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AI-Human Collaboration in Education and Psychology: Personalised Learning, Language Acquisition and Student Support Systems

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ABSTRACT

The growing ability of artificial intelligence (AI) to be integrated into educational systems has transformed the practice of teaching, learning, and supporting students, and has put into doubt the nature and efficiency of AI-human interaction. The systematic review summarises empirical and grey literature of AI-human interaction in education and psychology, namely personalised learning, language acquisition, and student support systems in the K-12 and higher-education environment. According to the guidelines of PRISMA 2020, a multidisciplinary search took place in multidisciplinary databases and in official policy sources, resulting in those studies that analysed both academic, psychological, and professional endpoints related to AI-assisted learning settings. The results suggest that AI-mediated personalised learning systems attain an optimum effectiveness when integrated into the human-guided pedagogical models. There is consistent evidence of better student results, such as understanding, retention, and language acquisition, especially in the hybrid models where AI is used to give adaptive feedback and analytics, whereas teachers are used to provide instructional scaffolding and socio-emotional support. Psychologically, AI tools help to improve engagement, autonomy, and motivation, but such advantages are only possible based on the active mediation of teachers to promote emotional well-being and learner agency. The review also explains that AI can assist the professional practice of teachers by automating the administration process and providing more specific feedback, which will create the opportunity to spend more time on relational and higher-order instructions. In spite of these advantages, the ethical issues of data privacy, algorithmic bias, transparency and equity stand out. The review concludes that the transformative possibilities of AI in education are not based on automation but are rather based on ethically regulated collaboration, which is both human-centred and in line with pedagogical values and psychological principles. Discussions on implications of research, practice and policy are discussed.

INTRODUCTION

The rapid development of artificial intelligence (AI) has led to a radical transformation of education systems worldwide, reshaping how teaching, learning, evaluation, and student support are conceptualised and delivered. The modern literature is moving away towards deterministic accounts according to which AI will eliminate human teachers. Rather, AI is presented as a co-teacher that is more than a human brain, which creates signs of hybrid or human-in-the-loop learning environments that combine computational intelligence with human deliberation, empathy, and pedagogical willfulness (Luckin *et al.*, 2022; Luckin *et al.*, 2016; Molenaar, 2024; Poudel & Maharjan, 2025; Gonzalo, 2025). The AI-human collaboration paradigm is especially relevant to education and psychology, where learning is not a purely cognitive experience but an emotional, motivational, and socially situated process that requires ethical sensitivity and a relational approach.

Intelligent tutoring systems, adaptive learning systems, natural language processing (NLP) systems, generative AI systems, and learning analytics are examples of AI-based educational technologies that have shown enormous potential to scale personalisation of instruction. These systems dynamically adjust content, pacing, assessment and feedback according to prior knowledge of learners, learning paths and behavioural information and accordingly tackle the long-standing problem of learner heterogeneity in the K12, higher education and adult learning settings (VanLehn, 2011; Kulik & Fletcher, 2016; Wang *et al.*, 2024). More recent empirical experiments and meta-analyses converge in showing that AI-based personalised learning can result in quantifiable improvements in academic performance, student engagement, and retention compared with homogeneous or teacher-only instructional models (Hu, 2024; Chen, 2025; Vieriu & Petrea, 2025). Such impacts are strong, especially in cases where AI systems are integrated in pedagogically based designs that maintain meaningful human control (Ellikkal & Rajamohan, 2025; Vorobyeva *et al.*, 2025).

In the language education field, AI-based applications have become a hub of AI-human interaction. It has been demonstrated that automated writing assessment, speech recognition, conversational agents, and adaptive

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feedback systems can facilitate vocabulary acquisition, syntactic development, pronunciation accuracy, and communicative competence as a result of the sustained low-stakes practice opportunities (Godwin-Jones, 2018; Huang *et al.*, 2023; Gonzalo, 2025). Current literature also proves that hybrid feedback models, where teachers deliver interpretive, motivational, and culturally relevant feedback, and AI delivers immediate, data-based feedback, are more effective than each of the two approaches individually (Bai & Nordin, 2025; Arefian, 2025; Yang, 2025). Psychologically, these results may be explained by self-determination theory, which highlights the importance of autonomy, competence, and relatedness in maintaining learner motivation; however, AI cannot provide full fulfilment unless human intervention is involved (Ma & Chen, 2025; Li *et al.*, 2025).

In addition to the provision of instruction, artificial intelligence systems are beginning to support the professional practice of teachers by automating routine administrative and analytical systems such as grading, tracking attendance, formative evaluation, and monitoring student progress. According to policy and industry reports, this type of automation can reduce the administrative workload of teachers by an average of 20-30 per cent, and thus allow teachers to spend more time and resources on high-impact pedagogical activities, including individualised instruction, dialogic teaching, and socio-emotional support (World Economic Forum [WEF], 2020; OECD, 2021). Empirical studies of teacher engagement also show that placing technology as a replacement for teacher knowledge leads to a decrease in the level of professionalness and instructional quality, and vice versa, where technology improves the reflective, formative, and adaptive abilities of the teacher, leading to the emergence of substantive professional learning, instructional innovation, pedagogical agency and long term increases in teaching quality. Therefore, the emergence of AI-enhanced professional learning structures, especially human-machine dialogic systems, is being defined as a means of extended pedagogical growth, as opposed to a means of managerial surveillance.

Psychologically and socio-cognitively, AI-human partnership is associated with raising some essential concerns related to student engagement, agency, motivation, and well-being. Although AI tutors are capable of delivering fast feedback, predictive hints, and adaptive scaffolds, human teachers continue to be required to interpret affective expressions, build trust, and aid identity formation and metacognitive development in learners (D'Mello & Graesser, 2015; Jarvela *et al.*, 2023). The investigations of hybrid learning models always prove that the best learning performance and psychological health outcomes are achieved in cases when AI systems provide the structured mental support and educators pay attention to the relational, motivational, and moral aspects of the learning (Roll & Wylie, 2016; Wang *et al.*, 2025). AI-based early-warning systems and learning analytics can be used as an instrument within student support services to understand learners who are potentially at risk of academic disengagement or even psychological distress, but only under the condition that the human interpretation and intervention are responsible (Sclater *et al.*, 2016; Norela *et al.*, 2025).

Despite the above pedagogical and psychological advantages, the integration of artificial intelligence in education has serious ethical, social, and governance concerns. Issues related to data privacy, algorithmic bias, explainability, surveillance, and equal access are especially relevant in education and psychology, where children and vulnerable populations are involved (Williamson & Eynon, 2020; UNESCO, 2021). The conclusion is justified by cross-sectional studies in journalism, public-health communication, and cyber-security governance that suggest that effective implementation of AI requires substantial human controls, contextual sensitivity, and responsibility systems, and not only technical protective measures (Abdulrauf *et al.*, 2025a; Adaji *et al.*, 2025). These discoveries also continue to shape the debate on the topic of educational AI, as they support the point of view that teachers and educational leaders should not be simply users of AI systems, but also ethical agents who moderate the application of technologies in ways that respect the autonomy, dignity and well-being of learners (Floridi *et al.*, 2018; Hamilton Mann & Platt, 2024).

Since the number of AI applications in educational environments is growing rapidly, the need to systematise the available evidence on the functionality of AI-human cooperation in the instructional, psychological, and governance contexts is becoming increasingly more urgent. The current reviews often focus on the effectiveness of the technology or learning outcomes but give minimal importance to the changing roles of the teachers, the psychological needs of the learners, or the ethical infrastructures needed to ensure the responsible implementation of the technology (Boussouf *et al.*, 2024; Wang *et al.*, 2024). In addition, relevant evidence is still scattered among peer-reviewed scholarly journals, cross-disciplinary conference papers, and policy-focused grey literature produced by organisations including IEEE, ACM, UNESCO, and international research consortia.

To this end, this systematic review attempts to summarise empirical and theoretical findings on AI-human cooperation in K-12 and higher education, and especially in personalised learning, language education, psychological development, and student interventions. In particular, the four interrelated questions are discussed in the review: (1) how effective AI-supported personalised learning systems are to student performance (2) how AI supports professional practice and pedagogical decision-making by teachers; (3) how human educators change their roles in psychological, emotional, and motivational development of learners in AI-enhanced learning settings; and (4) what ethical frameworks are required in responsible and human-centred practice. It is hoped that, guided by systematic review protocols that will be adhered to, this study will offer an integrated and theoretically

informed understanding that can help guide educators, researchers, policymakers, and technology designers on how AI can be used to improve, rather than diminish, the human underpinnings of education.

MATERIALS AND METHODS

Review Design and Protocol

In order to ensure methodological rigour, transparency, and reproducibility, this study used a systematic review methodology to synthesise existing empirical and conceptual evidence on AI–human collaboration in education and psychology. The review was carried out in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. Before the study started, a review protocol was developed to specify the objectives, research questions, eligibility criteria, search strategy, screening procedures, data extraction processes, and synthesis approach. Developing the protocol a priori reduced the risk of selective reporting and researcher bias while offering a structured roadmap for the review process. Any deviations from the protocol were recorded and justified to maintain methodological integrity.

Review Scope and Conceptual Framing

An interdisciplinary conceptual framework that incorporates viewpoints from educational technology, learning sciences, and educational psychology served as a guide for the review's scope. The deliberate integration of AI-enabled systems with the pedagogical, psychological, and ethical responsibilities of human educators was operationalised as AI–human collaboration. Personalised learning, language acquisition, and student support systems were given special attention in the review, which concentrated on formal educational settings in K–12 and higher education. This framing recognised that AI systems interact dynamically with educators, students, and institutional settings rather than operating in a vacuum.

Eligibility Criteria

Eligibility criteria were set using the Population, Intervention, Comparator, Outcome, Context (PICOC) framework to ensure consistency and relevance. The population included students and educators in K-12 and higher education settings. This included studies that looked at cognitive, emotional, or socio-psychological aspects of learning. Interventions involved AI-enabled educational systems that featured human-AI collaboration. These included intelligent tutoring systems, adaptive learning platforms, conversational agents, automated feedback tools, and AI-supported student support or learning analytics systems. Comparator conditions featured traditional teacher-led instruction, non-AI digital learning tools, or other instructional methods. The outcomes of interest covered academic results, like language acquisition, comprehension, and retention; psychological effects, such as engagement, motivation, and well-being; and professional outcomes for educators, including workload, instructional practices, and time allocation. The review was limited to formal educational contexts. It included empirical quantitative, qualitative, and mixed-methods studies, as well as high-quality grey literature. It excluded purely technical AI studies without educational applications, opinion pieces, and non-English publications.

Information Sources and Search Strategy

A thorough and organised search strategy was used to collect both peer-reviewed and grey literature. The academic databases searched included Scopus, Web of Science, ERIC, PsycINFO, IEEE Xplore, ACM Digital Library, and arXiv. These choices showed the interdisciplinary nature of the topic. Grey literature came from reliable organisations and policy groups like UNESCO, OECD, the World Economic Forum, and national education or technology agencies. Search strings included keywords and specific terms related to artificial intelligence, such as "artificial intelligence," "intelligent tutoring systems," and "adaptive learning." They also covered human collaboration with terms like "human-in-the-loop" and "teacher-AI collaboration," along with educational and psychological outcomes such as "personalised learning," "language acquisition," "student support," and "well-being." Boolean operators, truncation, and filters specific to each database helped narrow down the search results. The search focused on studies published from 2010 onward to capture the latest developments in AI.

Study Selection Process

All the records that were retrieved were imported into a citation management software package. Duplicates were eliminated. Study selection was done in a two-step process. The title and abstract of potential studies were reviewed for relevance to the inclusion criteria in the initial process. This helped to remove studies that were clearly not relevant. The next process required the full text of the potential studies for a more thorough assessment. This process of selection was done in an independent manner by two people to improve validity. This process is recorded using a PRISMA flow chart.

Data Extraction

A structured data extraction form was designed to harvest relevant information from all selected studies. The variables that had been extracted included: Bibliographic information, Study context and setting, Educational level, Characteristics of participants, Study design, Characteristics of AI system, Nature of human-AI collaboration, Outcome measurements, Key findings, and Noted ethical issues.

Risk-of-Bias and Quality Assessment

The methodological rigour and risk of bias in the studies incorporated have been evaluated systematically in order to ensure the results are interpreted in an appropriate

manner. Due to the variability in the types of studies incorporated in the review, a variety of criteria have been employed. In the case of the quantitative studies incorporated in the systematic review, the incorporation of bias in selecting the studies for the review, performance bias, validity in the measures of the outcomes, and the control of confounding variables have all been evaluated. In the qualitative studies incorporated in the systematic review, the credibility, transferability, dependability, and confirmability have all been evaluated.

Data Synthesis and Analysis

Since it was expected that the study designs, AI systems configuration, and outcome measures would be heterogeneous, a narrative synthesis approach was chosen. Themes were ranked according to both the general research questions of the review, therefore, helping to incorporate educational, psychological and ethical aspects. Quantitative evidence was synthesised descriptively, highlighting trends in the findings and reported effect sizes where such data were reported, and qualitative evidence was synthesised to reveal common themes related to AI-human cooperation. This synthesis predetermined the relations between AI functions, the role of human teachers, and student performance, instead of emphasising individual technological impacts.

Reporting and Transparency

The review was in line with the PRISMA 2020 reporting standards, consequently providing transparency and complete reporting. The major methodological choices, including inclusion criteria, screening results, and quality evaluations, were clearly outlined. Restrictions related to the publication bias, heterogeneity, and evidence gaps were properly considered to justify the careful interpretation and to inform future research.

RESULTS AND DISCUSSIONS

Overview of Included Studies

The systematic review covered both empirical and conceptual studies as well as review studies that investigated AI–human collaboration in K-12, higher education, and adult learning settings. About 50 key studies were examined, and four related topics were discussed, namely AI-enabled personalised learning, teacher professional practice, psychological engagement and well-being, and ethical and governance. Table 1 presents a summary of the key studies included in the review.

Temporal Distribution

Most of the published sources were within the years of 2024 to 2026, thus highlighting the growing and modern academic interest in AI applications in the educational setting. A previous body of conceptual work, including that of Dellermann *et al.* (2021), provides the conceptual frameworks guiding hybrid intelligence. To the contrary, the majority of the empirical research studies concentrate on the practical application and the resulting consequences of AI-based learning in practice.

Geographic Coverage

In the studies, a wide global context of Africa (Abdulrauf *et al.*, 2025a; Akpabio *et al.*, 2025), Asia (Kong and Yang, 2024), Europe (Kretzschmar *et al.*, 2024; Hamilton Mann and Platt, 2024), North America (Clark and Tafini, 2024; Zhang *et al.*, 2025), and multi-country/global reviews are represented. This universality testifies to the fact of the universal applicability of AI-human cooperative methods in educational organisations, but at the same time, the specifics of the region, including infrastructural opportunities, the policy system, and the cultural adjustment of AI technologies.

Publication Sources

The studies used in this review were obtained in peer-reviewed journals, conference papers, book chapters, preprint archives like arXiv and SSRN. This sampling method highlights the academic quality of the literature as well as the immature and fast-developing nature of artificial intelligence in the field of educational research, since preprint and conference publications often precede official journal publication due to the rapid technological advances.

Study Types

The literature is a diverse collection of empirical research, meta-analyses, conceptual frameworks and reviews. The corpus is dominated by empirical studies that provide evidence of the effects of artificial intelligence on the learning outcomes, student engagement, and teacher practice (Ma and Chen, 2025; Ellikkal and Rajamohan, 2025). Theoretical scaffolding, ethical issues, and design concepts of the hybrid AI-human systems are available in conceptual studies (Dellermann *et al.*, 2021; Yan, 2025) and review articles (Abdulrauf *et al.*, 2025a).

Global Trends

Essentially, the bibliometric synopsis above points to the trend of combined human and AI cooperation in the learning domain. Most of the studies pointed to the incapability of AI to produce optimal learning results on its own and the need for integration with other factors that address the ethical and psychological issues surrounding AI application.

Table 1: Summary of Included Studies on AI–Human Collaboration in Education

Author(s)	Year	Country/ Context	AI Type	Sample/ Participants	Focus/ Domain	Key Outcomes
Ma & Chen	2025	Various	AI-powered language feedback	Language learners	Language acquisition	↑ Autonomy, ↓ Anxiety, ↑ Vocabulary & fluency

Basri	2024	Higher Education	Intelligent Tutoring System	University students	STEM & Management	↑ Learning outcomes, ↑ retention
Ellikkal & Rajamohan	2025	Higher Education	Adaptive learning + AI dashboards	Management students	Management education	↑ Engagement, ↑ academic performance
Wan & Gu	2025	Teacher education	AI-supported PD platforms	Pre-service & in-service teachers	Professional development	↑ Pedagogical knowledge, ↑ student-centred practice
Baskara	2024	University	Generative AI	University students	Language & metacognitive skills	↑ Metacognitive skills, ↑ engagement
Li *et al.*	2025	China	AI learning platforms	Undergraduate students	Motivation & well-being	↑ Autonomy, ↑ academic engagement
Yan	2025	K–12	Generative AI agent	Diverse learners	Collaborative learning	↑ Agency, ↑ self-regulation
Zhang *et al.*	2025	Higher Education	Multi-agent GenAI system	University teachers & students	Personalised learning	↑ Human-AI collaboration, ↑ alignment with pedagogy
Abdulrauf *et al.*	2025	Africa	AI communication & analytics	Public health & education	Ethics & governance	↑ Awareness, ↓ info fatigue
Adaji *et al.*	2025	International	AI governance frameworks	Business analysts & educators	Ethical AI deployment	↑ Compliance, ↑ transparency
Hamilton Mann & Platt	2024	Europe	AI-enabled hybrid collaboration	Education & society	Policy & governance	↑ Stakeholder trust, ↑ ethical deployment
Dellermann *et al.*	2021	International	Hybrid intelligence	Multi-domain	AI-human collaboration	Conceptual taxonomy
Akpabio *et al.*	2025	Nigeria	AI-based English learning tools	Secondary & tertiary learners	Language learning	Vocabulary, ↑ fluency, ↑ autonomy
Yesilyurt	2023	Global	AI-enabled feedback	Language learners	Assessment & feedback	↑ Writing performance, ↑ learner engagement
Hu	2024	Meta-analysis	AI-assisted learning platforms	31 empirical studies	Academic achievement	↑ Academic performance, ↑ engagement
Chen	2025	US	AI-assisted personalised learning	University students	Academic performance	↑ Exam scores, ↑ retention
Arefian	2025	Iran	AI-human feedback	Language teachers & students	Teacher assessment literacy	↑ Teacher capacity, ↑ learner outcomes
Kesar *et al.*	2026	IGI Global case	AI-enhanced network learning	K–12 & higher ed	Personalised & ethical AI	↑ Inclusion, ↑ self-regulation
Ma	2025	International	AI + human intelligence	Language learners	Foreign language education	↑ Engagement, ↑ retention
Molenaar	2024	Netherlands	AI-human hybrid	Secondary & higher education	Collaborative learning	Conceptual insights

Vieriu & Petrea	2025	Romania	AI-enabled education tools	University students	Academic development	↑ Learning outcomes, ↑ motivation
Wang *et al.*	2025	International	AI-driven personalised learning	University students	Psychological outcomes	↑ Engagement, ↑ motivation
Kretzschmar *et al.*	2024	Germany	AI personalised learning	Higher education	Learning outcomes	↑ Engagement, ↑ retention
Clark & Tafini	2024	USA	AI-human interface	Chemistry students	STEM education	↑ Academic performance
Jamil	2025	Data science courses	AI-assisted lecture design	University learners	Personalized instruction	↑ Engagement, ↑ adaptive learning
Kong & Yang	2024	K–12	Generative AI for self-regulated learning	Secondary students	Self-regulated learning	↑ Autonomy, ↑ motivation
Shukla & Pandey	2025	Global	Human-AI collaboration	Teachers & students	Teaching & learning	Conceptual synthesis

AI-Assisted Personalised Learning and Academic Outcomes

In its synthesis, the analysed literature analysis presents the strong and consistent results that AI-supported personalised learning systems have better academic results when practised as part of the teacher-guided learning systems, but not as fully autonomous learning systems. Statistically significant improvements in achievement, retention, and mastery of tasks have been observed when adaptive AI systems are applied to supplement teacher-led learning in empirical studies in K-12, higher education, and adult learning (Basri, 2024; Chen, 2025; Ellikkal & Rajamohan, 2025; Vieriu & Petrea, 2025). The results of meta-analytic and systematic reviews also support the presence of moderate to large effect sizes on AI-assisted personalised learning on academic performance, specifically in cognitively challenging areas that need repetitive practice and feedback (Hu, 2024; Wang *et al.*, 2024; Boussouf *et al.*, 2024).

A number of studies highlight the fact that intelligent tutoring systems and AI-driven feedback tools are most useful when they instantiate proven learning-science principles, such as spaced repetition, mastery learning, adaptive scaffolding, etc. (VanLehn, 2011; Basri, 2024). This conclusion is extended by recent findings in the emerging education settings that show that AI-based tutoring systems with customised feedback can produce a strong impact on student performance even in the secondary school setting with limited resources, although teachers need to be actively engaged in the interpretation and follow-up (Adayilo *et al.*, 2026). The findings are contrary to initial presumptions, suggesting that AI effectiveness relies on the presence of high-resource conditions and is rather focused on human mediation, rather than technological growth.

The hybrid models, which integrate AI analytics with teacher dashboards, have continued to document better results in comparison with fully automated systems or traditional instruction. Research on multi-agent and GenAI-assisted learning environments indicates that AIs can be useful in eliciting latent learning, anticipating misunderstandings, and individualising learning processes, whereas teacher-centred pedagogical judgement, motivational encouragement, and contextual adjustment can be given (Zhang *et al.*, 2025; Kong & Yang, 2024; Jamil, 2025). This division of labour is what Dellermann *et al.* (2021) term as hybrid intelligence, whereby the computational and human advantages are tactfully coordinated to maximise the learning process.

Teacher Professional Practice and Engagement

In addition to the implication on student achievement, the evidence indicates that AI-human collaboration leads to significant changes in professional practice, interaction, and pedagogical decision-making of teachers. According to survey-based and mixed-methods studies carried out in the field of higher education and teacher-education programmes, educators utilising AI techs in non-surveillant and collaborative situations report higher rates of instructional engagement, self-efficacy, and openness to pedagogical innovation (Kim *et al.*, 2025; Wan & Gu, 2025). These findings are in line with broader literature on professional-development, which respects sustained teacher engagement with autonomy, contextual relevance, and reflective practice opportunities, instead of adherence to technology (Harper-Hill *et al.*, 2022; Salter & Tett, 2022).

Professional learning environments with AI reinforcement, especially those encouraging dialogic human-machine interaction, have been observed to enhance pedagogic reasoning and formative assessment skills and responsiveness to student diversity among teachers (Wan & Gu, 2025; Jaiswal & Arun, 2021). In these environments, AI systems will act as cognitive co-workers but not commanding teachers and will provide data-based suggestions but leave the interpretation and moral decision-making to the instructors. The empirical research on the use of AI-enhanced teacher

dashboards also supports the idea that the adoption of AI is accompanied by better classroom discourse, more accurate scaffolding, and better consistency of assessment and learning goals when teachers maintain control over the introduction of analytics into the educational process (Kong & Yang, 2024; Zhang *et al.*, 2024).

Notably, there is evidence that the resistance of teachers to the use of AI is more associated with relational and ethical, as opposed to technical, issues. Findings through the use of both governance and human-AI collaboration models based on cybersecurity and organisational research indicate that transparency, explainability, and role clarity have significant impacts on professional trust in AI systems (Adaji *et al.*, 2025; Umoh *et al.*, 2025). These results highlight the necessity of positioning AI as an ergonomic professional tool that supplements teacher competence instead of being an evaluation or a replacement process.

Psychological Dimensions: Engagement, Motivation, and Well-Being

The reviewed literature provides a significant amount of evidence that predetermines the psychological consequences of AI-human cooperation with a specific focus on the topics of learner engagement, motivation, and well-being. Empirical research based on the self-determination theory has revealed on a consistent basis that AI tools are the most psychologically useful when human educators extensively contextualise AI feedback to assist learners with the necessary needs of autonomy, competence, and relatedness (Ma & Chen, 2025; Li *et al.*, 2025). As much as AI-informed personalisation can improve competence by itself as a result of adaptive feedback, long-term motivation and engagement require the support of the relationship offered by teachers.

The literature on the topic of experimental and quasi-experimental studies conducted in the context of language and higher education demonstrates that AI-based learning experiences can help decrease anxiety, enhance learner confidence, and encourage metacognitive awareness when presented to teachers as a formative partner in learning as opposed to a performance-surveillance mechanism (Baskara, 2024; Shkembi *et al.*, 2024). Similarly, AI-based systems that can result in dialogic interaction have been demonstrated to support reflective thinking and self-regulation, especially when teachers instruct learners on how to critically assess AI-generated feedback (Yan, 2025; Jarvela *et al.*, 2023).

On the other hand, fully automated learning environments with AIs have ambivalent psychological results. A number of studies document reduced interaction and shallow learning in the case of AI systems that are not appropriately facilitated by humans, further supporting the fact that over-automation can be detrimental to the feeling of agency and belonging between students (Habib *et al.*, 2025; Wang *et al.*, 2025). The results point to the fact that the psychological well-being of AI-enhanced education is not technologically determined, but rather relational.

Language Acquisition and Human Scaffolding

Within language education, the results highlight the essential factor of human scaffolding in the AI-enhanced learning situations. The instruments based on AI, such as automatic composition evaluation, pronunciation corrective comments, and chatbots, continue to generate improvements in linguistic accuracy, fluency, and frequency of instruction (Akpabio *et al.*, 2025; Yesilyurt, 2023). However, longitudinal and mixed-method research studies show that the quality of learning outcomes depends on the ability of the teachers to place AI-generated feedback within the framework of the sociocultural, pragmatic, and affective aspects of language practice (Bai & Nordin, 2025; Arefian, 2025).

Educators represent a central mediational hub in terms of cultural delicacy, discursive suitability, and communicative purpose areas, where modern AI-based practices are still lacking. Empirical research, based on the scaffolding theory and socio-cultural conceptions of second-language acquisition, indicates that AI is most effective as a micro-level scaffold, with educators offering macro-level instruction, which includes linguistic form, meaning and use (Hamidi & Bagherzadeh, 2018; Owuamanam, 2020). This scaffold tier is consistent with neurocognitive theories according to which language learning is not a strictly computational process but a type of social process (Dove, 2020).

Ethical, Equity, and Implementation Considerations

Although the academic and psychological outcomes are mostly positive, the results demonstrate some long-standing ethical, equity and governance issues within the educational settings. The systematic reviews and policy-oriented research continually find risks related to algorithmic bias, non-transparent decision-making, data privacy violations, and unequal access to AI infrastructure (Williamson & Eynon, 2020; UNESCO, 2021; Wang *et al.*, 2024). In particular, these issues are acute in environments where resources are scarce, and insufficient teacher training and infrastructural issues can reinforce digital disparities (Adayilo *et al.*, 2026; Mulaudzi & Hamilton, 2024)

The fact that the ethical application of AI involves the need to employ human accountability frameworks, context-sensitive reasoning, and sustained monitoring in addition to technical protection through cross-domain evidence of public health communication, journalism, and cybersecurity governance supports the assertion that ethical AI application must be established (Abdulrauf *et al.*, 2025b; Adaji *et al.*, 2025). In education, schools that implement the principles of participatory governance (that is, involving teachers, students, and administrators in the development of AI policies) have been reported to have more trust, adhere to ethical standards, and align their pedagogical practices (Hamilton Mann & Platt, 2024; Kesar *et al.*, 2026).

College-level policy studies also show that the institutional reaction to generative AI is cautious and insecure but is gradually changing to assessments based

on authentic and process-oriented evaluation predictive of human judgment and critical thinking (Zhang *et al.*, 2025; Zheng & Chen, 2025). Such results indicate that AI implementation cannot be fixed to the ethical dimension without the wider pedagogical reform, but not a technological issue all on its own.

Discussion

Integrating AI to Enhance Human Instruction

The findings of this systematic review reinforce a central finding of contemporaneous education research: AI's potential in education lies not with automation but in the augmentation of human teaching. In different contexts and subjects, AI systems are most pedagogically valuable when they function as adaptive cognitive tools infused in human-led instructional frameworks. AI-driven personalisation can bring many benefits to students, like adjusting the pace of learning, giving immediate feedback, and using data to create personal learning pathways. However, these benefits are consistently amplified when teachers are the ones to interpret the AI output, add context, and apply a human touch (Ma & Chen, 2025; Ellikkal & Rajamohan, 2025; Basri, 2024).

This finding confirms that expert guidance helps with knowledge construction, knowledge transfer and motivation, in line with the well-recognised cognitive and sociocultural theories of learning (Hamidi & Bagherzadeh, 2018; Owuamanam, 2020). AI systems can provide micro-level scaffolding when they respond in real-time to learner inputs. However, they cannot provide the scaffolding necessary for learners' cultural identities, emotional states, and epistemic beliefs. Teacher scaffolding is crucial in interpreting algorithmic feedback in meaningful ways, especially in complex learning situations such as language learning and problem solving (Bai & Nordin, 2025; Arefian, 2025).

The evidence reviewed suggests that successful integration of AI-human instruction reflects hybrid intelligence principles whereby task allocation is optimised based on the respective strengths of the human and the machine (Dellermann *et al.*, 2021; Molenaar, 2024). Artificial intelligence is good at spotting and manipulating patterns and information. Also, AI can repeat processes exactly, requiring no breaks and torturing no one. However, teachers are good at interpretation, ethical reflection, and relationship management. Educational systems that do not acknowledge this division of work otherwise can underuse AI or adversely impact the didactic determinants of teachers by automating the teaching process excessively.

Psychological Engagement and Sustainability

Veiwing at it from a psychological standpoint, it is possible to affirm that engagement is not driven by technology but rather by framing and support. AI systems can allow for self-paced practices, can potentially lower the cognitive overload of learners, and can provide timely feedback. These features are associated with greater learner persistence and perceived competence (Hu, 2024; Chen, 2025). The effect of AI tools to sustain and deepen student engagement will depend critically upon the educators' agency and integration.

According to self-determination theory, studies indicate that AI systems contribute most to student motivation when they enhance students' autonomy and competence, whereas teachers contribute relatedness through dialogue, affirmation, and socio-emotional attunement (Ma & Chen, 2025; Li *et al.*, 2025). As students receive AI feedback, they can view it as not personal and evaluative, which can hurt their motivation and agency (Habib *et al.*, 2025; Wang *et al.*, 2025). AI-facilitated involvement is constructed relationally, not technologically.

The advantages of using AI in collaboration with students extend to the educators, too. Research on teacher engagement and professional development suggests that collaborative use of AI can enhance teachers' professional efficacy, agency and innovativeness, particularly when AI is placed as a supportive pedagogical partner rather than a surveillance tool (Harper-Hill *et al.*, 2022; Wan & Gu, 2025). According to the conservation of resources theory, having supportive means, as well as autonomy at work, can alleviate occupational stress and therefore lead to sustained engagement over time. AI and human collaboration and sustainability are a big focus of EdTech today because of their impact on human behaviour.

Language Learning as a Model of Human–AI Complementarity

The current review defines language education as an example of paradigm efficacy of human-AI complementarity. Cyclic practice, immediate corrective feedback, and eventual exposure to linguistic input features that AIs are particularly effective in providing, specifically, vocabulary learning, pronunciation, and syntactic accuracy (Akpabio *et al.*, 2025; Yesilyurt, 2023). However, it is always shown that meaningful language acquisition will still be conditional based on human mediation, particularly concerning pragmatics, culture, and intentionality of communication (Bai & Nordin, 2025; Ma, 2025).

Conceptually, these results can be discussed in terms of the sociocultural and neurocognitive approaches to the conceptualisation of language as a socially constructed and identity-infused phenomenon instead of a strictly formal system (Dove, 2020). In this regard, teachers are critical in turning AI-generated feedback into dialogic learning experiences, which, in turn, will motivate metacognitive reflection and develop confidence and readiness to communicate in learners. In turn, AI hybrid feedback models result in not only beneficial linguistic performance but also the psychological needs of a learner to belong and express themselves (Arefian, 2025; Baskara, 2024).

Navigating Ethical, Equity, and Governance Complexities

A review of AI-human partnership in the educational

setting cannot be complete without the mention of the ethical and governance issues that dominate AI integration. Empirical studies always show that there are still unresolved issues regarding data protection, algorithm bias, transparency and unfair access (Williamson & Eynon, 2020; UNESCO, 2021). These problems are not technical in nature, and they have a far-reaching impact on the dynamics of trust between students, teachers and institutions.

The assumption of the need to implement sustainable human control and context-specific decisions when deploying AI ethically is supported by cross-sectoral evidence on the one hand in the field of public-health communication, journalism, and cybersecurity regulation, on the other hand, through evidence of auto-compliance-oriented AI implementation (Abdulrauf *et al.*, 2025b; Adaji *et al.*, 2025). In popular educational contexts, educators and institutional administrators engage in salient ethical positions, where they mediate AI use to ensure the autonomy of learners, their psychological well-being and equity.

The tension is further explained by the institutional reactions to generative AI. The studies of university policies indicate a shift from overt prohibition to pedagogically-based governance frameworks that preempt transparency, ethical literacy and reassessment redesign (Zhang *et al.*, 2025; Zheng & Chen, 2025). According to such models, ethical AI incorporation cannot be considered without holistic reform of education, which requires consistency in curriculum design, workforce growth and institutional culture (Hamilton Mann & Platt, 2024; Kesar *et al.*, 2026).

Implications for Theory, Practice, and Research

Altogether, the results and their discussion reveal that AI-human cooperation in the educational sphere should be understood as a socio-technical system that is based on the learning theory, psychological science, and ethical governance (Yan, 2025; Shukla & Pandey, 2025). Such findings highlight how such an evaluation's method has moved beyond tool-based assessments of AI performativity to relationship-focused and context-specific models that preempt human agency and responsibility.

In practical implications, the evidence is an indication of the priority of the teacher professional development, participatory governance, and psychologically informed instructional design. Such initiatives are critical towards the incorporation of the socio-technical outlook into the normal educational practice.

Research-wise, the results point to the need to conduct longitudinal, mixed-method studies that will not just examine the results of learning but also identity development, well-being, and the ethical decision-making process in AI-enhanced learning settings. The future development of AI as a sustainable aspect of education has less to do with the sophistication of algorithms than with the ability of educational systems to maintain and enhance the human basis of the teaching and learning process.

CONCLUSION

It is a systematic review that summarises peer-reviewed and grey literature regarding AI-human cooperation in the fields of education and psychology, focusing on the personalised learning, language learning, and student support in K-12 and postsecondary settings. The synthesized evidence is always that AI can best serve as an augmentative tool, which adds value to but does not replace the pedagogical, relational and ethical mandates of teachers as traditionally understood.

Individualised AI-based systems have proven to be effective at improving academic outcomes, specifically student understanding, retention, and language skills, especially in hybrid learning environments where educators respond to the data analytics interpretation, scaffolding of learning, and responding to socio-emotional needs. Psychologically speaking, AI-mediated spaces can encourage motivation, autonomy, and engagement; however, the inclusion of human educators is invaluable towards the promotion of the emotional growth and wellbeing of students.

Additionally, AI enhances professional practice by automating administrative tasks and providing actionable information, which will release educators to focus on mentorship and can provide advanced instructional materials. However, the concerns about privacy of data, bias in algorithms, transparency, and unfair access are present throughout the literature. The longitudinal and mixed-method designs must be used in the future to evaluate the long-term academic, psychological, and professional implications of AI-human collaboration.

REFERENCES

Abdulrauf, H. , Lawal, A.A. , Yusuf, Z.B. , Babatayo, S. , Ademola, C. , Odejide, G.S. , Adekoya, O.A. and Ayobami, U. (2025a) Artificial Intelligence and Public Health Communication in Africa: A Critical Synthesis of Emerging Evidence and Conceptual Gaps. *Open Journal of Social Sciences, 13,* 346-363. https://doi.org/10.4236/jss.2025.139021.

Abdulrauf, H., Lawal, A. A., Mba, A. N. U., Ademola, C., Yusuf, Z. B., Babatayo, S., & Ayinde, I. (2025b). Artificial Intelligence in Journalism: A Narrative Review of Opportunities, Challenges, Ethical Tensions, and Human-Machine Collaboration. *American Journal of Arts and Human Science, 4*(4), 5–18. https://doi.org/10.54536/ajahs.v4i4.5963

Adaji, C. C., Bello, A. A., Ukatu, C. E., Okika, N., Agboola, O. K., & Amomo, C. G. (2025). AI-Powered Cybersecurity Governance: The Role of Business Analysts in Ethical AI Deployment. *International Journal of Innovative Science and Research Technology, 10*(3), 1384-1396. https://doi.org/10.38124/ijisrt/25mar924.

Adayilo, D. M., Oyefolahan, I. O., Ndunagu, J. N., Otuya, C., Malcalm, E., & Twabu, K. (2026). AI-Powered Tutoring Systems for Personalised Learning Feedback in Developing Secondary Education Contexts. *Journal of Future Artificial Intelligence and Technologies, 2*(4), 549-564.

Akpabio, E., Akpabio, I., & Akpabio, I. (2025). Leveraging AI for Personalized English Language Learning: Tailoring Instruction to Individual Needs. In *AI Applications for English Language Learning* (pp. 385-414). IGI Global Scientific Publishing.

Arefian, M. H. (2025). *Supporting Iranian Teachers' Language Assessment Literacy: A Hybrid AI–Human Feedback Approach within Collaborative Action Research.*

Bai, X., & Nordin, N. R. M. (2025). Human-AI collaborative feedback in improving EFL writing performance: An analysis based on natural language processing technology. *Eurasian Journal of Applied Linguistics, 11*(1), 1-19.

Baskara, F. R. (2024, November). Fostering metacognitive skills through AI-human dialogues: A new paradigm for language learning. In *Proceeding of International Conference on Language Pedagogy (ICOLP)* (Vol. 4, No. 1, pp. 140-151).

Basri, W. S. (2024). Effectiveness of AI-powered Tutoring Systems in Enhancing Learning Outcomes. *Eurasian Journal of Educational Research (EJER),* (110).

Boussouf, Z., Amrani, H., Khal, M. Z., & Daidai, F. (2024). Artificial intelligence in education: A systematic literature review. *Data and Metadata, 3,* 288.

Chen, M. (2025). The impact of AI-assisted personalized learning on student academic achievement. *US-China Education Review, 15*(6), 441-450.

Clark, T. M., & Tafini, N. (2024). Exploring the AI–Human Interface for Personalized Learning in a Chemical Context. *Journal of Chemical Education, 101*(11), 4916-4923.

D'Mello, S., & Graesser, A. (2015). Feeling, thinking, and computing with affect-aware learning technologies. *Educational Psychologist, 50*(4), 329–345. https://doi.org/10.1080/00461520.2015.1075408

Dellermann, D., Calma, A., Lipusch, N., Weber, T., Weigel, S., & Ebel, P. (2021). *The future of human-AI collaboration: a taxonomy of design knowledge for hybrid intelligence systems.* arXiv preprint arXiv:2105.03354.

Dove, G. (2020). More than a scaffold: Language is a neuroenhancement. *Cognitive neuropsychology, 37*(5-6), 288-311.

Ellikkal, A., & Rajamohan, S. (2025). AI-enabled personalized learning: empowering management students for improving engagement and academic performance. *Vilakshan-XIMB Journal of Management, 22*(1), 28-44.

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., ... & Vayena, E. (2018). AI4People—An ethical framework for a good AI society: Opportunities, risks, principles, and recommendations. *Minds and machines, 28*(4), 689-707.

Godwin-Jones, R. (2018). Using mobile technology to develop language skills and cultural understanding. *Language Learning & Technology, 22*(3), 1–17.

Gonzalo, J. (2025). Generative AI as a learning tool in aviation: A review of pedagogical approaches and outcomes. *Journal of Educational Technology and E-Learning Innovations, 1*(2), 1–7.

Habib, M. U., Sattar, A., Iqbal, M. J., & Saleem, S. (2025). AI Driven Tutoring vs. Human Teachers Examining the on Student Teacher Relationship. *Review of Applied Management and Social Sciences, 8*(1), 363-374.

Hamidi, E., & Bagherzadeh, R. (2018). The logical problem of scaffolding in second language acquisition. *Asian-Pacific Journal of Second and Foreign Language Education, 3*(1), 19.

Hamilton Mann, C. W., & Platt, M. (2024). A new era of AI-supported human collaboration and societal transformation. *European Business Review.*

Harper-Hill, K., Beamish, W., Hay, S., Whelan, M., Kerr, J., Zelenko, O., & Villalba, C. (2022). Teacher engagement in professional learning: what makes the difference to teacher practice?. *Studies in Continuing Education, 44*(1), 105-118.

Hu, S. (2024). The effect of artificial intelligence-assisted personalized learning on student learning outcomes: A meta-analysis based on 31 empirical research papers. *Science Insights Education Frontiers, 24*(1), 3873-3894.

Huang, X., Zou, D., Cheng, G., Chen, X., & Xie, H. (2023). Trends, research issues and applications of artificial intelligence in language education. *Educational Technology & Society, 26*(1), 112-131.

Jaiswal, A., & Arun, C. J. (2021). Potential of Artificial Intelligence for transformation of the education system in India. *International Journal of Education and Development using Information and Communication Technology, 17*(1), 142-158.

Jamil, H. M. (2025). Human–AI Co-Orchestration in Data Science Education: Interactive, Adaptive, and Personalized Lecture Design for Diverse Learners. *ACM Transactions on Computing Education.*

Järvelä, S., Nguyen, A., & Hadwin, A. (2023). Human and artificial intelligence collaboration for socially shared regulation in learning. *British Journal of Educational Technology, 54*(5), 1057-1076.

Kesar, B., Joseph, S., & Kesar, D. (2026). AI-Enhanced Network Learning Theory Transforming Education Through Personalized, Inclusive, and Ethical Artificial Intelligence. In *Reshaping Blended Learning Environments With AI* (pp. 53-84). IGI Global Scientific Publishing.

Kim, J., Yu, S., Detrick, R., Lin, X., & Li, N. (2025). Designing AI-powered learning: adult learners' expectations for curriculum and human-AI interaction. *Educational technology research and development, 73*(6), 3397-3421.

Kong, S. C., & Yang, Y. (2024). A human-centered learning and teaching framework using generative artificial intelligence for self-regulated learning development through domain knowledge learning in K–12 settings. *IEEE Transactions on Learning Technologies, 17,* 1562-1573.

Kretzschmar, V., Sailer, A., Wertenauer, M., & Seitz, J. (2024). Enhanced Educational Experiences through Personalized and AI-based Learning. *International Journal on Studies in Education (IJonSE), 6*(2).

Kulik, J. A., & Fletcher, J. D. (2016). Effectiveness of intelligent tutoring systems: A meta-analytic review. *Review of Educational Research, 86*(1), 42–78. https://doi.org/10.3102/0034654315581420

Li, Y., Sueb, R., & Said Hashim, K. (2025). Basic Psychological Needs and Psychological Well-Being Among Undergraduate Students in China: The Mediating Role of Autonomous Motivation and Academic Engagement. *Psychology Research and Behavior Management,* 527-549.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education.* Pearson.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2022). *Artificial intelligence in education: Promises and implications for teaching and learning.* Pearson.

Ma, N. (2025). Exploration of the Collaboration between Artificial Intelligence and Human Intelligence in Foreign Language Education. *future, 8*(3), 126-131.

Ma, Y., & Chen, M. (2025). The Human Touch in AI: Optimizing Language Learning through Self-Determination. *Frontiers in Psychology, 16,* 1568239.

Molenaar, I. (2024). *Human–AI collaboration in education: The hybrid future.*

Mulaudzi, L., & Hamilton, J. (2024). Student perspectives on optimising AI tools to enhance personalised learning in higher education. *Interdisciplinary Journal of Education Research, 6*(s1), 1-15.

Norela, M., Apolo, D. I. R., Dávila, M. F. E., Garces, C. B. U., & Tomalá, M. P. C. (2025). Artificial Intelligence to Strengthen Pedagogical Support for Students with Learning Disorders. *Prisma Journal, 1*(4), 384-396.

Owuamanam, C. N. (2020). Scaffolding and language development in infants and adolescents. *Journal of Nigeria Languages' Studies (NILAS), 4*(2), 173–189.

Poudel, S., & Maharjan, S. (2025). Artificial intelligence and education in Nepal: A mixed-methods study on student adoption and learning outcomes. *American Journal of Data Science and Artificial Intelligence, 1*(2), 18–25.

Roll, I., & Wylie, R. (2016). Evolution and revolution in artificial intelligence in education. *International Journal of Artificial Intelligence in Education, 26*(2), 582–599. https://doi.org/10.1007/s40593-016-0110-3

Salter, D. E., & Tett, D. L. (2022). Sustaining teacher engagement in practitioner research. *Journal of Education for Teaching, 48*(3), 287-299.

Sclater, N., Peasgood, A., & Mullan, J. (2016). Learning analytics in higher education. *London: Jisc. Accessed February, 8*(2017), 176.

Shkembi, F., Sauku, V. H., Ibrahimi, S., & Ibrahimi, E. (2024). The psychological impact of online education on student well-being and motivation. *International Social Sciences and Education Journal, 2*(2), 01-08.

Shukla, H., & Pandey, K. (2025). Human-AI Collaboration in Teaching and Learning. Available at SSRN 5198554.

Umoh, B. U., Bello, A., Okika, N., Ukatu, C. E., & Kabiru, A. O. (2025). The intersection of artificial intelligence and human decision-making in cybersecurity resilience: Business analysis perspective. *CogNexus, 1*(02), 26-36.

UNESCO. (2021). *Ethical guidelines on the use of artificial intelligence in education.* UNESCO Publishing.

VanLehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. *Educational Psychologist, 46*(4), 197–221. https://doi.org/10.1080/00461520.2011.611369

Vieriu, A. M., & Petrea, G. (2025). The impact of artificial intelligence (AI) on students' academic development. *Education Sciences, 15*(3), 343.

Vorobyeva, K. I., Belous, S., Savchenko, N. V., Smirnova, L. M., Nikitina, S. A., & Zhdanov, S. P. (2025). Personalized Learning through AI: Pedagogical Approaches and Critical Insights. *Contemporary Educational Technology, 17*(2).

Wan, P., & Gu, X. (2025). Developing teachers' professional abilities: a systematic review of human-machine dialogic learning for teacher education. *Interactive Learning Environments,* 1-25.

Wang, J., Hussain, Y., & Mao, C. (2025). Artificial Intelligence-Driven Personalized Learning: Psychological Implications and Educational Outcomes. Int. *J. Educ. Humanit. Soc. Sci, 2*(1), 1.

Wang, S., Wang, F., Zhu, Z., Wang, J., Tran, T., & Du, Z. (2024). Artificial intelligence in education: A systematic literature review. *Expert Systems with Applications, 252,* 124167.

Williamson, B., & Eynon, R. (2020). Historical threads, missing links, and future directions in AI in education. *Learning, Media and Technology, 45*(3), 223–235. https://doi.org/10.1080/17439884.2020.1798995

Yan, L. (2025). *From Passive Tool to Socio-cognitive Teammate: A Conceptual Framework for Agentic AI in Human-AI Collaborative Learning.* arXiv preprint arXiv:2508.14825.

Yang, M. L. (2025). Artificial intelligence versus human teacher assistants and language learners' progress in learning and retention of complex sentences. *Current Psychology, 44*(7), 6292-6304.

Yesilyurt, Y. E. (2023). AI-enabled assessment and feedback mechanisms for language learning: Transforming pedagogy and learner experience. In *Transforming the language teaching experience in the age of AI* (pp. 25-43). IGI Global.

ZHANG, L., Jackson, H., Yang, S., Qian, X., Carter, R., Diliberto, J., & Zhang, J. (2024). Prototyping A Multi-Agent System to Enhance AI-Human Collaboration in Individualized Education Program Development.

Zhang, L., Yao, Z., & Hadizadeh Moghaddam, A. (2025). Designing GenAI Tools for Personalized Learning Implementation: Theoretical Analysis and Prototype of a Multi-Agent System. *Journal of Teacher Education, 76*(3), 280-293.

Zheng, C., & Chen, G. (2025). The AI Co-Pilot: A Culturally-Responsive Framework for Orchestrating Interactive Learning in the Classroom. *International Journal of Chinese Education, 14*(3), 2212585X251400819.