Furthermore, the regression analysis confirmed that AI-supported learning methods are a significant predictor of instructional quality, accounting for 46% of the variance. This highlights the substantial role that AI-based instructional support plays in shaping students' learning experiences, particularly in language instruction contexts where feedback, personalisation, and practice are critical. These results provide empirical support for the growing adoption of AI technologies in higher education teaching and learning.

Recommendations

Based on the findings of this study, the following recommendations are proposed: Given the strong positive impact of AI-supported learning methods on instructional quality among Year One English–French students, higher education institutions should strategically integrate AI tools, build lecturer capacity, provide institutional support, and further research their pedagogical use to enhance early undergraduate learning experiences.

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