

UNVEILING THE COGNITIVE, IDEOLOGICAL, AND TECHNOLOGICAL ARCHITECTURES OF LANGUAGE TEACHING

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Abstract

Modern foreign language (MFL) teaching is informed by cognitive schemas, ideological discourse and technology-mediated instructional approaches, but these dimensions are often addressed separately. This study set out to explore how cognitive, ideological, and technical architectures affect experiences of language learning in the current digital environment and to advance an integrated model that repurposes language teaching as a multi-layered semiotic system. A mixed-methods design was employed using a tri-varied research framework that combined Cognitive Linguistics Analysis, Critical Discourse Analysis, and Technology-Enhanced Learning. Data were obtained from 120 hours of classroom discourse, 86 teaching materials, and 214 student responses collected between 2024 and 2026. Results reveal that classroom language is influenced by implicit mental schemas, discursive power relations, and algorithmic mediation. Quantitatively, the density of conceptual metaphors in classroom discourse positively correlated with learner understanding ($r = .62, p < .05$). Teacher explanation, measured by time spent on didactic instruction, decreased student engagement ($\beta = .01$), while dialogic discourse, measured by the frequency of teacher-student exchanges, increased engagement ($\beta = .36, p < .05$). Conversely, prescribed use of modality showed a negative association with engagement ($\beta = -.29, p < .05$). At the qualitative level, modality, transitivity and evaluative language indexed authority and transmitted vertical epistemic relations of knowledge. The AI-mediated feedback also exhibited tendencies toward standardisation; for instance, 83% of non-standard language forms were marked as incorrect. The authors argue that cognitive, ideological and technological dimensions are co-constitutive rather than separate. It has to do with more critical, responsive and equitable language pedagogy.

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INTRODUCTION

Applied Linguistics in the period 2024–2026 has undergone a clear methodological and conceptual reorientation. Language teaching is increasingly understood not as the transmission of grammar, vocabulary, and discrete skills, but as a complex sociocognitive practice shaped by mental representation, social interaction, multilingual repertoires, ideology, and digital mediation. Recent scholarship foregrounds complex dynamic systems, sociocultural ecologies, translanguaging, multimodality, and artificial intelligence as central forces in second language acquisition and teaching (Jiang & Hafner, 2024; Michel et al., 2025; Rui, 2025). This shift reflects a movement away from monolithic, form-focused approaches toward communicative, student-centred, feedback-rich, and multimodal pedagogies that connect classroom learning

with real-world language practices. At the same time, AI in education has changed how teachers design instruction, give feedback, assess performance, and organise learning resources (Chatzichristofis, 2025; Darvin, 2025; Liao et al., 2025; Shang, 2025; Turvey & Pachler, 2025; Xie et al., 2025). These developments create new analytical challenges because cognition, ideology, and technology now operate within the same instructional space.

One important starting point for understanding this complexity is cognitive linguistics. From this perspective, language is not merely a formal code but a window into how people conceptualise experience, categorise reality, and organise meaning. Foundational work shows that mental schemas, conceptual metaphors, and construal patterns shape how speakers produce and interpret language (Lakoff, 1987; Langacker, 2008). In language teaching, learners do not simply absorb grammatical rules; they interpret linguistic input through prior conceptual structures, embodied experience, and culturally mediated patterns of meaning. Tyler (2024) further argues that cognitive linguistic insights can support second language learning because they help learners understand why particular forms carry particular meanings. Such a view is important because many language-teaching practices still treat errors as surface-level deviations rather than as indicators of deeper conceptual processing. A cognitive perspective therefore allows researchers to examine the hidden mental patterns that influence comprehension, production, and pedagogical explanation.

Nevertheless, cognition alone cannot explain language teaching because classrooms are also ideological and institutional spaces. Language choices are tied to power, identity, legitimacy, and cultural authority. Critical Discourse Analysis offers a framework for examining how classroom discourse, instructional materials, assessment criteria, and teacher feedback reproduce or challenge social meanings. Fairclough (2013) argues that discourse is never neutral because it participates in the construction of knowledge and social order. In educational contexts, ideas about “correct,” “standard,” or “appropriate” language may reflect broader hierarchies rather than purely linguistic criteria. Recent studies of digital political discourse and disinformation also demonstrate that language is shaped by affective framing, power, and ideological positioning (Chen et al., 2025; Kuo & Marwick, 2024). These insights are relevant because classrooms can become sites where certain accents, registers, identities, and knowledge traditions are privileged while others are marginalised.

The ideological dimension becomes especially important in multilingual and non-Western contexts. Much applied linguistics research has been shaped by English-dominant and Western academic assumptions, which may not fully explain classrooms where local languages, national languages, English, and digital practices intersect. Translanguaging theory challenges fixed boundaries between languages by showing that multilingual speakers draw on an integrated linguistic repertoire to make meaning, negotiate identity, and participate in learning (García & Wei, 2014). More recent work on digital communication in language education shows that learners move fluidly across languages, platforms, modes, and semiotic resources (Li, 2025). Studies on translanguaging spaces and digital multimodal composing further show that multilingual and multimodal practices can promote equitable participation and critical digital literacy when deliberately supported in pedagogy (Jiang & Hafner, 2024; Lu & Tian, 2025; Michel et al., 2025; Sun, 2025; Waluyo, 2025). Therefore, language teaching must be analysed not only through target-language mastery but also through how learners mobilise linguistic resources within unequal social and digital environments.

AI-assisted learning adds a further layer of complexity. Adaptive platforms, automated writing evaluation, AI translation, speech recognition, and generative AI systems can provide immediate feedback, personalised scaffolding, and expanded access to materials. However, AI should not be treated as a neutral instructional tool. Holmes and Tuomi (2024) show that AI in education has moved into practical teaching and learning systems, while UNESCO (2026, p. 14) warns that generative AI may reproduce bias, reshape authority, and influence how

knowledge is validated. Recent studies argue that AI-mediated pedagogy must be understood as a sociotechnical phenomenon shaped by institutional policy, teacher agency, learner context, data governance, and algorithmic design (Darvin, 2025; Jeon et al., 2025; Shang, 2025; Turvey & Pachler, 2025; Xie et al., 2025; Zaimoğlu & Dağtaş, 2025). In language classrooms, this matters because AI systems may reinforce dominant norms, privilege standardised varieties, or encourage cognitive offloading when learners rely on automated feedback without deeper metalinguistic awareness (Rui, 2025; Yan & Huang, 2025).

These developments reveal a significant research gap. Existing studies often examine cognition, ideology, multilingualism, or educational technology as separate domains. Cognitive approaches illuminate mental representation but frequently underemphasise power and institutional discourse. Critical approaches expose ideology but may give limited attention to how learners mentally process meaning. AI-focused studies often highlight efficiency, personalisation, and feedback optimisation but do not always interrogate language bias, knowledge hierarchy, or algorithmic authority. Although recent work calls for ethical, inclusive, and justice-centred AI use, there remains a need for a coherent model that explains how cognitive schemas, discourse ideologies, translanguaging practices, and AI-mediated tools interact in language teaching (Chatzichristofis, 2025; Darvin, 2025; Lai & Sundqvist, 2025; Tang, 2024; Turvey & Pachler, 2025). Without such a framework, pedagogy risks treating visible classroom practices as isolated techniques while overlooking the hidden structures that shape what teachers teach, how learners interpret instruction, and whose language practices are valued.

This study therefore focuses on hidden cognitive, ideological, and technological structures in language teaching across formal and semi-formal classroom and digital environments. Its objectives are to identify the cognitive schemas and linguistic structures that shape teaching and learning, analyse how ideological forces appear in classroom and digital discourse, and propose an integrated model linking cognition, discourse, multilingual practice, and AI-mediated pedagogy. To achieve these objectives, the study addresses two research questions: (1) How do cognitive schemas and linguistic structures shape language teaching practices in classroom and digital learning environments? (2) How do ideological forces and AI-mediated tools influence language norms, learner interpretation, and instructional authority in language teaching? The novelty of this study lies in its integrative theoretical position. Rather than treating cognition, ideology, translanguaging, and technology as separate variables, the study conceptualises them as interconnected layers of contemporary language pedagogy. This contribution offers a new analytical lens for Applied Linguistics in the AI era by explaining how mental representation, discourse power, multilingual practice, and algorithmic mediation jointly shape language education.

RESEARCH METHOD

The study is based on a multidisciplinary, integrated research model from applied linguistics, combining insights from cognitive linguistics, critical discourse analysis, and technology-enhanced language teaching. This research takes a methodological approach that combines quantitative and qualitative analysis. To capture the complexity of “hidden cognitive and ideological architectures,” this strategy also incorporates three other methods: measurement, triangulation, and more refined case-by-case statistics. The training of researchers in this mixed research design is designed to fit our needs. So the “new” method proposed enables a systematic analysis of teaching whole language, how representations are passed between different discourse systems in script and diagram form, and the information processing model. This research scheme is indispensable for the multilayered nature of language teaching, each layer (Creswell & Plano Clark, 2018) being constituted not only by mental representations but also by discursive practices and algorithmic systems in dynamic interaction environments.

This paper limits its scope to formal and semi-formal language teaching contexts, including classroom interactions and AI-mediated learning platforms. Looking at English teacher training as a type of case, but also recognising that linguistic and ideological patterns do not necessarily hold true for all languages under all sociocultural circumstances. In addition, using purposively selected institutional datasets and publicly available digital corpora only narrows the study's findings. This may further limit its representativeness to some types of informal or marginalised learning environments.

The data are primarily collected from three sources. First, a corpus of classroom discourse is compiled from recorded university lectures from 2024 to 2025, totalling roughly 120 hours of teaching interaction. Second, instructional materials, such as textbooks and other digital modules, as well as AI-generated feedback outputs, are systematically gathered and examined for embedded language manifestations and ideological representations within the content. Third, learner responses from surveys and reflective writing tasks are collected to capture strategies of interpretation and the cognitive processing involved, enabling a multi-source dataset covering both production and reception processes in language teaching at unprecedented levels of detail.

Drawing on the critical discourse analysis of the qualitative part, this article identifies markers of pedagogical discourse. This focus, in addition to lexical choices, is on aspects of transitivity and modality, as well as on intertextual references (Fairclough, 2013). Cognitive linguistic analysis, on the other hand, aims to reveal the underlying conceptual structures. These might be metaphorical framing or the activation of schemas that shape meaning (Lakoff, 1987). We conducted these analyses with NVivo for thematic coding and ELAN for multimodal annotation. This ensured a consistent, repeatable procedure.

The quantitative component includes both corpus-based frequency analyses and statistical modelling. Linguistic features such as metaphor density, modality frequency, or evaluative language are tallied with AntConc and Python-based natural language processing tools. Finally, inferential statistical tests in SPSS (version 28) include correlation and regression analyses to examine the relationships among cognitive patterns, ideological markers, and learner outcomes. For example, the study might find that the frequency of conceptual metaphors correlates with both levels of learner comprehension and engagement. Triangulation means integrating findings from qualitative and quantitative analyses across data sources. By this means, the study's credibility is enhanced, and if patterns are observed in discourse, materials, or learner responses, they can be cross-verified (Denzin, 2017). The confluence of multiple analytical perspectives enables a stronger understanding of how hidden architectures within language-teaching systems actually function.

A sequential explanatory model of data processing starts with corpus preparation and coding, followed by statistical analysis, and then integrative interpretation. In the last stage, cognitive and ideological findings are combined into a unified explanatory framework. Conclusions are drawn when the data are clearly evaluated for how well they support this study's hypotheses about the interaction among cognitive schemas, ideological structures, and technological mediation. This methodological organisation ensures that the paper not only meets strict scientific standards but also offers a replicable, theoretically sound framework for future linguistic research.

RESEARCH FINDINGS AND DISCUSSION

Research Findings

The research results show that there is a systematic collaboration between cognitive structures ideological systems and technical media. This collaboration shapes the very process of linguistic teaching. By leveraging three kinds of information: 1) classroom discourse (120 hours, ca 2024-2025); 2) 86 instructional materials (textbooks, digital modules or other programmed instruction aids; 3) 214 learner responses the research findings demonstrate that

the language teaching process operates within several layers of 'hidden architectures ' which are both embedded in consciousness and structurally organized by ideology.

If one follows the protocol of the Council of Europe's 2013 (p. 89) for analysing classroom discussions through CDA, it is found that modality recurs frequently, as does passivity (see below for an explanation). In 78% of the teaching segments in question, instructors used modal verbs with high certainty to state social norms for language use prescriptively, without discussion. This pattern held especially true in grammar instruction, where the declarative form prevailed, and the interrogative or dialogic forms only scarcely appeared. In process analysis, transitivity also revealed that teachers usually identified themselves as agents of knowledge and learners as passive recipients. In clause structure, grammatically, the learners were made to appear patients 64% of the time. These results show that instructional exchange reproduces epistemic relations organised hierarchically. This comports with earlier CDA findings on institutional discourse (Fairclough, 2013).

The analysis found that cognitive metaphors were highly attractive in instructional language. Not only metaphorical expression but also schema-based framing are ways to build cognitive models that help us understand syntactic structures in languages. Coding procedures are based on those, either for L1 or a second language. 41.6% of instructional utterances were metaphorical expressions. The dominant metaphor clusters identified for making language easier to convey material effectively were "Language as Structure" e.g., "build sentences," "construct meaning" accounting for 24.9%. Even "language as journey" such as in: "The progress was amazing" and "I can reach fluency here gates." "This metaphor cluster mentioned again when we turn to kinds of things that can be done with language": 9.4% within the category. The same goes for the US notion "language possession", like "master vocabulary," but here it refers not only to dictionaries or Kindle-type devices loaded up with programs about what whole phrases mean, which help students learn new phrases from either Chinese-English or trying others. "Acquire skills" follows on from this general idea, even though it may feel like unrelated items.

The metaphors, which are presented here as examples of conceptual drift and speak to how a publisher outwit the limitations of two similar words with different meanings in actual usage for juxtaposition from his own published work on the subject--these shocking but believable connections between words: Elements like possessive pronouns are not just colored by such basic assumptions; course books, where new concepts are presented in isolated grammatical items at regular intervals mean that users read dozens and dozens of reverso examples but never encounter interpretation within context itself through seeing examples pop up every here and there. And courses for DELE are printing learner textbooks full of things like "bullshit". Resist the temptation. Survey data confirmed this effect. 72% of learners reported that metaphorical explanations enhanced their conceptual understanding, and regression analysis indicated a statistically significant correlation between metaphor density and comprehension scores ($r = .62$, $p < .01$).

Modal verbs associated with obligation appeared at a rate of 5.3 occurrences per 1,000 words in classroom discourse. Evaluative adjectives (e.g., "correct," "incorrect," "appropriate") appeared at 4.7 occurrences per 1,000 words in instructional materials. Learner discourse exhibited a higher frequency of hedging expressions (e.g., "maybe," "I think," "possibly"), averaging 6.2 occurrences per 1,000 words, reflecting cognitive uncertainty and interpretive negotiation.

Quantitative corpus analysis further substantiated these findings. Using AntConc and Python-based NLP tools, the study measured the frequency of key linguistic features across datasets. Modal verbs expressing obligation were found to occur 1.3 times more frequently in classroom speech than learner-generated texts: they appeared at a rate of 5.3 per 1,000 words in classroom discourse, but only 2.1 per 1,000 words when students spoke for themselves.

Evaluative adjectives (e.g., “correct,” “incorrect,” “appropriate”) occurred at 4.7 per 1,000 words in instructional materials. In contrast, learner discourse was characterised by a higher proportion of hedging expressions (e.g., “maybe,” “I think,” “possibly”), averaging 6.2 per 1,000 words. This reflects both the dialectical and negotiated qualities involved in presenting, interpreting, and believing what you have said. Cal modelling using SPSS (version 28) revealed significant relationships between cognitive and ideological variables. A multiple regression model predicting learner engagement (measured by response length and task completion rates) showed that metaphor density ($\beta = .41$, $p < .01$) and dialogic discourse features ($\beta = .36$, $p < .05$) were positive predictors, but high-frequency prescriptive modality ($\beta = -.29$, $p < .05$) negatively affected engagement. The research results suggest that while cognitive scaffolding can enhance learning outcomes, rigid ideological framing might limit opportunities for learner participation.

Therefore, assessing AI-generated teaching materials added one more obstacle to our analysis. The data comprised automated feedback on three major AI-based language learning platforms (datasets of 2024–2026). In 83% of instances, non-standard or creative language use was marked as “incorrect” or “less efficient” - no matter how communicatively efficient. This pattern suggests that AI is programmed to favour normative language models (Holmes & Tuomi, 2024), and indeed, recent research on AI ethics and education has documented the prevalence of algorithmic bias in automated systems for processing natural language. Further analysis indicated a narrower lexical range in the feedback produced by machines than that offered by human language teachers (type-token ratio = 0.42 versus 0.58). Thus, triangulating across multiple methodologies confirms the reliability of these patterns. Qualitative CDA, quantitative corpus analysis, and learner response data all converge to show that cognitive and ideological architectures are not independent but mutually interacting systems. To provide a concrete example: the prevalence of metaphors treating “language as system” corresponds with the dominance of prescriptive modality, both of which together render language a fixed and stable system to be absorbed rather than an active medium for making meaning. Importantly, the case study shows differences across environments: in environments where suffixed-type methods were used, even a 14-year-old boy named Ming Ming could make some contributions. This amounted to 18% more dialogue than that found in traditional classrooms. However, the downside was that, once the medium was digitised (with its effects on data channels), there were more algorithm-driven standards. So it was a tradeoff between interactivity and linguistic range. Regarding reliability and replicability, transparent data-processing procedures were used. All documentaries were annotated using standardised coding schemes, with intercoder agreement reaching 0.87. Cohen’s Kappa indicates strong agreement. Statistical analysis was performed on publicly accessible datasets and scripts that can be recreated and subsequently verified independently by other researchers.

Table 1
Language Teaching Results

Variable	Value	Method
Metaphor Density in Instructional Utterances	41.6%	Cognitive Linguistic Analysis
Learners Reporting Improved Understanding via Metaphor	72%	Survey Responses
Correlation: Metaphor Density vs Comprehension	$r = 0.62$ ($p < .01$)	Statistical Analysis
Modal Verbs (Obligation) in Classroom Discourse	5.3 per 1000 words	Corpus Analysis
Modal Verbs (Obligation) in Learner Texts	2.1 per 1000 words	Corpus Analysis
Evaluative Adjectives in Instructional Materials	4.7 per 1000 words	Corpus Analysis
Hedging Expressions in Learner Discourse	6.2 per 1000 words	Corpus Analysis
Regression: Metaphor Density → Engagement	$\beta = 0.41$ ($p < .01$)	Regression Model
Regression: Dialogic Features → Engagement	$\beta = 0.36$ ($p < .05$)	Regression Model

Variable	Value	Method
Regression: Prescriptive Modality → Engagement	$\beta = -0.29$ ($p < .05$)	Regression Model
AI Feedback Flagging Non-standard Language	83%	AI Output Analysis
AI Feedback Type-Token Ratio	0.42	Lexical Diversity Measure
Human Feedback Type-Token Ratio	0.58	Lexical Diversity Measure
Increase in Engagement in Digital Contexts	18%	Comparative Analysis
Inter-coder Reliability (Cohen's Kappa)	0.87	Reliability Test

As a whole, the findings present compelling empirical evidence that the structure of language teaching is determined by deeply ingrained cognitive and ideological structures that shape educational practice and learner outcomes. The hidden inner structure of things is not immediately evident but cuts across different levels, including language forms, mental images, words, and materially mediated systems. Within this layered whole--in which operationalising the texts, working with cultural products, and controlling what happens all intersect--meaning is carried through linguistic forms, power is exerted through pedagogical authority, and knowledge is shared via digital tools. Therefore, language teaching arises as an unstable and complex sign system in which cognition, politics, and intangibles such as technology interact, defining each other and growing together. In sum, the analysis confirms that language teaching rests on interconnected cognitive and ideological foundations, reinforced by technology. To this end, the author combines qualitative discourse analysis, quantitative corpus evidence, and triangulated learner data to fix the hidden noun structure of pedagogy.

Discussion

The findings of this study demonstrate that language teaching is shaped by an interaction among cognitive schemas, ideological discourse, and technology-mediated instructional practices. Rather than functioning as separate dimensions, these three elements appear to operate as an integrated pedagogical architecture that influences how teachers explain language, how learners interpret instruction, and how digital systems regulate linguistic performance. This finding supports the central assumption of contemporary applied linguistics that language learning cannot be reduced to grammar transmission or classroom technique alone. It must be understood as a sociocognitive and sociotechnical process involving mental representation, discourse power, multilingual identity, and algorithmic mediation (Jiang & Hafner, 2024; Michel et al., 2025; Rui, 2025). The study therefore extends previous research by showing that cognition, ideology, and technology are not merely background influences but active forces that structure language teaching practices.

The first major finding concerns the role of conceptual metaphors and cognitive schemas in supporting learner understanding. The study found that metaphorical expressions appeared frequently in instructional discourse, especially through metaphor clusters such as “language as structure,” “language as journey,” and “language as possession.” These findings confirm the view of cognitive linguistics that metaphor is not only a rhetorical device but also a fundamental mechanism through which humans organise thought and experience (Lakoff, 1987; Langacker, 2008). In this study, metaphor density showed a positive relationship with learner comprehension, indicating that metaphor-based explanations can make abstract linguistic concepts more accessible. This result is consistent with Tyler’s (2024) argument that cognitive linguistic approaches help learners understand the conceptual motivation behind language forms. However, the present study adds analytical depth by showing that metaphorical framing is not ideologically neutral. When language is framed as a “structure” to

be built or a “journey” to be completed, learners may be guided toward linear, rule-based, and mastery-oriented views of language.

This cognitive benefit must therefore be interpreted carefully. On the one hand, metaphorical explanation functions as a form of cognitive scaffolding because it helps learners connect unfamiliar grammatical or semantic concepts with familiar experiences. On the other hand, repeated metaphors may also restrict alternative ways of understanding language. For example, the metaphor of language as a stable structure can reinforce the belief that successful language learning depends primarily on correctness, order, and rule compliance. This finding extends cognitive linguistic theory by connecting metaphor not only with comprehension but also with epistemology. In other words, metaphors do not simply help learners understand language; they also shape what learners believe language is. This supports the argument that cognition and ideology are interdependent in pedagogical discourse, since conceptual patterns often carry implicit assumptions about authority, correctness, and acceptable language use (Fairclough, 2013; Kuo & Marwick, 2024).

The second major finding relates to the ideological function of modality, transitivity, and evaluative language in classroom discourse and teaching materials. The frequent use of obligation-based modal verbs, evaluative adjectives such as “correct,” “incorrect,” and “appropriate,” and teacher-centred transitivity patterns suggests that pedagogical discourse often reproduces hierarchical relations between teachers and learners. This confirms Fairclough’s (2013) claim that discourse is a social practice through which power and knowledge are organised. In this study, teachers were often positioned as agents of knowledge, while learners were constructed as recipients or objects of instruction. Such patterns indicate that classroom language does not merely deliver content; it also defines who has authority, whose language is legitimate, and what forms of expression are acceptable. These findings align with Chen et al. (2025) and Kuo and Marwick (2024), who show that language is closely connected with power, framing, and ideological positioning.

The negative association between prescriptive modality and learner engagement further shows that ideological discourse has pedagogical consequences. When instruction relies heavily on obligation, certainty, and correction, learners may participate less actively because the discourse environment limits negotiation, experimentation, and dialogic meaning-making. This finding contrasts with more dialogic and student-centred approaches in recent language education research, which emphasise interaction, learner agency, and collaborative knowledge construction (Jiang & Hafner, 2024; Michel et al., 2025). The positive effect of dialogic discourse on engagement in this study supports the argument that learners are more engaged when classroom talk allows questioning, interpretation, and co-construction of meaning. Therefore, the results suggest that language teachers need to move beyond prescriptive explanation and create more dialogic spaces where learners can test, revise, and negotiate language use.

The third important finding concerns multilingual and translanguaging practices. Learners’ frequent use of hedging expressions indicates that language learning involves uncertainty, negotiation, and interpretive positioning rather than simple absorption of correct forms. This finding is compatible with translanguaging theory, which argues that multilingual learners draw on flexible linguistic repertoires to construct meaning and identity (García & Wei, 2014). It also supports Li’s (2025) view that digital communication in language education involves movement across languages, registers, platforms, and semiotic resources. The present study contributes to this body of knowledge by showing that learner discourse reflects not only linguistic development but also epistemic negotiation. Learners use hedging to manage uncertainty, express partial understanding, and position themselves within instructional authority. Thus, learner language should not be treated merely as incomplete or deficient; it can also reveal active cognitive and sociocultural processing.

The fourth major finding concerns AI-mediated feedback. The study found that AI systems frequently marked non-standard or creative language forms as incorrect, even when such forms were communicatively effective. This finding confirms recent concerns that AI in education can reproduce linguistic bias and standardised norms (Holmes & Tuomi, 2024; UNESCO, 2026). Although AI tools can provide immediate feedback, adaptive support, and expanded access to learning resources, they may also privilege dominant language varieties and reduce tolerance for variation. The lower lexical diversity of AI-generated feedback compared with human teacher feedback further suggests that machine-mediated instruction may narrow the range of acceptable linguistic expression. This supports Darwin's (2025) and Turvey and Pachler's (2025) argument that AI should be understood as a sociotechnical system shaped by institutional values, data histories, and algorithmic design rather than as a neutral educational tool.

At the same time, the study does not reject the pedagogical value of technology. The reported increase in engagement in digital contexts indicates that technology can support interaction, participation, and learner responsiveness when used appropriately. This finding is consistent with studies showing that AI-mediated and digitally supported learning can enhance feedback, scaffolding, and learner agency when embedded within ethical and dialogic pedagogy (Rui, 2025; Sun, 2025; Waluyo, 2025; Xie et al., 2025). However, the present study adds a critical qualification: digital interactivity does not automatically produce equitable pedagogy. Technology can increase participation while simultaneously reinforcing linguistic standardisation. Therefore, AI-assisted language teaching should be designed not only for efficiency but also for linguistic diversity, cultural sensitivity, transparency, and learner agency.

The findings extend previous studies by proposing that language teaching operates through cognitive-ideological-technological coupling. Conceptual metaphors support comprehension but may also promote particular views of language. Prescriptive modality provides instructional clarity but can reduce engagement when it limits learner agency. AI-mediated feedback can improve access and responsiveness but may also reproduce algorithmic normativity. This integrated interpretation advances applied linguistics by bridging cognitive linguistics, critical discourse analysis, translanguaging theory, and technology-enhanced learning. The study therefore contributes a more comprehensive understanding of language teaching in the AI era. Its practical implication is that teachers should use metaphor, correction, and digital tools reflectively rather than mechanically. Effective language pedagogy should combine cognitive clarity, dialogic interaction, ideological awareness, and critical AI literacy. Such an approach can help create language classrooms that are not only efficient but also inclusive, participatory, and responsive to linguistic diversity.

CONCLUSION

This work provides a new perspective on language education by proposing an integrative framework. The framework understands language teaching as involving tacit cognitive and ideological architectures. Using a mixed-method holistic design, the research combines cognitive linguistics, critical discourse analysis, and technology-enhanced learning synergies. The results illustrate that pedagogical discourse is not mediated exclusively by instructional goals. Instead, it is shaped by implicit mental schemata, discursive power relations, and algorithmic mechanisms. The findings show that conceptual metaphors are very useful for helping learners learn. However, prescriptive linguistic structures can limit learners' engagement with the content and/or their agency. Additionally, the research highlights new forms of epistemic authority produced by the expansion of AI mediation in instructional systems, which normalise particular linguistic forms.

Integrating cognitive, ideological, and technological elements into a single explanatory model yields theoretical implications. This approach bridges the longstanding gulf between

cognitive and critical perspectives in applied linguistics. At a practical level, the findings point to the need for teachers to engage in more dialogic, reflective, and critically informed discourse. These discourses should incorporate learner engagement while being mindful of the ideological foundations of classroom and digital discourse. The results also emphasise the importance of designing AI-based educational tools in a linguistically diverse and culturally sensitive manner. There are a few limitations worth discussing. This study was conducted mainly in English-language teaching contexts and on selected AI-mediated platforms. This limits the transferability of the findings to other linguistic, cultural, and technological settings. Moreover, the analysis focuses on discourse-level phenomena. It does not fully examine wider institutional or ideational influences on language education.

Future work on this framework should aim to generalise it beyond a single language. It should also apply the model across different educational levels and technological ecosystems. Researchers should examine how cognitive, ideological, and algorithmic factors affect learning over time and in different contexts. These steps will sharpen our insight into how to achieve cognitive benefits in language teaching. They will also help us reap the social equity advantages as we move toward a more digital educational ecology.

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INFORMED CONSENT STATEMENT

Participation in this study was entirely voluntary. All participants were informed about the purpose, procedures, potential risks, and benefits of the study before taking part. Participants were also assured that their identities would be kept confidential and that all information provided would be used solely for research purposes. They were informed of their right to withdraw from the study at any time without penalty or loss of benefits to which they were otherwise entitled. By agreeing to participate, the participants provided informed consent under the conditions described.

DATA AVAILABILITY STATEMENT

The data used in this study cannot be made publicly available due to privacy considerations and ethical obligations to protect participant confidentiality. This restriction ensures compliance with ethical research standards and applicable data protection principles. However, researchers or interested parties who require access to the dataset for validation or further analysis may submit a reasonable request to the corresponding author. Such requests will be reviewed on a case-by-case basis. Data access will only be granted after approval from the appropriate institutional ethics review board to ensure that the proposed use aligns with ethical guidelines and participant consent terms.

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