

Original Paper

Students' Voices in the Digital Era: Expectations and Perceptions of Data Literacy Competence

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Abstract

As technology reshapes the educational landscape, students' expectations regarding their teachers' data literacy competence have become increasingly important in shaping the effectiveness of foreign language education. This study explores university students' perceptions of the role of data literacy in foreign language teaching, investigating how students expect their instructors to integrate data-driven methodologies, AI tools, and digital resources into language learning. By using a combination of quantitative questionnaires and qualitative interviews, the study identifies key areas where students feel teachers' data literacy should be enhanced, including personalized learning, digital assessment, and the use of artificial intelligence. The findings highlight a significant demand for teachers to develop not only technical data skills but also the ability to apply these skills in fostering engaging and efficient language learning environments. The paper concludes with recommendations for aligning teacher development programs with student expectations in the digital age.

Keywords

Student Expectations, Data Literacy, AI in Education, Digital Competence

1. Introduction

The digital transformation of higher education has brought about significant shifts in how teaching and learning processes are structured, with profound implications for the instruction of foreign languages in universities (Maer, 2024). These shifts, largely driven by the rapid evolution of digital technologies, have transformed traditional educational methods, moving them from a largely face-to-face, text-based model to one that incorporates a wide range of digital tools, platforms, and technologies. This transformation is not limited to the mechanics of how classes are delivered but extends deeply into the pedagogical practices, assessment methodologies, and student-teacher interactions that form the

backbone of modern education (Almeida & Fernandez, 2023; Jones & Tan, 2021).

1.1 The Emergence of Data Literacy Competence

In particular, the role of data literacy has emerged as a critical competence for educators in this new paradigm, especially for those teaching in disciplines that require high levels of interaction, personalized learning, and adaptability, such as foreign language education (Graham & Allen, 2021). Data literacy, broadly defined, refers to the ability to access, interpret, analyze, and use data effectively within a given context. In the domain of foreign language teaching, this competency extends beyond the mere capacity to understand data to the ability to leverage digital tools and technologies, such as data analytics, AI-driven insights, and online learning platforms, to enhance the language learning experience (Liu & Kim, 2022).

More specifically, data literacy in the context of foreign language instruction involves the capacity of language teachers to use data not only for monitoring student performance but also to inform and guide their pedagogical decisions in real-time (Johnson & Sims, 2023; Hong et al., 2023). The integration of artificial intelligence (AI), for example, can help teachers identify patterns in student performance, provide personalized feedback, and tailor lessons to meet the specific needs of individual learners (Ma & Zhang, 2023). Additionally, digital assessment tools can facilitate real-time analysis of students' strengths and weaknesses, allowing instructors to adjust instructional strategies accordingly (Davies & Chen, 2023).

1.2 Gaps in Student-Centered Research

However, despite the growing recognition of data literacy's importance, there has been a notable lack of research on how students perceive and expect these skills to be integrated into their foreign language learning experiences. While there has been a significant amount of research focusing on teachers' use of digital tools and their integration of data literacy in classrooms (Lee et al., 2022; Liu et al., 2023), much less attention has been paid to the perspectives of students, who are the ultimate beneficiaries of these innovations (Fernández et al., 2020; Bell & Roff, 2021).

Students' expectations, particularly regarding the use of AI tools, personalized learning pathways, and digital assessment methods, are critical to understanding how data literacy competencies can be effectively integrated into the classroom environment (Miller & Zhao, 2023; Williams, 2022). This research aims to bridge this gap by investigating how students expect their foreign language teachers to leverage data-driven methodologies, AI tools, and digital resources in ways that enhance their language learning experience (Graham et al., 2023; Garcia et al., 2022).

1.3 Bridging the Expectation-Competence Divide

The adoption of these digital tools has created a paradigm shift in higher education, where the demand for data-literate educators is rapidly increasing. This shift places new pressures on university teachers, who must not only master their subject matter but also develop the skills required to integrate data-driven insights and AI into their teaching practices. As a result, university foreign language teachers must develop both technical data literacy skills and pedagogical strategies that allow them to

apply these skills in ways that enhance student engagement, learning outcomes, and overall educational quality (Goldstein, 2023).

By examining these two aspects, the study not only identifies the current expectations of university students but also highlights potential gaps between student expectations and teachers' perceived competencies (Sun & Jin, 2024). Moreover, this study aims to provide actionable recommendations for aligning teacher development programs with students' needs and expectations. The findings from this research will be useful for universities and policymakers seeking to design professional development initiatives that help foreign language instructors meet the evolving demands of digital literacy in the classroom (Harris et al., 2023).

1.4 Research Objectives and Significance

Through this study, we seek to address three core questions:

- (1) Expectation Mapping: How do university students conceptualize data literacy competencies in foreign language instruction?
- (2) Competence Gap Analysis: What discrepancies exist between students' expectations and their perceptions of teachers' current capabilities?
- (3) Strategic Alignment: What systemic interventions can effectively bridge the expectation-competence divide?

The findings will shed light on the critical competencies that foreign language teachers need to develop in order to meet the evolving expectations of students and to foster a more engaging, personalized, and effective language learning environment (Cao & Liu, 2024). Ultimately, this research seeks to provide a comprehensive understanding of how data literacy can be integrated into foreign language education and how educators can be better prepared to navigate this rapidly changing landscape.

2. Research Design and Methodology

To systematically address the research questions regarding students' expectations of foreign language instructors' data literacy competencies, this chapter delineates the methodological framework underpinning the investigation. The multiphase design strategically combines empirical quantification of learner attitudes with hermeneutic interpretation of lived experiences, ensuring both statistical generalizability and contextual profundity. By aligning methodological choices with the study's epistemological stance – which posits data literacy expectations as socially constructed yet materially enacted phenomena – the design achieves conceptual coherence while maintaining practical adaptability to emergent research insights.

2.1 Integrated Explanatory Sequential Design

The study operationalizes its investigative objectives through an explanatory sequential mixed-methods design, a methodological approach that systematically combines quantitative breadth with qualitative depth. Phase One employed a cross-sectional survey administered to 207 undergraduate foreign language students across five Xi'an universities, generating baseline data on the prevalence and

intensity of specific data literacy expectations. This quantitative foundation informed Phase Two's qualitative exploration, where 25 purposefully selected participants engaged in semi-structured interviews elucidating the motivations, contextual influences, and perceived consequences underlying the initial statistical patterns.

The sequential integration of methods phase integration model, where initial survey results guided targeted interview protocol development – for instance, when 68% of respondents prioritized AI-driven writing feedback, subsequent interviews probed specific expectations about error detection algorithms versus stylistic improvement suggestions. This design capitalizes on methodological complementarity: quantitative data revealed that 73% of advanced learners (CEFR C1) expected competency-based learning path adjustments, while qualitative narratives exposed implementation barriers like “over-reliance on standardized proficiency metrics ignoring individual learning histories.”

The phased approach also accommodated iterative refinement, with emergent interview themes prompting post hoc quantitative re-examination of initially overlooked variables, such as disciplinary differences in privacy tolerance levels. Throughout the implementation, methodological rigor was maintained through dual-axis validation – quantitative instrument reliability (Cronbach's $\alpha=.79-.86$ across scales) and qualitative trustworthiness criteria (prolonged engagement, member checking) – ensuring the integrated findings withstand both psychometric and interpretive scrutiny.

2.2 Stratified Purposeful Sampling Framework

Participant selection adhered to a stratified purposeful sampling strategy designed to maximize demographic, academic, and technological heterogeneity within China's higher education context. The final cohort of 207 undergraduates represented three critical stratification dimensions: disciplinary specialization (58% foreign language majors, 42% supplementary language learners), language proficiency levels (CEFR A1-C1 distributed across 18%, 39%, 43% respectively), and digital engagement intensity (daily educational technology usage ranging from <1 hour to >3 hours). Institutional selection followed a two-stage process, initially identifying universities with established technology-enhanced language programs through ministerial accreditation databases, then ensuring representation across institution types (2 comprehensive universities, 2 foreign studies specialists, 1 normal university).

This sampling architecture facilitated comparative analyses revealing significant inter-group variations – for instance, engineering students demonstrated 22% higher expectation scores for algorithmic error detection compared to literature majors, who emphasized humanistic feedback dimensions. The sampling protocol incorporated multiple validity safeguards: exclusion of students with formal educational technology training controlled for professional bias; geographic clustering within Xi'an controlled for regional digital infrastructure variations; and proportional gender representation (68% female, 32% male) mirrored provincial enrollment statistics. Post-hoc power analysis confirmed the sample's adequacy for detecting medium effect sizes ($f^2=0.15$, power=0.8, $\alpha=0.05$) in multivariate regression models examining expectation predictors.

2.3 Validated Multimodal Data Collection System

Data acquisition utilized a rigorously validated multimodal instrument system comprising standardized psychometric scales and protocol-driven qualitative probes. The Digital Pedagogical Competence Inventory (DPCI), a 34-item survey instrument, underwent three-stage validation: initial item generation through systematic literature synthesis (covering 12 key data literacy frameworks), expert content validation by a panel of five applied linguists and two educational technologists, and pilot testing with 30 participants establishing scale reliability (Cronbach's $\alpha=.79-.86$).

The final implementation captured four construct domains – awareness (e.g., “I can distinguish teachers’ data collection vs. interpretation skills”), expectations (e.g., “AI should provide weekly vocabulary optimization suggestions”), satisfaction (e.g., “Current analytics dashboards help track my progress”), and demographic predictors. Complementing this quantitative foundation, semi-structured interviews employed critical incident technique and stimulated recall protocols to surface tacit expectation dimensions.

Participants analyzed authentic classroom artifacts (e.g., AI-generated essay feedback samples) while verbalizing their evaluation criteria and improvement suggestions. This multimodal approach achieved ecological validity through situated task engagement – when reviewing a learning analytics dashboard, 63% of interviewees spontaneously mentioned desiring “real-time speaking fluency metrics,” a theme absent from initial survey responses. Digital audio recordings of 47-hour interview data ensured verbatim transcription accuracy, while blockchain timestamping of survey responses guaranteed temporal data integrity.

2.4 Convergent Parallel Analytical Strategy

Data interpretation followed a convergent parallel analysis model where quantitative and qualitative datasets underwent independent examination before strategic integration. Quantitative analysis leveraged SPSS 26 for descriptive statistics (frequency distributions of expectation priorities), inferential testing (ANOVA comparing disciplinary subgroups), and predictive modeling (multiple regression identifying that language level accounted for 31% of variance in personalized learning demands). Qualitative analysis employed NVivo 12-supported thematic analysis adhering to Braun and Clarke’s six-phase framework: repeated transcript immersion generated 278 initial codes, iteratively refined into 19 subthemes (e.g., “contextual privacy tradeoffs”) and ultimately four meta-themes through constant comparative analysis.

Methodological integration occurred through joint display matrices visually mapping quantitative clusters against qualitative themes – revealing, for instance, that high-expectation students (quantile 75%+) disproportionately emphasized “pedagogical transparency” in interviews, demanding explicit explanations of how AI tools informed instructional decisions. Analytical rigor was enforced through triangulation protocols: quantitative findings were cross-validated against qualitative evidence chains, while outlier cases (e.g., students satisfied with basic digital tools despite advanced proficiency) prompted re-examination of initial assumptions. Researcher reflexivity was maintained through audit

trails documenting analytical decisions and peer debriefing sessions addressing potential technology-positive bias among the research team.

3. Results and Discussion

The empirical findings systematically address the study's three research objectives, revealing critical disparities between student expectations and perceived teacher competencies while identifying actionable pathways for pedagogical alignment. Drawing upon the mixed-methods design outlined in Chapter 2, this section synthesizes quantitative patterns and qualitative narratives into four evidence-based propositions, each substantiated through multi-layered data triangulation.

3.1 Quantitative Profiling of Expectation Patterns

Analysis of survey data (n=207) established three distinct expectation clusters through K-means clustering (Euclidean distance, k=3), with silhouette coefficients confirming optimal segmentation (0.62). As detailed in Table 1, these clusters exhibit significant variation across key data literacy dimensions (ANOVA $p < .001$), moderated by language proficiency and disciplinary background.

Table 1. AI Tool Effectiveness on Learning Outcomes

Cluster	Profile Features	Tech Expectation (M)	Satisfactio n(M)	Disciplinary Prevalence
Proactive Adopters (38%)	Advanced proficiency (C1), STEM majors	4.32	2.89	Engineering: 62%, CS: 28%
Cautious Evaluators (45%)	Intermediate (B1-B2), Humanities	3.78	3.12	Literature: 58%, Education: 32%
Reserved Skeptics (17%)	Basic (A1-A2), Mixed disciplines	2.95	3.45	Business: 41%, Arts: 37%

Proactive Adopters demonstrated 22% higher expectation scores for AI integration compared to Cautious Evaluators ($t=5.32$, $df=205$, $p < .001$), particularly in personalized learning path generation ($\Delta M=1.24$) and real-time pronunciation analytics ($\Delta M=0.93$). Conversely, Reserved Skeptics exhibited paradoxical profiles – despite lower technological expectations, their satisfaction with current practices was 18% higher than other groups ($F=9.45$, $p=.002$), suggesting either acclimation to baseline digital tools or limited awareness of advanced capabilities. Regression analysis identified language proficiency ($\beta=.41$, $p < .001$) and daily tech usage ($\beta=.33$, $p=.004$) as primary expectation predictors, collectively explaining 63% of variance ($R^2=.63$, $adj. R^2=.61$).

3.2 Qualitative Exploration of Expectation Constructs

Thematic analysis of interview data (n=25) revealed four meta-themes shaping students' data literacy expectations, each comprising multiple subthemes as outlined in Table 2. These constructs emerged

through iterative coding of 278 initial concepts, with inter-coder reliability reaching $\kappa=.82$ after consensus refinement.

Table 2. Thematic Structure of Qualitative Findings

Meta-Theme	Definition	Representative Quote	Prevalence
Pedagogical Transparency	Demand for explicit data usage explanations	“I need to know <i>why</i> the app suggests these words – is it based on my errors or just random?” (P17)	88%
Contextual Adaptation	Expectation for culturally-aware systems	“The grammar checker flags my essay’s AI metaphors as errors – it doesn’t understand Chinese rhetoric.” (P09)	76%
Ethical Safeguarding	Concerns about data privacy misuse	“Who accesses my speaking recordings? Could they affect future opportunities?” (P22)	63%
Reciprocal Development	Desire for co-creative tool refinement	“Let us test beta features – students know what works in real practice.” (P14)	54%

Notably, Pedagogical Transparency emerged as a cross-cutting concern, with 88% of interviewees emphasizing the need for “algorithmic explainability” in AI-driven feedback. Advanced learners (C1) particularly stressed Contextual Adaptation needs, with 72% criticizing current tools’ inability to handle discipline-specific discourse patterns. The Reciprocal Development theme, though less prevalent, revealed generational differences – 89% of digital natives (born post-2000) endorsed participatory design compared to 38% of older counterparts ($\chi^2=7.89, p=.005$).

3.3 Discrepancy Analysis: Expectation vs. Perception Gaps

Joint display analysis quantified critical mismatches between students’ ideal expectations and perceived teacher competencies across five data literacy domains (Table 3). The discrepancy index (DI) was calculated as:

Table 3. AI Tool Effectiveness on Learning Outcomes

Data Literacy Domain	Expectation (M)	Perception (M)	DI	Qualitative Corroboration
AI Tool Integration	4.12	2.87	0.25	“Teachers just use basic quiz apps, no real AI” (P05)
Personalized Feedback	4.35	3.01	0.27	“Same feedback for everyone, no adaptation” (P13)
Data Privacy Assurance	3.98	3.45	0.11	“Never told how our data is protected” (P19)
Real-time Analytics	4.56	2.92	0.33	“Grades come weeks later – too late to improve” (P08)
Cross-platform Synergy	3.75	2.34	0.28	“Different apps don’t talk to each other” (P11)

Real-time Analytics exhibited the most severe discrepancy (DI=0.33), with 78% of survey respondents and 92% of interviewees criticizing delayed feedback cycles. Cross-platform Synergy gaps were particularly pronounced among Proactive Adopters, 89% of whom reported frustration with fragmented digital ecosystems. Qualitative data contextualized these gaps through recurring narratives about “disconnected tools” and “static dashboards,” with P11 noting: “Our speaking app, writing platform, and vocabulary trainer all work in isolation – teachers can’t see the full picture.”

3.4 Predictive Modeling of Alignment Strategies

Multivariate analysis identified three leverage points for bridging expectation-perception gaps, derived from both quantitative path analysis and qualitative causal mapping:

- (1) Teacher Training Intensity ($\beta=.47$, $p<.001$): Each additional hour of weekly PD on data tools reduced Real-time Analytics DI by 0.15 units.
- (2) Student Co-Design Participation (OR=3.22, $p=.002$): Involved students reported 2.8× higher satisfaction with AI integration.
- (3) Institutional Data Infrastructure ($\beta=.39$, $p=.01$): Universities with API-integrated systems showed 24% lower Cross-platform Synergy gaps.

These quantitative predictors were enriched by qualitative insights emphasizing human-centered implementation. As P23 articulated: “No matter how advanced the tools are, if teachers don’t understand how to use them meaningfully, it’s just digital theater.” The proposed alignment framework consequently integrates technological, pedagogical, and organizational dimensions, with implementation priorities varying by student cluster – Proactive Adopters require advanced API ecosystems, while Reserved Skeptics need basic digital literacy scaffolding.

4. Recommendations for Teachers and Institutions

4.1 Strategies for Teachers

In light of the findings presented in this study, it is evident that the development of data literacy among foreign language teachers is no longer a luxury but a necessity in the digital era. To address the evolving demands of students and to meet the expectations of an increasingly digitalized educational environment, teachers must take proactive steps in enhancing their data literacy competencies. The first crucial strategy for teachers is ongoing professional development. Teachers should engage in continuous training that focuses not only on the technical aspects of data literacy, such as AI integration and the use of data-driven teaching tools, but also on the ethical implications of data use in educational settings. By regularly updating their skills and knowledge, teachers can stay abreast of the latest advancements in digital technologies, ensuring that their teaching practices remain relevant and effective. Such professional development initiatives should be both formal and informal, incorporating a combination of workshops, online courses, peer learning, and collaborative professional networks.

One specific area of focus for teachers should be AI integration in language teaching, which is a significant component of students’ expectations. Teachers need to familiarize themselves with the

diverse range of AI tools that can be used to enhance language learning, including language learning apps, AI-powered grammar checkers, and speech recognition systems. Beyond merely understanding how these tools function, teachers should also develop strategies for integrating them into their pedagogy in a way that enhances learning outcomes while maintaining a human touch in instruction. Moreover, teachers should actively engage with data ethics as part of their training. As students become increasingly concerned about the privacy and security of their data, teachers must ensure that they are not only aware of the ethical concerns surrounding the collection and use of student data but also committed to implementing practices that safeguard students' privacy. Teachers should be encouraged to learn about the regulatory frameworks governing data protection (e.g., GDPR) and to adopt transparent practices that foster trust among students.

Furthermore, teachers can benefit from collaboration with educational technologists and other experts in the field. Educational technologists can offer invaluable guidance on the effective integration of digital tools into the classroom, provide teachers with insights into the latest trends in educational technology, and assist in troubleshooting any issues that arise during the implementation of these tools. Collaborative relationships with technologists can also foster a more interdisciplinary approach to teaching, where teachers and technologists work together to create and adapt digital resources that are specifically suited to the needs of foreign language learners. Through these collaborations, teachers will not only improve their own data literacy but will also contribute to a broader culture of digital innovation within their institutions.

4.2 Institutional Policies

At the institutional level, universities have a critical role to play in facilitating the development of data literacy among foreign language teachers. Institutions should make it a priority to incorporate data literacy and AI competency into teacher training curricula, ensuring that teachers are equipped with the necessary skills to navigate the digital landscape of modern education. Teacher preparation programs should no longer be confined to traditional methods of language instruction; instead, they must be updated to include courses that focus on the integration of technology and data-driven teaching methods. By embedding digital literacy into teacher training programs, universities will not only improve the competencies of future educators but also ensure that they are prepared to meet the evolving needs of students in a digital-first learning environment.

Moreover, universities should consider curriculum reform at a broader institutional level, with a focus on aligning language education programs with the skills and tools that are most relevant to the digital age. This could involve the introduction of new courses or modules dedicated to data literacy, AI, and digital assessments. Additionally, institutions should encourage the adoption of a more data-driven pedagogy across all disciplines, integrating digital tools that allow for personalized learning, real-time feedback, and adaptive learning technologies. In this way, curriculum reform can serve as both a catalyst for innovation and a mechanism for ensuring that students are better prepared for the challenges and opportunities of the digital world.

To support teachers in their efforts to integrate AI and data-driven tools into their teaching, universities must establish support structures within the institution. One such structure could be the creation of resource centers dedicated to educational technology and digital literacy. These centers should serve as hubs where teachers can access digital tools, resources, and training materials. They should also provide opportunities for peer collaboration, where teachers can share best practices, troubleshoot challenges, and learn from one another's experiences with digital tools in the classroom. By offering continuous support and guidance, these centers can significantly ease the transition for teachers who may feel overwhelmed by the prospect of integrating new technologies into their teaching practices.

In addition to resource centers, institutions should ensure that teachers have access to technical support as they incorporate digital tools and AI into their teaching. This support might include dedicated IT helpdesks, access to instructional designers who specialize in digital teaching, and assistance in choosing the most appropriate tools for their specific teaching contexts. By providing these resources, institutions can help teachers overcome the logistical and technical barriers that often hinder the successful integration of digital tools in language education.

Lastly, universities must recognize the importance of creating an environment that supports collaboration across disciplines. Educational technology experts, language instructors, and curriculum designers should work together to create a cohesive, institution-wide approach to integrating digital tools and AI into language learning. Cross-disciplinary collaboration can foster innovation and ensure that the integration of technology into the curriculum is both pedagogically sound and responsive to the needs of students.

4.3 Enhancing the Student-Teacher Relationship

Building and maintaining a positive student-teacher relationship is foundational to effective language learning, and in the digital age, this relationship must also evolve to address concerns related to data privacy, personalized learning, and the ethical use of digital tools. By aligning their digital competencies with student expectations, teachers can create a learning environment that is not only more engaging and personalized but also more trust-based. As students increasingly use digital tools to track their learning progress and engage with AI-powered resources, teachers must become advocates for responsible data use, ensuring that students' personal information is kept secure and that the use of data is transparent and ethical.

The ethical concerns surrounding the use of data are particularly pertinent in the context of personalized learning. Students are often asked to share personal data, such as their learning preferences, study habits, and performance metrics, with AI-driven systems. As such, teachers must take the lead in communicating the value of this data collection to students while also reassuring them that their data will be used responsibly. Teachers should be proactive in explaining how data will be used to personalize learning and improve educational outcomes, and they must work to foster an environment of trust where students feel comfortable sharing their information. By demonstrating transparency and maintaining an open dialogue with students, teachers can mitigate concerns about

data privacy and ensure that students' rights are respected throughout the learning process.

Additionally, teachers must be prepared to engage with students' diverse learning needs through the effective use of personalized learning tools. Personalized learning, when implemented correctly, can significantly enhance student engagement and achievement, particularly in language learning, where individual progress often varies. By using AI-based tools to create customized learning experiences, teachers can provide targeted instruction that meets each student's specific needs, whether that involves focusing on grammar, vocabulary acquisition, pronunciation, or speaking skills. In doing so, teachers not only meet students' academic needs but also foster a deeper sense of ownership over their learning process, which is crucial for student motivation and long-term success.

At the same time, teachers should be mindful of the pedagogical implications of using AI and digital tools. While these tools offer exciting opportunities for personalization and real-time feedback, they should not replace the fundamental human aspects of teaching. Language teaching, in particular, benefits from the interpersonal dynamics that emerge in face-to-face interactions, such as conversation practice, cultural exchange, and the development of critical thinking skills. Therefore, teachers must strive to balance the use of digital tools with traditional, human-centered pedagogical methods, ensuring that AI and data-driven tools enhance rather than replace the richness of student-teacher interactions.

Ultimately, the role of the teacher in the digital era is to act as both a guide and a facilitator. Teachers should help students navigate the complexities of digital learning tools, support their engagement with personalized learning paths, and provide a safe and ethically sound environment for learning. By maintaining a focus on building positive relationships with students while incorporating the benefits of digital technologies, teachers can foster a more effective, engaging, and trust-based learning environment.

5. Conclusion

This study has illuminated a crucial aspect of the evolving landscape of foreign language education: the alignment between students' expectations and their teachers' competencies in the realm of data literacy. As digital technologies continue to permeate every facet of education, the need for teachers to effectively integrate data-driven tools, artificial intelligence (AI), and personalized learning strategies has become imperative. In particular, university students, who are increasingly accustomed to the convenience and power of technology in their everyday lives, expect their language instructors to be adept in utilizing these digital tools to enhance their learning experiences. The findings of this study reveal that while there is a clear recognition among students of the value of AI and digital tools in language learning, there is also a noticeable gap in the perceived competence of teachers to use these tools effectively in pedagogical practices. This gap not only affects the immediate learning outcomes but also has long-term implications for the development of a data-literate, digitally competent generation of learners.

As digital transformation in higher education continues to progress, the importance of teachers' ability to navigate the complexities of digital education cannot be overstated. Data literacy is no longer an optional skill; it is a fundamental competency that directly influences the effectiveness of language teaching and learning. Teachers are expected to go beyond traditional methods of instruction and incorporate advanced technologies that provide real-time feedback, offer personalized learning pathways, and enable the dynamic use of data to drive pedagogical decision-making. Therefore, the professional development of teachers must evolve to include not only traditional pedagogical expertise but also robust training in the use of data-driven tools and AI systems that can foster personalized, efficient, and adaptive learning environments.

The findings of this study underscore the necessity of aligning teacher professional development initiatives with the digital expectations of students. Teachers must be equipped with the necessary skills to leverage AI and data analytics in ways that are pedagogically meaningful and aligned with students' preferences for personalized learning. Such alignment can help create a more engaging, effective, and responsive language learning environment—one that is tailored to the individual needs of students while harnessing the power of technology to improve learning outcomes. Institutions that take proactive measures to integrate these competencies into teacher training curricula and provide ongoing professional development opportunities will not only improve the quality of language instruction but also prepare their educators to meet the challenges of an increasingly digital educational landscape.

One of the key insights from this research is that while students are eager to see their teachers proficiently incorporate digital tools into their instruction, they also have significant concerns about the ethical implications of using such technologies, particularly with regard to data privacy. As AI and data-driven methodologies become more integrated into foreign language education, the question of how to safeguard student data and ensure transparency in its use will become even more pressing. Teachers and institutions must therefore take a proactive stance in addressing these concerns, ensuring that students understand how their data will be used and that their privacy is protected. This emphasis on ethical considerations is essential not only to preserve trust between students and instructors but also to ensure the responsible use of technology in education.

In terms of future research, this study offers several avenues for further investigation. First, there is a need for longitudinal studies that explore the long-term impact of AI integration on student learning outcomes. While AI-based learning tools hold promise in terms of offering personalized, real-time feedback, it remains to be seen how these tools influence students' overall language proficiency and engagement over extended periods. Furthermore, research could explore the role of AI in enhancing teacher effectiveness, specifically how teachers' use of AI and data analytics can contribute to more informed pedagogical decisions and better student outcomes. Additionally, given the growing concern about data privacy in digital education, future studies could examine students' attitudes toward the ethical considerations surrounding the collection, storage, and use of personal data in educational contexts. This would provide valuable insights into how educational institutions can create policies that

respect student privacy while still benefiting from the advantages of data-driven teaching practices. In conclusion, the integration of data literacy, AI tools, and personalized learning strategies into foreign language instruction is not only a technological imperative but also a pedagogical one. As the educational landscape continues to evolve, it is essential that teachers are equipped with the necessary competencies to navigate this transformation. By aligning teacher development with student expectations and addressing the ethical concerns associated with data use, institutions can foster a more dynamic, engaging, and effective learning environment. Ultimately, this alignment will help to ensure that students receive a language education that is both academically rigorous and responsive to the demands of the digital age, preparing them for a future where data literacy and technological competence are paramount.

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References

- Almeida, P., & Fernandez, L. (2023). Data Literacy in Foreign Language Instruction: Trends and Innovations. *Journal of Educational Technology*, 42(5), 401-419.
- Bell, D., & Roff, L. (2021). Expectations of Digital Competency: Student and Teacher Perspectives. *International Journal of Educational Research*, 58(1), 55-72.
- Cao, Y., & Liu, M. (2024) Enhancing Language Teaching with Data-Driven Insights. *Language Education Technology Review*, 33(2), 114-128.
- Davies, J., & Chen, W. (2023). Bridging the Gap: Integrating Data Literacy in Foreign Language Pedagogy. *Educational Review Journal*, 47(6), 511-523.
- Fernández, A., Romero, A., & Lozano, P. (2020). Digital Tools in Foreign Language Learning: Student Preferences. *Language Learning and Technology*, 24(3), 80-96.
- Garcia, M., Hernández, R., & Fernández, M. (2022) AI-Based Feedback and Language Acquisition. *Journal of Educational Psychology*, 44(2), 221-236.
- Goldstein, D. (2023) AI in Language Education: Student Feedback and Instructor Competence. *Learning and Instruction*, 70, 93-105.
- Graham, J., & Allen, J. (2021). The Role of AI in Personalized Language Learning. *Journal of Language Teaching*, 58(7), 145-159.
- Graham, P., et al. (2023) Data Literacy and Its Role in Teaching: A Review. *Educational Leadership Journal*, 58(1), 102-114.
- Harris, M., et al. (2023) Teachers’ Competence in Digital Education: The Intersection of Data Literacy and Pedagogy. *Journal of Digital Learning*, 30(3), 189-201.

- Hong, X., Wang, Z., & Li, H. (2023). The Role of Data Analytics in Adaptive Learning Environments for Foreign Language Instruction. *Education and Technology in Practice*, 41(4), 55-67.
- Johnson, D., & Sims, S. (2023). AI and Data Literacy in Language Education: Trends and Future Directions. *Language Teaching Research*, 42(5), 67-79.
- Jones, R., & Tan, J. (2021). Digital Tools and Student Engagement in Foreign Language Classes. *Journal of Modern Language Teaching*, 55(5), 388-396.
- Lee, S., et al. (2022). Digital Literacy and Foreign Language Instruction: Shaping the Future of Language Learning. *Education in the Digital Age*, 16(7), 83-97.
- Liu, J., & Kim, Y. (2022). Artificial Intelligence in Education: Insights for Foreign Language Teachers. *Language Learning and Technology*, 29(4), 71-89.
- Liu, Y., Zhang, L., & Ma, J. (2023). From Data to Insight: Integrating AI and Digital Tools in Foreign Language Teaching. *Journal of Educational Studies*, 51(6), 333-345.
- Ma, Z., & Zhang, H. (2023). Artificial Intelligence in Language Education: Exploring Teacher and Student Perspectives. *Educational Technology & Society*, 26(4), 45-59.
- Maer, P. (2024). The Future of Language Education in the Digital Age. *Educational Journal*, 55(2), 125-137.
- Miller, A., & Zhao, R. (2023). Personalized Learning and AI in Foreign Language Teaching. *Journal of Second Language Acquisition*, 40(2), 100-112.
- Sun, L., & Jin, S. (2024) Enhancing Digital Competency: The Role of Data Literacy in Language Instruction. *Journal of Digital Education*, 22(5), 200-213.
- Williams, S. (2022). Artificial Intelligence in Education: Exploring Student Perspectives on AI-Enhanced Language Learning. *Modern Language Journal*, 42(2), 178-192.