

Artificial intelligence usage in the teaching-learning process: perception and challenges

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ABSTRACT

Artificial intelligence (AI) has advanced in the post-pandemic era and is unavoidable in teaching and learning. Teachers' perceptions, as the primary gatekeepers, are essential for ensuring quality education and inclusive classrooms, with AI as a collaborator. While some teachers resist these technological shifts, others are actively adapting an AI-assisted teaching approach. We conducted this study to understand the reasons for teachers' resistance (challenges and difficulties) and how they perceive the use of AI in the teaching, learning, and assessment process, because the first step in effective incorporation is having a favorable attitude towards it. Hence, this study explored the perceptions of 15 secondary private school teachers, selected through purposive sampling, regarding the incorporation of AI into teaching, learning, and assessment processes, as well as the challenges they faced. The researchers developed an in-depth interview schedule and conducted interviews to understand participants' perceptions and challenges. The data is analyzed following the thematic analysis steps by Braun and Clarke. Thematic analysis revealed that teachers demonstrated a positive understanding towards the pedagogical relevance of AI, rather than merely having a favorable perception. Furthermore, teachers predominantly viewed AI as an additional tool to enhance the effectiveness of knowledge transactions and instructional design. The challenges include infrastructure accessibility and professional training; time management for preparation, skill updating, and fulfilling varied teaching and other responsibilities; the inability to verify the accuracy of information; and parental mindset. This study offers insights for developing AI-aided teacher training and relevant curricula for schools.

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1. INTRODUCTION

The use of artificial intelligence (AI) has grown exponentially across multiple sectors in recent years, infiltrating the educational landscape, and it was necessary to improve the quality of teaching and learning to build the competencies required in the 21st century [1]. Although many educators emphasized the need for AI integration in education, the pace of its implementation was very slow. However, the COVID-19 pandemic made AI an inevitable part of the teaching, learning, and assessment process. As learning moved from offline to online and then to hybrid mode, technology became integral in sustaining educational processes. During the pandemic, the incorporation of AI in education (AIED) became necessary, despite

insufficient preparation and resistance from many. Innovative assessment and learning pedagogies were introduced to ensure continued learning. Hence, understanding teachers' perceptions maximizes the efficient incorporation of AI tools into the teaching and learning process, even in extreme external scenarios such as a pandemic.

Post-pandemic, there have been drastic changes in the way the entire teaching-learning process is viewed. There has been an increasing adoption of blended learning and other virtual assistive tools to make the learning process joyful and engaging [2]. Students have become increasingly attuned to using learning analytics dashboards, adaptive learning systems, and automated assessments. These teaching-learning aids enable teachers to identify weak and shy students, cater to diverse learners, and foster an inclusive classroom environment [3]. Although many teachers were unequipped for the AI-aided transition from the traditional method, they have been compelled to become familiar with AI teaching aids. The shift in pedagogical approach has brought about this compulsion; however, further curricular orientation and teacher training are still needed [4]. Many teachers believe that using AI hinders children's development of patience for more intensive tasks. Many also feel that the use of AI teaching tools makes teaching feel machine-like and impersonal, which in turn triggers absenteeism [5]. Nonetheless, many teachers have embraced AIED and have begun using various AI tools in their teaching and student interaction [6]. This study emphasizes understanding how teachers perceive the use of AI, why they resist its incorporation, and the challenges they face when incorporating it.

Studies have shown that the use of digital aids and AI systems promotes a self-regulated learning atmosphere for students, giving them a sense of ownership and fostering a student-centered learning environment [7]. AIEDs have transformed from merely uploading teaching content online to creating lesson plans, assessment sheets, posters, presentations, quizzes, and gamified activities with immediate feedback [8]. Newer AI tools provide a personalized learning environment, content development ideas, subject data analytics, grading and assessment reports, planning, and administration [9]. AI tools also enhance instructors' and students' autonomy and provide a more engaging environment [10]. AI can help teachers plan their content based on students' needs and subsequently track student progress and the effectiveness of their content delivery. However, the teachers' digital skill sets play a crucial role in their interest in adopting AI, and studies have shown that the pandemic catalyzed the use of various digital aids in teaching and learning, leading to an increased willingness among teachers to use AI [11].

The COVID-19 pandemic served as a catalyst for the adoption of AI teaching aids in education as a necessary adaptation for remote learning. However, due to AI's tremendous potential to create engaging learning experiences, its adoption has extended beyond the pandemic and is no longer a compulsion for teachers. The pedagogical marks of AI incorporation, such as a personalized learning environment, individualized attention, gamified assessments, continuous monitoring, immediate feedback, and engaging activities, can create an optimal learning environment and a more sustainable educational atmosphere. AI incorporation in education is not merely a technological shift, but a techno-pedagogical shift. Nonetheless, the fear of AI replacing teachers remains prevalent, hindering many teachers' interest and willingness to adopt AI [12]. It must be emphasized that AI is not about replacing human teachers but about bringing out their best qualities to achieve better educational outcomes [13].

Moreover, the development of AIED is not limited to software developers; teachers can collaborate to integrate ideas for AI-incorporated teaching [14] successfully. The voluntary incorporation of AI as a complement to traditional teaching is necessary to foster a more effective, equitable, and engaging teaching and learning experience for all learners. Despite the shift back to in-person instruction in education post-pandemic, demand for AI tools in education has only increased, reflecting a broader recognition of their true potential as evidenced by the growing number of research studies on teachers' use of AI in recent years. There has been an increase in pre-service and in-service teachers becoming AI-proficient and using it effectively, and this can lead to better outcomes in future teaching and learning [15]. Furthermore, professional development programs focusing on the collaborative potential of AI teaching aids can foster a more positive perception of AI's incorporation into teaching and learning [16], [17].

In the context of the rapid inclusion of AIED, the current study was conducted to understand teachers' perceptions of incorporating AI teaching aids into daily classroom practice and the challenges they encounter. Based on the review of the recent literature, teachers' perceptions emerge from their lived experiences in regular classroom teaching. For maximized efficient inclusion of AI, it is necessary to understand how teachers perceive AI use, the challenges they face, and the resistance some show. Their lived experience, still less explored, is relevant to researchers, policymakers, and subject matter experts in designing curriculum and capacity-building frameworks to promote the effective incorporation of AI and overcome various obstacles, such as infrastructure, relevance, efficiency, and mindset [18]. This study is relevant because it identifies teachers' perspectives on incorporating current AI advancements into regular teaching. Understanding perceptions prevents a one-size-fits-all approach to professional training, as research

suggests that familiarity with AI affects one's use rather than experience or age. The research questions of this study were:

- i) What are the perceptions of teachers about the incorporation of AI in the teaching-learning process?
- ii) What are the challenges for teachers about the incorporation of AI in the teaching-learning process?

The present study explored teachers' perceptions of incorporating AI into their daily teaching and learning. To better understand the teachers' perceptions, three important theoretical frameworks were considered. They were the technology acceptance model (TAM), technological pedagogical content knowledge (TPACK) framework, and diffusion of innovation (DOI) theory. The TAM model [19] was incorporated in this study to understand teachers' perceived usefulness and perceived ease of use of AI. Perceived usefulness refers to the degree to which a teacher believes AI teaching aids can enhance their teaching efficiency and effectiveness. Perceived ease of use refers to the teacher finding an AI teaching aid that helps them without much effort. In this study, perceived ease of use and usefulness were examined among teachers to understand their adoption of AI and their hesitancy to use it. The TPACK framework [20] was used to understand how technological knowledge enabled teachers to navigate instructional designs informed by their content expertise. Rogers [21] DOI theory was used to categorize teachers by their levels of innovation adoption. Based on the DOI, innovative teachers are comfortable integrating AI into their teaching, planning, and assessments. In contrast, some teachers are overly cautious about incorporating AI due to ethical concerns, and others are resistant to using AI due to a lack of institutional support and insufficient training.

2. METHOD

2.1. Research design

This current study adopted an exploratory research design to explore secondary school teachers' perceptions of incorporating AI into their daily teaching and learning interactions, using an interpretive lens and an expository design. An interpretive lens helps one gain deeper insight into an individual's perceptions, leading to an enriching subjective experience [22]. The collected subjective experiences were qualitatively analyzed to examine participants' perceptions of AI use. Expository design elucidates the systematic discussion of the recurrent patterns emerging from the interview data from teacher participants.

2.2. Participants of the study

This study involved 15 secondary private school teachers from West Bengal and Karnataka, India, with at least 4 years of teaching experience in secondary grades. Participants were selected through purposive sampling for the interview. This technique was considered appropriate because it enabled the selection of well-positioned teachers to make meaningful contributions to the study's objective. Table 1 shows the demographic details of the participants. A sample size of 15 was considered sufficient to capture the insights, as data saturation may be achieved with 15 participants for homogeneous samples [23], [24]. An interview schedule was developed and validated by a panel of external experts from the field for the relevance and structure of the questions. Although data saturation was reached with the eleventh participant, the interviews continued with four more participants to gather further insights.

Table 1. Demographic details of participants

Pseudonym	Age	Gender	Teacher trainee/educator	Educational qualification
SET1	38	F	Secondary teacher	M.A., B.Ed.
SET2	31	F	Secondary teacher	M.Sc., B.Ed.
SET3	33	F	Secondary teacher	B.Sc., B.Ed.
SET4	42	M	Secondary teacher	M.A., M.Ed., LL.B.
SET5	43	M	Secondary teacher	M.Sc., B.Ed.
SET6	48	F	Secondary teacher	M.A., M.Ed.
SET7	46	F	Secondary teacher	M.Com., B.Ed.
SET8	29	M	Secondary teacher	M.Sc., B.Ed.
SET9	37	F	Secondary teacher	B.Sc., B.Ed.
SET10	29	F	Secondary teacher	M.A., B.Ed.
SET11	32	F	Secondary teacher	M.A., B.Ed.
SET12	29	F	Secondary teacher	M.Sc., B.Ed.
SET13	34	M	Secondary teacher	M.A., B.Ed.
SET14	38	F	Secondary teacher	M.A. B. Ed.
SET15	41	F	Secondary teacher	M.Com., B.Ed.

2.3. Ethical considerations

The study protocol was submitted to the Institutional Review Board (IRB) of the respective institution for ethical approval. Informed consent was obtained from participants before the semi-structured interviews, and they had the option to withdraw at any time. Each interviewee was informed that the recorded audio would be stored in a password-protected file until the completion of the research study and that it would be erased thereafter.

2.4. Data collection procedure

An interview schedule was developed based on a recent literature review and three rounds of expert validation. The experts evaluated the interview questionnaire based on the study's relevance, objectives and rationale. Each interview began with a brief elicitation of the study purpose and the signing of the consent form [25]. Interview questions focused on exploring participants' subjective experiences of AI use in their daily teaching. The interviews were conducted by telephone because the interviewees were not comfortable with video calls. Each interview lasted an average of 40 to 50 minutes. Pseudonyms were assigned to the recorded interviews, which were saved in a password-protected folder. The funnel technique [26] was used to design the interview roadmap. An open-ended question, such as "tell me about your daily teaching experience," was asked first. Each interviewee began their narrative in their own way. Some started with their first day of teaching, others with their most memorable experience using digital aids during COVID-19, and others discussed their excitement, innovative ideas, concerns, and anxiety surrounding AI use. To wrap up the interview, the interviewer summarized the responses and asked whether the participants wanted to add anything. The narrative, attentive nature, and the addition of last-minute details were made possible by the funnel technique.

2.5. Data analysis

The 15 interviews were first transcribed, and the transcripts were initially read multiple times to get familiar with the data. An inductive thematic analysis of Braun and Clarke was followed to identify significant themes in teachers' subjective experiences. Data were organized, and meaningful portions were determined to generate initial codes based on the perceptions. Themes derived from the observed perception patterns in the transcripts were logically organized. The analysis was a reiterative process: the researcher revisited the themes, organized them, identified sub-themes, and extracted supporting chunks from the data. Although interrater reliability was not calculated, as thematic analysis focuses on subjective interpretation to establish the reliability of the themes and sub-themes generated and to ensure transparency, each author reviewed the generated themes, thereby minimizing subjectivity and ensuring rigorous analysis [27].

3. RESULTS AND DISCUSSION

The inductive thematic analysis of the 15 interview transcripts revealed that secondary teachers held diverse perceptions regarding the incorporation of AI into their teaching and learning. Amid dynamic changes in education, a few teachers were actively incorporating AI into lesson planning, presentations, and gamified assessments. Most participants had positive notions about using AI in the classroom. Furthermore, some teachers also discussed their tendency to use AI, but due to a lack of resources within institutions or school rules, they could not make it more effective. Interestingly, the educators were skeptical about ethical clearances and the limitations they entailed, underscoring the need for greater emphasis on training. Table 2 presents the main themes and subthemes that emerged from the data analysis, depicting the secondary school teachers' perceptions of AI. In the subsequent sections, each theme and subtheme have been described with relevant excerpts from the interview transcripts. Table 2 demonstrates the themes and subthemes the researcher identified from the analysis of the interviews.

3.1. Perception and attitude towards AI

Many teachers perceive that AI is only for retrieving lesson plans, reviewing assessments, and providing feedback. They take their ideas and prompts to create content aligned to learner needs [28]. Teachers agree that incorporating AI into teaching and learning helps motivate students to develop their techno-pedagogical competency [29]. They also believe it may help students better understand and analyses the content [30]. The interviewed teachers admitted that it has significant potential for classroom use; some of them expressed their perceptions regarding AI:

"We used to be busy with our presentation, but it has reduced. We can concentrate on learning difficulties." (SET 13)

"I think AI eradicates the cumbersome techniques that we used to have earlier." (SET 5)

Table 2. Themes and subthemes related to the perceptions of secondary teachers about AI incorporation in teaching-learning

Themes	Subthemes
Perception and attitude towards AI	AI as a collaborative tool AI as a threat to teaching roles AI literacy among teachers AI's impact on student learning
AI Usage in classrooms	AI in the planning and preparation of classes AI in interactive and engaging content creation AI in conducting classes AI for automated tasks AI in assessments
Challenges in AI adoption	Lesson planning Structuring content Flexibility and adaptability Digital tools for increased engagement Teaching with gamification Visual and audio aids Interactive learning strategies AI for increasing student participation AI-based classroom Blended learning approaches AI as a collaborative and assisting tool AI assistance to save time Automated attendance and grading Personalized one-to-one feedback AI in reducing teacher workload AI-based formative assessments Bias and reliability in AI-aided grading Ethical usage of AI in assessments Digital literacy and training needs Lack of institutional resources Ethical concerns in AI usage AI-induced cognitive disruptions

3.1.1. AI as a collaborative tool

To many teachers, AI is not a tool but a partner that helps them plan and develop syllabi, conduct attendance and assessments, and provide feedback [31]. It is evident from the perceptions identified.

“I think that teachers of this generation have a lot to learn themselves, and AI is a colleague to work with.” (SET 5)

Various AI features are attracting teachers seeking an enriching classroom experience, such as automating daily administrative tasks, providing a personalized learning environment, and enabling individualized student support [32], [33]. Improved academic performance resulting from exposure to a customized learning environment showcases the power of AI-enabled learning platforms [34]. Teachers need to feel the ease of use and trust in using AI tools in classrooms to achieve better student performance [35]. Studies show that, for synergy between AI and pedagogical strategies for teachers, there is also a need for practical guidance on using these digital tools [30]. While some teachers believe AI tools were only needed during the pandemic, others recognize their benefits but lack the skills to incorporate them effectively. Other factors also contribute to the unwillingness to use AI in daily classes, such as comfort zone, students' respect, and control over students [36].

“I like Google Forms and upload it to Google Classroom for quick revisions. Google Docs is very helpful in this regard. I like ChatGPT for quick ideas.” (SET 7)

3.1.2. AI as a threat to teaching roles

Some teachers still believe that these new technologies are more burdensome than helpful. However, more young teachers are increasingly active using it in their daily lives, enabling them to incorporate it into curricula as well [37].

“AI, yet I am not familiar.” (SET 10)

“You cannot pretend that just because you are not talking about it, they do not know about it.

It is best when an adult comes into the picture and tells them what is right and wrong.” (SET 11)

Students use AI to generate idea prompts and provide writing guidance. Nevertheless, due to a lack of age-specific content at times, misunderstandings happen between teachers and students [29]. Some teachers expressed what they faced:

“Students are challenging the teachers based on online content. They are not aware that not all knowledge is deliverable for all age groups.” (SET 2)

“They know that even if they do not pay attention in class, they still get the materials and do not need to listen, taking schools for granted.” (SET 4)

Teachers are not replaceable, as they can help students channelize the new learning systems for better outcomes. Students’ overreliance on digital tools can lead to violations of ethical or intellectual property rights. They are not aware of age-specific content choices or of nurturing filtered content with their own ideas [38].

“A lot of students feel that teachers are replaceable as they perceive that teacher are information givers, just like Google or ChatGPT for information.” (SET 6)

3.1.3. AI literacy among teachers

Students may face discrimination due to receiving unfair feedback, data encryption and zero age-specific limitations that require strong ethical guidelines. Teachers are treating AI aids as complicated due to their inadequate knowledge and refusal to adapt to them [39]. Teachers fear a lack of control and the replacement of classroom teachers with AI [40].

“Students believe that everything can be replaced. If they make a mistake, it does not leave a long-lasting effect.” (SET 4)

Some teachers believe that AI tools decrease social interaction skills and erode cognitive abilities, hindering human interaction [41].

“Students are more AI-oriented than their brains. AI should not be available under 18.” (SET 9)

3.1.4. AI’s impact on student learning

AI tools are mostly impersonal and repetitive, whereas teachers, through ongoing assessment and understanding, can help students gather, demonstrate, and process information. Moreover, AI tools cannot transfer traditional and cultural values [42]. Some of the interviewed teachers’ notions regarding this were:

“For the kids, it will kill the thought process of a child as he is getting the answers instantly.” (SET 15)

3.2. AI usage in classrooms

3.2.1. AI in planning their classes

Lesson planning: many teachers admitted they followed a conventional plan of introduction, explanation and assessment, with few changes to accommodate learners’ different needs [43]. The teachers believed that a heterogeneous class with varying needs would not fit with prior plans.

“I prefer ChatGPT to get a quick summary and lesson plan that I copy-paste into my Google Doc.” (SET 4)

“Anytime plans can change for students. How to cater for that with AI ideas?” (SET 6)

Structuring content: a broader aspect of pedagogical content knowledge involves students’ problem-solving, creative, and critical attitudes [44]. AI can scaffold the lesson planning process and fine-tune it, though teachers still prefer traditional lesson planning methods [45].

“I prefer writing lesson plans manually after coming to school, as I chalk out what I will do every day.” (SET 6)

“I generate a lesson plan based on bots giving various ideas, and I design based on those.” (SET 15)

According to another teacher, lesson plans and textbooks helped teachers understand local traditions and students’ mindsets in a particular region. The teacher admitted that using ChatGPT was beneficial, as it provided a quick summary even when they were not prepared, whilst another teacher considered the manual lesson plan a benefit.

“I love how ChatGPT gives a quick summary of a lesson plan model that I can copy and redesign into my Google Doc.” (SET 4)

Flexibility and adaptability: teachers preferred to follow lesson plans and textbooks that aligned with diverse traditions to preserve institutional ethics and engagement [38]. However, Google Docs and Google Classroom helped teachers upload it, and students could access it whenever they needed.

“I like to do it in Google Docs. Google Docs is better as I can share it quickly.” (SET 15)

3.2.2. AI in interactive and engaging content creation

Various AI teaching aids ensure that diverse learners are more motivated, engaged, and achieve better academic results. It facilitates a further, more individualized, practical learning experience [46]. A teacher supports the same.

“I love Pinterest and ChatGPT platforms for various ideas to identify the struggling points of each child.” (SET 9)

Digital tools for increased engagement: storytelling is a popular engagement that, according to research, facilitates better understanding. Teachers admitted that presenting videos on AI-enabled sites helps students engage more effectively [47]. Teachers used new techniques, such as interactive storytelling [48]. A 29-year-old teacher shared an effective student engagement strategy.

“I prefer Gemini, for audiobooks and personalized stories.” (SET 8)

Teaching with gamification: for adolescents, the use of gamified technology is encouraged, but with proper guidance that supports their active participation and motivation [49]. Gamification, aided by digital tools and AI, has been shown to increase engagement and motivation among learners [38]. Teachers used images and videos to create a gamified environment for joyful learning.

“I like to use images and videos to help the children connect to the topic. They are immediately drawn to it.” (SET 6)

Visual and audio aids: teaching is a dynamic process, and the use of digital aids can help the teacher adapt to students' pace and catalyze their curiosity. Based on the e-learning teaching aids, teachers continuously monitored students' requirements and adjusted their teaching accordingly [50].

“I go to YouTube, search for a topic and look for interesting videos if available. The child gives references and speaks about what they have heard or seen in that video.” (SET 7)

Interactive learning strategies: teachers used flashcards and infographics to foster creativity and critical thinking among students, creating a more interactive learning experience [51]. A teacher told:

“I love poster, infographic, and flashcard making, etc. They discuss how it relates to the topic.” (SET 6)

Teachers and students were positive about quizzes, and many used Kahoot. Along with those videos, real-life clippings provided more participation [52].

“I like Kahoot sometimes. I am more comfortable with Quizziz.” (SET 6)

3.2.3. AI in conducting classes

The lack of AI relevance in pedagogical concepts created challenges for teachers, but the growing number of positive outcomes is a compelling argument for AI implementation [53].

“I don't understand the use of chatbots in my subject. I don't think AI has much to do with it if I demand Bengali texts. Spellings, information is wrong.” (SET 5)

AI for increasing student participation: research suggests that students' academic outcomes or engagement depend on teachers' instructional strategies. Teachers set the background by testing students' prior knowledge to guide the class [54]. Studies show that implementing AI in instructional delivery promotes student motivation and critical thinking. It also enhances teacher-student interaction [55]. A teacher (41-year-old female) said that:

“I first interact with common questions on the Mentimeter. I generate a basic summary of the do-ables in the class before I start. I create colorful pictures from bots. Students are excited and interested.” (SET 15)

Teachers like to use AI to generate content based on their ideas, creating an individualized learning environment for learners [56]. Some excerpts from the interviews on this theme are presented:

“I love ChatGPT for generating ideas for better content. Presentations I edit in Canva.” (SET 13)

“I prefer QuestionPaper.ai and Turing.com to make my question papers engaging. I have come across this Piktochart, Venngage, Appy Pie, etc. that help you create infographics.” (SET 11)

AI-based classroom: each student’s emotional well-being depends on their engagement and interaction with the teacher and peers. So, plans to create a meaningful learning experience differ based on students’ diverse needs. AI can help teachers make a sudden shift in content [57]. According to studies, some platforms are not economically feasible for accessibility. The AI functionality in some bots is confusing but helpful, according to many teachers.

“I have online quizzes and videos ready for a better capture of different students.” (SET 11)

Blended learning approaches: digital technologies can help ensure a sustainable education system, and many teachers are opting for blended learning, using both digital and non-digital tools to increase engagement and interaction and improve learning outcomes [58]. Some participants narrated their experiences in using both types of aids:

“I have created Google classrooms for each class, uploaded brief content there for 24/7 learner access.” (SET 12)

“Sometimes, I prefer podcasts that tend to be more interesting than a lecture.” (SET 8)

Teachers can help students organize information from digital and non-digital sources, guide them to become independent learners, and capture their attention in class through blended formats that increase engagement [59]. Most participants admitted that, in addition to handmade props, AI-aided content display on projectors helped them reach students more effectively.

“I try to use news clippings so that the children can make a connection to real-life situations. AI provides me with the handmade newspaper cuts just a click away.” (SET 6)

AI as a collaborative and assisting tool: AI is widely used across various EdTech platforms such as Udemy, Udacity, and Google AI, and teachers are using it for innovative strategies without realizing the AI’s role in these platforms. Although they use the tools, they are unable to relate whether AI is already involved in the educational sector [60]. One teacher expressed a similar thought:

“I use Google Classroom to upload materials to support students. I use Grammarly for checking my lesson plans. Are they AI?” (SET 9)

Various classroom management strategies may be circumstance-specific or subject and student-oriented. These strategies differ for novice and experienced teachers. These strategies may hinder a teacher from following the plan exactly [61]. A teacher with 6 years of experience stated that reiterating the previous topic helps avoid confusion, whereas a teacher with over 10 years of experience saw it as a hindrance.

“These are classrooms with 20, 25, and 30 students, respectively. For reiteration, I use Kahoot and Quizzes. I also sometimes create a video presentation on Canva.” (SET 6)

“So many students, about 60! How to use AI? Entire class shouting.” (SET 5)

3.2.4. AI for automated tasks

Teachers prefer AI to automate daily work [62]. Teachers like using AI for planning classroom instruction and for quick assessment with feedback, which reduces workload and allows them to spend more time providing individualized attention to students [63]. The participants’ reflections support the studies:

“Half automated, especially attendance, and you can connect with the child more.” (SET 10)

“We provide tailored feedback based on AI-driven analytics.” (SET 9)

AI assistance to save time: using various chatbots helps teachers plan their regular classes, build adequate student support, create personalized lesson plan templates, and provide individualized activity prompts for diverse students [64].

“We have a lot of classes and less time. AI helps us get a gist of what we will teach or summarizes a concept for us.” (SET 15)

“Thanks to AI tools for automatic feedback and quick lesson plans.” (SET 9)

Automated attendance and grading: the computerized grading system also frees up teachers’ time, allowing them to review strengths and weaknesses and provide personalized feedback to students [65].

“I check and upload a screenshot of the copy. It calculates for me. The chatbot gives me the shortcomings of each student pointwise.” (SET 12)

Personalized one-to-one feedback: AI can detect diverse learning styles, and based on that, a teacher can cater to them in an individualized manner [66].

“I check and upload in Cograder, it reads through and gives me quick feedback, which I post back in Google Classroom.” (SET 9)

AI in reducing teacher workload: AI helps reduce daily routine tasks for teachers, such as attendance updates, lesson planning, and grading, enabling them to better cater to diverse students [65], [66].

“Now I generate and print the lesson plans after editing them.” (SET 6)

Classroom recordings can help the teacher access a better reflective analysis of student engagement with the content [67]. A teacher stated that reflective feedback is necessary in classes when shortcomings are reported.

“I try to record the activities and participation levels of my students online, and they are shared too.” (SET 5)

3.2.5. AI in assessments

Teachers realize the challenges in assessments, particularly with preferred face-to-face examinations, video observation, and spoken tasks. Teachers are also in favor of creating questionnaires with the aid of generative AI, but prefer to adjust the rubrics [68].

“We are not allowed to assess with AI aids by our principal.” (SET 6)

“I take help in designing exam questions, but I grade manually.” (SET 10)

AI-based formative assessments: The incorporation of AI into assessments is slowly increasing due to its time-saving and feedback-generating features. It helps the teachers make their decisions based on student engagement and performance [61]. The most popular continuous assessment models among teachers are now quiz platforms like Quizziz and Kahoot [69]. It is evident from one of the participants’ views:

“I love Quizziz and Quizlet for quick assessments.” (SET 13)

“I upload the Google Forms to Google Classroom. They get the grades.” (SET 12)

Bias and reliability in AI-aided grading: AI can support certain aspects of grading, but cannot replace the neutral human judgement that advocates for examinations to ensure ethical integrity [70]. AI assistance is preferred for question paper templates, ideas, and rubrics designed by teachers [71].

“I check and give one-to-one feedback not visible to other students.” (SET 12)

“I take question paper ideas from ChatGPT, but I give manual feedback.” (SET 13)

Ethical usage of AI in assessments: ethical concerns emphasize the need to create opportunities for diverse students [72]. AI systems are trained on existing data and are updated to reflect current social inequities, including biased comments and grading practices that undermine students’ capabilities [73]. A concern of an educator is identified.

“Students are copy-pasting ready-made projects. Zero unique ideas.” (SET 12)

One-size-fits-all is not the tagline for using AI in schools. Teachers are concerned about the biased attitudes of various intelligent systems that provide information based on pre-programmed biases without creative ideas [74]. This was evident from the data.

“Students think that the AI is more advanced than a teacher, the least informed about AI content authenticity.” (SET 15)

3.3. Challenges in AI adoption

3.3.1. Digital literacy and training needs

Various constraints in incorporating AI in classrooms pose a challenge to the diverse transformation of the teaching-learning experience [39]. Teachers in remote regions or from lower socioeconomic backgrounds often lack access to advanced AI platforms and feel limited to English. In contrast to metro cities or affluent areas with broader access to technology, teachers here often consider other non-digital, gamified methods and avoid AI [75]. A participant working at a school in Siliguri expressed that the economic and socio-lingual status of the locality affects the teacher’s digital training needs. The participant preferred to create a lesson plan in Google Docs.

“I am ready with backup plans for the diverse students for network problems. It is only for English, anyway. I write or type in a Google Doc, for sharing quickly.” (SET 15)

Some parents also object to the use of digital aids in class, while some encourage it at home. There is a bridge between parents’ understanding and the children’s learning process [76]. Teachers perceive that parent believe digital aids used in teaching distract students and, as a result, object to their use [77].

“My colleagues and I aren’t using it because parents don’t like this.” (SET 3)

3.3.2. Lack of institutional resources

Internet infrastructure and unequal access among teachers are challenges that hinder their use of blended approaches, such as emails, videos, or presentations, to enhance the teaching-learning experience [78]. A participant (38-year-old female) expressed:

“In the classroom, we only have normal chalk and board use.” (SET 14)

Inadequate electricity, unreliable high-speed internet, cost constraints, connectivity, training, school management policies, and data security are among the significant challenges in the way of incorporating AI into the teaching-learning process [79]. Some of the challenges that teachers came across, as evident in the transcripts, were:

“There are two smart classrooms. Here, if the teacher thinks that this topic is important, then she can book an advanced slot a week ago.” (SET 10)

“Management is investing in internet connectivity and subscriptions to various AI aids. We need training, otherwise how can we be aware?” (SET 8)

3.3.3. Ethical concerns in AI usage

Research shows that the two primary ethical concerns about AI use in teaching and learning are plagiarism and data privacy [72]. The younger generation is adaptable to new technologies, but the question arises about how much the teachers allow students to use AI for fruitful outcomes. Since AI detection tools remain unreliable, students continue to use AI tools as a one-stop solution for their presentations and projects despite being warned not to [80].

“There is a website called Turnitin that helps you detect plagiarism and see how much of it is plagiarized. So, if your essay turns out to be more than 20% plagiarized, then we will dismiss it and consider rework.” (SET 11)

3.3.4. AI-induced cognitive disruptions

AI can sometimes constrain critical thinking and creativity due to its repetitive and impersonal nature. Constant assessments with AI aid can cause anxiety and technical frustration [81]. The interviewed teachers also expressed a similar concern.

“The power of listening and understanding has become less. Next time, instead of remembering it, they will take a screenshot and scan Google from there.” (SET 13)

Cognitive disruptions and stress from prolonged screen time are some of the major concerns. Students tend to look for easy answers and inevitably avoid thinking, planning, creating or analyzing [82]. The interviewed teachers also admitted that they receive work copied from AI tools.

“When we give an assignment to research something new, they prefer ChatGPT.” (SET 4)

“They copy-paste without thinking about situations and problems that develop their engaging skills with the world.” (SET 6)

Optimal use of AI is needed so that students achieve the best outcomes without relying on it too often to ease their work [83]. Teachers are also concerned about the screen time students are getting.

“Adolescents, watch it for 5 minutes and move on to some game platform. The children are playing games and are least bothered.” (SET 13)

3.4. Key findings

The major findings of the current study are as:

- Most teachers are aware and supportive of incorporating AI into regular teaching.
- Teachers prefer AI incorporation mainly at the procedural and planning levels, such as marking attendance, giving feedback, and generating lesson plans and activity ideas. It is a mere technical skill to them rather than designed thinking with AI in regular classrooms. Most of the teachers mentioned time savings from routine tasks and liked the extra time for each student, and for handling higher-order teaching ideas.
- Teachers are ambiguous about the relevance of AI in the curriculum and treat it as an add-on.
- Due to the unavailability of regional languages, many teachers treat them as the preserve of privileged groups.
- Ambiguity about ethical clarity prevents teachers from utilizing AI tools to design summative and end-of-term examinations and assessments. In most cases, it is restricted to regular quizzes and weekly tests.
- Non-uniform availability of resources creates confusion among teachers about how to incorporate AI into classroom teaching.

3.5. Discussion

In the current study, the perceptions of secondary teachers on AI usage in their daily teaching-learning process were assessed and explored. The primary focus was to highlight the ways teachers perceive AI incorporation in their classrooms and the challenges they face in their region, institution, or due to their knowledge. Teachers were aware of the utility of AI in lesson planning, content design, and ensuring those designs remain flexible. These findings align with a recent study by Pozo *et al.* [1], who emphasized that incorporating digital aids enhances teaching quality and helps teachers build 21st-century competencies. The participants acknowledged that AI is a time-saver, offering a structured, flexible, and personalized lesson plan that enriches the learning experience for students with diverse needs. This can be particularly useful for teachers facing larger class sizes and heavy administrative pressure. In another study by Šumak *et al.* [3], which explored how AI teaching assistants help teachers create an inclusive learning environment in class, they found that this also led to higher professional efficiency and better work-life balance for teachers.

The theme of ‘AI in planning their classes’ revealed various perspectives, acknowledging that having diverse students in a class made it difficult to follow a pre-developed plan. It was found that most teachers who prefer ChatGPT for lesson plans were unaware of the latest AI teaching aids. Although they used Google Docs to quickly share daily instructional lessons, AI was merely a technical skill to them rather than a design element in their teaching plans. This is further evident in their preference towards the traditional format of following the textbook, without an inclination to embrace connected ideas with AI teaching aids to foster an interdisciplinary outlook [84]. The theme of observing ‘AI in conducting classes’ reveals that teachers were ambivalent about the relevance of AI-assisted teaching aids in their prescribed curricula. This could be because region-specific languages in India are not receiving rich, accurate information through these aids to generate ideas and conduct classes. This highlights one limitation of AI aids, which are predominantly based in English. It also reveals that the scarcity of data for training large AI models in region-specific languages, along with the technical complexity and limitations in the phonological and morphological features of languages, creates a digital divide and limits access for indigenous communities [85].

The subtheme ‘AI in interactive and engaging content creation’ revealed that teachers liked AI teaching aids as gamification tools to improve participation and engagement. Teachers perceived that students were prone to low attention and motivation in the post-pandemic period, and these teaching aids

help teachers capture students' attention and motivate them to engage in regular learning [2]. Many teachers also reported that abstract concepts, which they found difficult to convey, became easier to teach when AI assistants used a game-based approach. This AI-integrated teaching indicates a shift from teacher-centered, passive transmission to student-centered, active lesson delivery. This has been one of the strengths of digital tools in education, such as AI, because they have significantly transformed the nature of educational instruction and classroom practices, making them more effective and engaging.

The theme of 'AI in teaching' highlighted how teachers' comfort zones expanded with the use of digital teaching aids. These findings support Zancajo *et al.* [4], who reported that following the pandemic, there has been a significant shift in education from offline to a hybrid learning modality across Europe. The same transformation is also evident in India, as highlighted in the results of this study. The reported teachers' perceptions suggest that they view AI as a collaborative partner rather than a competitor. Using AI aids to automate routine tasks frees teachers to handle higher-order teaching functions, such as facilitating and boosting discussions, and providing constant student support. Since AI facilitates automatic grading, attendance updates, and the design of individualized feedback, as reported by the teachers in this study, it also points to a critical issue prevalent in the Indian education system: teachers are often required to handle multiple responsibilities beyond classroom teaching. Due to large classroom sizes often exceeding 50 students, providing customized feedback is rare in Indian classrooms. The use of AI assistants, which can provide differentiated instruction and feedback for each student, has the potential to make teachers' work more systematic.

The theme of 'AI in assessments' emphasized that AI digital aids are helpful for quick revisions and for weekly and daily formative assessments at the end of each lesson, in the form of quizzes, assignments, and activity sheets. Teachers preferred using AI tools for formative assessments but expressed concerns about their school's restrictions on their use for annual or summative assessments. These findings support Berg and Papadopoulos [86] view that teachers perceive AI as mere technical support for time-saving rather than as an independent technique in evaluating learning outcomes. Some concerns about fully incorporating AI into assessment, including personalized feedback, might affect teacher-student relationships. The findings of this study also portray teachers' perceived risk regarding AI's inflexibility or transparency in maintaining the human-AIED balance in the summative assessment scenario.

Although teachers generally supported the incorporation of AI, they expressed concerns about bias and the reliability of these AIEDs. From the interviews, it was evident that teachers lacked clarity about fair guidelines for the usage of AI in classes. Many emphasized issues like plagiarism in student assessments. These problems call for updated professional modules that address technological guidelines and their implementation. Moreover, some teachers also reported frustration with the training gap and outdated training curricula, as highlighted by study Zulkarnain and Yunus [17], which underscores the importance of continuous, comprehensive training schedules for teachers. The ethical questions raised by the teachers were related to data security, algorithmic bias, and the boundaries of AI incorporation in pedagogy, and reflect the teachers' concern and commitment to student welfare [87]. Another concern raised by teachers was students' use of AI as a shortcut to avoid deeper engagement, underscoring the need for carefully designed curricula and trained supervision that are relevant across different studies. The present study indicates two contrasting perceptions among teachers. Some teachers perceived AI as beneficial, providing relief from routine tasks and allowing them to focus on facilitation and individualized student attention. However, other teachers identified AI as a threat to job security and contributing to the erosion of human interaction. These fear elements reflect logical anxiety and the need to evaluate the extent of AI's scope in teaching. Furthermore, it reflects a mindset of using AI as a technical relief for daily routine work rather than incorporating it into instructional strategies, classroom teaching, and structured assessment.

3.6. Limitations of the study

This study focused exclusively on the secondary teachers in private schools of India. This limits the generalizability of the findings to other educational levels, types of schools and countries. Since the study was limited to West Bengal and Karnataka, it did not consider the diverse cultural, social, academic, and economic backgrounds of other Indian states. While this study offers rich insights into teachers' lived experiences, more work is needed to explore teachers' perceptions across various experience levels, educational levels, and regional differences. The data were collected from in-service secondary teachers and do not represent teachers from primary, middle school, or higher secondary levels. The study included only 15 participants, which is appropriate for qualitative research but still limits the representativeness and generalizability of the themes captured.

3.7. Recommendations

Future research should explore longitudinal studies that track teachers' perceptions of the continually evolving practices of AI. Cross-cultural research comparing AI incorporation across educational levels, schools and countries can identify differences in cultural patterns and mindsets, highlighting

differences in perceptions and incorporation. Experimental research is recommended to evaluate the AI's effectiveness in enhancing teacher competency and in guiding the responsible and ethical implementation of AI teaching aids. This study is helpful for policymakers and curriculum developers to delve deeper into contextualizing AI for regional-language-based pedagogy and interdisciplinary application across subjects, grounded in social, economic, and cultural factors across different regional, educational, and institutional contexts, thereby strengthening AI's impact in the current academic landscape.

4. CONCLUSION

This study provides insights into how teachers perceive AI-driven advancements in the post-pandemic landscape of Indian secondary school education, drawing on a recent literature review and a qualitative study that highlight both digital optimism and pragmatic concerns arising from the growth of AIED. The findings answering the two research questions identified that teachers perceive AI mainly as planning support, such as lesson planning and technical tasks like attendance updates, automated grading for saving time. Teachers expressed ambiguity about the relevance and integration of AI across the curriculum, as well as the authenticity of content on AI-aided platforms. In addition, teachers are concerned about plagiarism and the need for clear guidelines on students' use of AI. From the findings, it can be concluded that most existing AI teaching aids are best suited for complementary or technical support roles rather than for deeper integration. Furthermore, the findings identify the lack of authentic, accurate regional content on AI-aided digital platforms. Teachers with a positive outlook and continuous developmental support for AI incorporation into regular teaching will promote meaningful AI implementation in their planning and in the facilitation of teaching and learning. Findings highlight the limitations of AI-aided assessments based solely on quizzes and their lesser relevance in the drafting and grading of question papers for quarterly, half-yearly, and summative examinations. Hence, it can be concluded that there are both positive and negative perceptions of AI's value in education. Despite positive perceptions, the study highlights the limitations of AI's pedagogical relevance and expertise in incorporating content on regional, interdisciplinary, and social-relevance bases across classroom teaching, learning and assessment. This research highlights teachers' favorable perceptions and willingness to learn, but these are constrained by infrastructure support, curriculum relevance, professional upskilling, and social and regional relevance. This study offers valuable ideas and insights, based on a thorough literature review of recent studies and on data analysis, providing fresh, subjective perspectives from teachers and embracing a design for need and relevance-based capacity development programs and curricula modification that foster a holistic teaching-learning engagement.

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C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests to disclose that might have affected the research manuscript in any way.

INFORMED CONSENT

Informed consent was obtained from all participants before data collection.

ETHICAL APPROVAL

The study procedure was approved by the Research Conduct and Ethics Committee (RCEC) at CHRIST (Deemed to be) University, Bangalore, India (CU: RCEC/00658/06/24). The procedures used in this study adhere to the tenets of the Declaration of Helsinki (1964).

DATA AVAILABILITY

The datasets analyzed in this study are not publicly available because they are part of an ongoing study; however, they are available from the corresponding author upon reasonable request.

REFERENCES

- [1] J. I. Pozo, B. Cabellos, and M. del P. P. Echeverría, "Has the educational use of digital technologies changed after the pandemic? A longitudinal study," *PLoS ONE*, vol. 19, no. 12, p. e0311695, Dec. 2024, doi: 10.1371/journal.pone.0311695.
- [2] Y. Zou, F. Kuek, W. Feng, and X. Cheng, "Digital learning in the 21st century: trends, challenges, and innovations in technology integration," *Frontiers in Education*, vol. 10, p. 1562391, Mar. 2025, doi: 10.3389/feduc.2025.1562391.
- [3] B. Šumak, M. Pušnik, and D. I. Kline, "Artificial intelligence tools and frameworks for inclusive digital education: benefits and challenges," *Methods*, pp. 704–707, 2025.
- [4] A. Zancajo, A. Verger, and P. Bolea, "Digitalization and beyond: the effects of COVID-19 on post-pandemic educational policy and delivery in Europe," *Policy and Society*, vol. 41, no. 1, pp. 111–128, Jan. 2022, doi: 10.1093/polsoc/puab016.
- [5] R. Pörn, M. Braskén, M. Wingren, and S. Andersson, "Attitudes towards and expectations on the role of artificial intelligence in the classroom among digitally skilled Finnish K-12 mathematics teachers," *Lumat*, vol. 12, no. 3, pp. 53–77, Mar. 2024, doi: 10.31129/LUMAT.12.3.2102.
- [6] M. Strbo, "AI-based smart teaching process during the COVID-19 pandemic," in *Proceedings of the 3rd International Conference on Intelligent Sustainable Systems, ICISS 2020*, Dec. 2020, pp. 402–406, doi: 10.1109/iciss49785.2020.9315963.
- [7] G. Fischer, J. Lundin, and J. O. Lindberg, "Rethinking and reinventing learning, education and collaboration in the digital age—from creating technologies to transforming cultures," *International Journal of Information and Learning Technology*, vol. 37, no. 5, pp. 241–252, Sep. 2020, doi: 10.1108/IJILT-04-2020-0051.
- [8] B. Cabellos, M. P. P. Echeverría, and J. I. Pozo, "The use of digital resources in teaching during the pandemic: what type of learning have they promoted?" *Education Sciences*, vol. 13, no. 1, p. 58, Jan. 2023, doi: 10.3390/educsci13010058.
- [9] M. Á. Escotet, "The optimistic future of artificial intelligence in higher education," *Prospects*, vol. 54, no. 3, pp. 531–540, Dec. 2024, doi: 10.1007/s11125-023-09642-z.
- [10] A. Almusaed, A. Almssad, I. Yitmen, and R. Z. Homod, "Enhancing student engagement: harnessing AIED's power in hybrid education—a review analysis," *Education Sciences*, vol. 13, no. 7, p. 632, Jun. 2023, doi: 10.3390/educsci13070632.
- [11] D. T. K. Ng, J. K. L. Leung, J. Su, R. C. W. Ng, and S. K. W. Chu, "Teachers' AI digital competencies and twenty-first century skills in the post-pandemic world," *Educational Technology Research and Development*, vol. 71, no. 1, pp. 137–161, Feb. 2023, doi: 10.1007/s11423-023-10203-6.
- [12] A. Kakun and S. Tytenko, "Generative AI and prompt engineering in education," *Modern Engineering and Innovative Technologies*, no. 29 Part 1, pp. 117–121, Oct. 2023, doi: 10.30890/2567-5273.2023-29-01-052.
- [13] J. Bryant, C. Heitz, S. Sanghvi, and D. Wagle, "How artificial intelligence will impact K-12 teachers," McKinsey and Company, Jan. 2020. Accessed: Nov. 4, 2025. [Online]. Available: <https://www.mckinsey.com/industries/education/our-insights/how-artificial-intelligence-will-impact-k-12-teachers>
- [14] J. M. Krüger, "Adaptive learning and instruction with augmented reality: a scoping review," in *International Conference on Immersive Learning Research Network (iLRN 2024)*, 2025, pp. 156–166, doi: 10.1007/978-3-031-80475-5_11.
- [15] A. Shirin, "Artificial intelligence technology on teaching-learning: exploring Bangladeshi teachers' perceptions," *Embedded Selforganising Systems*, vol. 9, no. 4, pp. 3–9, 2022, doi: 10.14464/ess.v9i4.553.
- [16] Y. J. Lee, R. O. Davis, and J. Ryu, "Korean in-service teachers' perceptions of implementing artificial intelligence (AI) education for teaching in schools and their AI teacher training programs," *International Journal of Information and Education Technology*, vol. 14, no. 2, pp. 214–219, 2024, doi: 10.18178/ijiet.2024.14.2.2042.
- [17] N. S. Zulkarnain and M. Md Yunus, "Primary teachers' perspectives on using artificial intelligence technology in English as a second language teaching and learning: a systematic review," *International Journal of Academic Research in Progressive Education and Development*, vol. 12, no. 2, pp. 861–875, May 2023, doi: 10.6007/ijarped/v12-i2/17119.
- [18] X. F. Lin *et al.*, "Teachers' perceptions of teaching sustainable artificial intelligence: a design frame perspective," *Sustainability*, vol. 14, no. 13, p. 7811, Jun. 2022, doi: 10.3390/su14137811.
- [19] A. F. Alkhwalidi and S. H. Alshammari, "Investigating academic intention to adopt virtual reality through the integration of the unified theory of acceptance and use of technology and the protection motivation theory in higher-education institutions," *International Journal of Information and Communication Technology Education (IJICTE)*, vol. 22, no. 1, pp. 1–21, 2026, doi: 10.4018/IJICTE.401498.
- [20] J. R. Moreno, M. A. Montoro, and A. M. O. Colón, "Changes in teacher training within the TPACK model framework: a systematic review," *Sustainability*, vol. 11, no. 7, p. 1870, Mar. 2019, doi: 10.3390/su11071870.

- [21] E. M. Rogers, *Diffusion of innovations*. New York, NY: Free Press, 1962.
- [22] C. Nickerson, "Theory of reasoned action (Fishbein & Ajzen, 1975)." *SimplyPsychology*, Nov. 2025. Accessed: Nov. 4, 2025. [Online]. Available: <https://www.simplypsychology.org/theory.of.reasoned.action.html>
- [23] T. Jowsey, C. Deng, and J. Weller, "General-purpose thematic analysis: a useful qualitative method for anaesthesia research," *BJA Education*, vol. 21, no. 12, pp. 472–478, Dec. 2021, doi: 10.1016/j.bjae.2021.07.006.
- [24] M. M. Hennink, B. N. Kaiser, and V. C. Marconi, "Code saturation versus meaning saturation: how many interviews are enough?" *Qualitative Health Research*, vol. 27, no. 4, pp. 591–608, Mar. 2017, doi: 10.1177/1049732316665344.
- [25] M. R. Lynn, "Determination and quantification of content validity," *Nursing Research*, vol. 35, no. 6, pp. 382–386, Nov. 1986, doi: 10.1097/00006199-198611000-00017.
- [26] T. Wengraf, *Qualitative research interviewing: biographic narrative and semi-structured methods*. 2nd ed. London, UK: SAGE Publications, Ltd., 2011, doi: 10.4135/9781849209717.
- [27] V. Braun and V. Clarke, "Thematic analysis," in *Encyclopedia of Quality of Life and Well-Being Research*, A. C. Michalos, Ed., Cham: Springer International Publishing, 2023, pp. 7187–7193, doi: 10.1007/978-3-031-17299-1_3470.
- [28] H. Alsager, "To look from another window in education: artificial intelligence assisted language learning and its reflections on academic demotivation, foreign language learning anxiety and autonomy," *Computer-Assisted Language Learning Electronic Journal*, vol. 25, no. 4, pp. 124–147, 2024.
- [29] M. P. Pratama, R. Sampelolo, and H. Lura, "evolutionising education: harnessing the power of artificial intelligence for personalised learning," *Klasikal: Journal of Education, Language Teaching and Science*, vol. 5, no. 2, pp. 350–357, Aug. 2023, doi: 10.52208/klasikal.v5i2.877.
- [30] D. T. Y. G. Sumakul, F. A. Hamied, and D. Sukyadi, "Students' perceptions of the use of AI in a writing class," in *Proceedings of the 67th TEFLIN International Virtual Conference & the 9th ICOELT 2021 (TEFLIN ICOELT 2021)*, 2022, pp. 52–57, doi: 10.2991/assehr.k.220201.009.
- [31] N. J. Kim and M. K. Kim, "Teachers' perceptions of using an artificial intelligence-based educational tool for scientific writing," *Frontiers in Education*, vol. 7, p. 755914, Mar. 2022, doi: 10.3389/educ.2022.755914.
- [32] J. Kim, "Leading teachers' perspective on teacher-AI collaboration in education," *Education and Information Technologies*, vol. 29, no. 7, pp. 8693–8724, May 2024, doi: 10.1007/s10639-023-12109-5.
- [33] M. A. M. Algerafi, Y. Zhou, H. Alfadda, and T. T. Wijaya, "Understanding the factors influencing higher education students' intention to adopt artificial intelligence-based robots," *IEEE Access*, vol. 11, pp. 99752–99764, 2023, doi: 10.1109/ACCESS.2023.3314499.
- [34] W. A. Hazaymeh, A. Bouzenoun, and A. Remache, "EFL instructors' perspective on using AI applications in English as a foreign language teaching and learning," *Emerging Science Journal*, vol. 8, Special Issue, pp. 73–87, Mar. 2024, doi: 10.28991/ESJ-2024-SIED1-05.
- [35] Q. Z. Luo, "The influence of AI-powered adaptive learning platforms on student performance in Chinese classrooms," *Journal of Education*, vol. 6, no. 3, pp. 1–12, Aug. 2023, doi: 10.53819/81018102t4181.
- [36] S. Choi, Y. Jang, and H. Kim, "Influence of pedagogical beliefs and perceived trust on teachers' acceptance of educational artificial intelligence tools," *International Journal of Human-Computer Interaction*, vol. 39, no. 4, pp. 910–922, Feb. 2023, doi: 10.1080/10447318.2022.2049145.
- [37] S. Pokrivcakova, "Preparing teachers for the application of AI-powered technologies in foreign language education," *Journal of Language and Cultural Education*, vol. 7, no. 3, pp. 135–153, Dec. 2019, doi: 10.2478/jolace-2019-0025.
- [38] S. Chaudhary and P. Gopal, "Guiding culturally responsive pedagogy in the classroom with textbooks," *Library Progress International*, vol. 44, no. 3, pp. 25259–25270, 2024.
- [39] K. Lodhi, "How the use of digital tools, gamification and artificial intelligence changes the dynamics of learning in the field of education," *Zakariya Journal of Education, Humanities & Social Sciences*, vol. 2, no. 2, pp. 23–36, 2024.
- [40] A. Semerci and M. K. Aydın, "Examining high school teachers' attitudes towards ICT Use in education," *International Journal of Progressive Education*, vol. 14, no. 2, pp. 93–105, 2018, doi: 10.29329/ijpe.2018.139.7.
- [41] S. Cojean, L. Brun, F. Amadiou, and P. Dessus, "Teachers' attitudes towards AI: what is the difference with non-AI technologies?" in *The 45th Annual Meeting of the Cognitive Science Society*, 2023, pp. 2069–2076.
- [42] I.-A. Chounta, E. Bardone, A. Raudsep, and M. Pedaste, "Exploring teachers' perceptions of artificial intelligence as a tool to support their practice in Estonian K-12 education," *International Journal of Artificial Intelligence in Education*, vol. 32, no. 3, pp. 725–755, Sep. 2022, doi: 10.1007/s40593-021-00243-5.
- [43] A. Jain and A. Mittal, "Digitalisation of higher education in India: constructive aspects and challenges," in *Virtual Teaching in India During Lock Down*, A. Kumar and S. Shukla, Eds., New Delhi: Research Foundation of India (RFI), 2020, pp. 27–42.
- [44] P. J. Woods and Y. Copur-Gencturk, "Examining the role of student-centered versus teacher-centered pedagogical approaches to self-directed learning through teaching," *Teaching and Teacher Education*, vol. 138, p. 104415, Feb. 2024, doi: 10.1016/j.tate.2023.104415.
- [45] S. H. Koenig, "Fine-tuning for lesson planning," M.S. thesis, University of Gothenburg, Gothenburg, Sweden, 2024.
- [46] Z. Wu, H. Abdul Halim, and M. R. Mohd Saad, "Artificial intelligence (AI) and gamification in blended learning: Enhancing language and literacy in Shanxi, China," *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, vol. 9, no. 12, p. e003159, 2024, doi: 10.47405/mjssh.v9i12.3159.
- [47] N. A. Shofiyyah, O. Lesmana, and H. Tohari, "Metamorphosis of Islamic religious education learning method: classic approach converted by artificial intelligence (AI)," *Jurnal Pendidikan: Riset dan Konseptual*, vol. 8, no. 2, pp. 265–275, Apr. 2024, doi: 10.28926/riset_konseptual.v8i2.998.
- [48] H. Sadaf, B. Rasheed, and A. Ahmad, "Exploring the role of YouTube lectures, vlogs, and videos in enhancing ESL learning," *Journal of Asian Development Studies*, vol. 13, no. 2, pp. 657–670, 2024, doi: 10.62345/jads.2024.13.2.52.
- [49] F. Hisey, T. Zhu, and Y. He, "Use of interactive storytelling trailers to engage students in an online learning environment," *Active Learning in Higher Education*, vol. 25, no. 1, pp. 151–166, Mar. 2024, doi: 10.1177/14697874221107574.
- [50] L. David and N. Weinstein, "Using technology to make learning fun: technology use is best made fun and challenging to optimize intrinsic motivation and engagement," *European Journal of Psychology of Education*, vol. 39, no. 2, pp. 1441–1463, Jun. 2024, doi: 10.1007/s10212-023-00734-0.
- [51] E. Dimitriadou and A. Lanitis, "A critical evaluation, challenges, and future perspectives of using artificial intelligence and emerging technologies in smart classrooms," *Smart Learning Environments*, vol. 10, no. 1, p. 12, Feb. 2023, doi: 10.1186/s40561-023-00231-3.
- [52] S. Apriani, F. Handane, and N. Cahayani, "Digital multimodal to promote 21st-century learning skills for English young learners: Teachers' perspective," *Library Progress International*, vol. 44, no. 3, pp. 24302–24311, 2024.

- [53] M. Martín-Sómer, C. Casado, and G. Gómez-Pozuelo, "Utilising interactive applications as educational tools in higher education: Perspectives from teachers and students, and an analysis of academic outcomes," *Education for Chemical Engineers*, vol. 46, pp. 1–9, Jan. 2024, doi: 10.1016/j.ece.2023.10.001.
- [54] B. Diaz and M. Nussbaum, "Artificial intelligence for teaching and learning in schools: the need for pedagogical intelligence," *Computers and Education*, vol. 217, p. 105071, Aug. 2024, doi: 10.1016/j.compedu.2024.105071.
- [55] E. A. Patall *et al.*, "A meta-analysis of teachers' provision of structure in the classroom and students' academic competence beliefs, engagement, and achievement," *Educational Psychologist*, vol. 59, no. 1, pp. 42–70, Jan. 2024, doi: 10.1080/00461520.2023.2274104.
- [56] M. A. Almuhan, "Teachers' perspectives of integrating AI-powered technologies in K-12 education for creating customized learning materials and resources," *Education and Information Technologies*, vol. 30, no. 8, pp. 10343–10371, Jun. 2025, doi: 10.1007/s10639-024-13257-y.
- [57] M. J. Timms, "Letting artificial intelligence in education out of the box: educational cobots and smart classrooms," *International Journal of Artificial Intelligence in Education*, vol. 26, no. 2, pp. 701–712, Jun. 2016, doi: 10.1007/s40593-016-0095-y.
- [58] L. K. Kobusingye and J. Okeju, "Predictors of happiness and life satisfaction among university teacher trainees on internship," *East African Journal of Education Studies*, vol. 7, no. 4, pp. 411–423, Oct. 2024, doi: 10.37284/eajes.7.4.2339.
- [59] S. Parveen and I. Ur, "The role of digital technologies in education: Benefits and challenges," *International Research Journal on Advanced Engineering and Management (IRJAEM)*, vol. 2, no. 6, pp. 2029–2037, Jun. 2024, doi: 10.47392/irjaem.2024.0299.
- [60] F. Su, D. Zou, L. Wang, and L. Kohnke, "Student engagement and teaching presence in blended learning and emergency remote teaching," *Journal of Computers in Education*, vol. 11, no. 2, pp. 445–470, Jun. 2024, doi: 10.1007/s40692-023-00263-1.
- [61] S. Gupta, "Tools for teaching-learning: combining AI and human intelligence (HI) into the process of education," in *Artificial Intelligence in Education: Revolutionizing Learning and Teaching*, P. Kaliraj and T. Devi, Eds., New Delhi: Red Unicorn Publishing, 2020, pp. 229–241, doi: 10.25215/9358094575.25.
- [62] N. J. Alasmari and A. S. A. Althaqafi, "Teachers' practices of proactive and reactive classroom management strategies and the relationship to their self-efficacy," *Language Teaching Research*, vol. 28, no. 6, pp. 2158–2189, Nov. 2024, doi: 10.1177/13621688211046351.
- [63] K. G. Srinivasa, M. Kurni, and K. Saritha, "Harnessing the power of AI in education," in *Learning, Teaching, and Assessment Methods for Contemporary Learners: Pedagogy for the Digital Generation*, K. G. Srinivasa, M. Kurni, and K. Saritha, Eds., Singapore: Springer Nature Singapore, 2022, pp. 311–342, doi: 10.1007/978-981-19-6734-4_13.
- [64] I. Celik, M. Dindar, H. Muukkonen, and S. Järvelä, "The promises and challenges of artificial intelligence for teachers: a systematic review," *TechTrends*, vol. 66, no. 4, pp. 616–630, Jul. 2022, doi: 10.1007/s11528-022-00715-y.
- [65] R. Hashem, N. Ali, F. E. Zein, P. Fidalgo, and O. A. Khurma, "AI to the rescue: exploring the potential of ChatGPT as a teacher ally for workload relief and burnout prevention," *Research and Practice in Technology Enhanced Learning*, vol. 19, p. 023, 2024, doi: 10.58459/rptel.2024.19023.
- [66] S. Sangheethaa and A. Korath, "Impact of AI in education through a teacher's perspective," *Educational Administration: Theory and Practice*, vol. 30, no. 4, pp. 3196–3200, 2024, doi: 10.53555/kuey.v30i4.1349.
- [67] P. Kacsó and I. Huszti, "Artificial intelligence (AI) as a useful assistant in English lesson planning," *Innovate Pedagogy*, no. 72, pp. 67–70, 2024, doi: 10.32782/2663-6085/2024/72.10.
- [68] I. Boufahja, J. Wolf, and M. Manenova, "The potential of classroom video recordings in detecting the TA-to-pupil, teacher-to-TA and peer interactions: An overview," *Pedagogical Perspective*, no. 27, pp. 62–73, 2024, doi: 10.29329/pedper.2024.26.
- [69] M. Bower, J. Torrington, J. W. M. Lai, P. Petocz, and M. Alfano, "How should we change teaching and assessment in response to increasingly powerful generative artificial intelligence? Outcomes of the ChatGPT teacher survey," *Education and Information Technologies*, vol. 29, no. 12, pp. 15403–15439, Jan. 2024, doi: 10.1007/s10639-023-12405-0.
- [70] H. R. Song and J. Y. Chung, "Analyzing elementary school teachers' perceptions of using AI tools," *Korean Association for Learner-Centered Curriculum and Instruction*, vol. 24, no. 18, pp. 45–61, 2024, doi: 10.22251/jlcci.2024.24.18.45.
- [71] T. Nazaretsky, M. Ariely, M. Cukurova, and G. Alexandron, "Teachers' trust in AI-powered educational technology and a professional development program to improve it," *British Journal of Educational Technology*, vol. 53, no. 4, pp. 914–931, 2022, doi: 10.1111/bjet.13232.
- [72] C. Aloisi, "The future of standardised assessment: Validity and trust in algorithms for assessment and scoring," *European Journal of Education*, vol. 58, no. 1, pp. 98–110, 2023, doi: 10.1111/ejed.12542.
- [73] S. Soriano, D. A. Diga, E. Belandres, J. Barrozo, E. S. Sison, and M. R. Cinchez, "Ethical implications of ai in student assessments: a critical examination," *Library Progress International*, vol. 44, no. 3, pp. 3224–3229, 2024.
- [74] Z. Yin, S. V. Chinta, Z. Wang, M. Gonzalez, and W. Zhang, "FairAIED: navigating fairness, bias, and ethics in educational AI applications," *arXiv*:2407.18745.
- [75] S. B. Ali, M. Haider, D. Samiullah, and S. Shamsy, "Assessing students' understanding of ethical use of artificial intelligence (AI): A focus group study," *International Journal of Social Science & Entrepreneurship*, vol. 4, no. 3, pp. 65–87, 2024, doi: 10.58661/ijssse.v4i3.301.
- [76] N. M. Giam, N. T. H. Nam, and N. T. H. Giang, "Situation and proposals for implementing artificial intelligence-based instructional technology in Vietnamese secondary schools," *International Journal of Emerging Technologies in Learning*, vol. 17, no. 18, pp. 53–75, 2022, doi: 10.3991/ijet.v17i18.31503.
- [77] M. Petsolari, S. Ibrahim, and P. Slovak, "Socio-technical imaginaries: envisioning and understanding AI parenting supports through design fiction," in *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems*, May 2024, pp. 1–27, doi: 10.1145/3613904.3642619.
- [78] S. A. Kryeziu, T. A. Avdiu, and A. Avdiu, "Examining the teachers, administrators and parents' view on drawbacks of technology use in education," *İlköğretim Online*, vol. 20, no. 2, pp. 206–215, 2021, doi: 10.17051/ilkonline.2021.02.26.
- [79] E. Alieto, B. Abequibel-Encarnacion, E. Estigoy, K. Balasa, A. Eijansantos, and A. Torres-Toukoumidis, "Teaching inside a digital classroom: a quantitative analysis of attitude, technological competence and access among teachers across subject disciplines," *Heliyon*, vol. 10, no. 2, p. e24282, 2024, doi: 10.1016/j.heliyon.2024.e24282.
- [80] M. Hakimi and A. K. Shahidzay, "Transforming education with artificial intelligence: potential and obstacles in developing countries," *Preprints*, pp. 1–14, Jul. 31, 2024, doi: 10.20944/preprints202407.2542.v1.
- [81] S. Pudasaini, L. Miralles-Pechuán, D. Lillis, and M. Llorens Salvador, "Survey on AI-generated plagiarism detection: the impact of large language models on academic integrity," *Journal of Academic Ethics*, vol. 23, no. 3, pp. 1137–1170, Sep. 2025, doi: 10.1007/s10805-024-09576-x.
- [82] H. Lin and Q. Chen, "Artificial intelligence (AI) -integrated educational applications and college students' creativity and academic emotions: students and teachers' perceptions and attitudes," *BMC Psychology*, vol. 12, no. 1, p. 487, Sep. 2024, doi: 10.1186/s40359-024-01979-0.

- [83] A. Shalaby, "Classification for the digital and cognitive AI hazards: urgent call to establish automated safe standard for protecting young human minds," *Digital Economy and Sustainable Development*, vol. 2, no. 1, p. 17, Aug. 2024, doi: 10.1007/s44265-024-00042-5.
- [84] D. Wu, L. Chen, and Y. Han, "Challenges that generative artificial intelligence poses to higher education and management and the countermeasures - A visualized analysis of literature from 2019 to 2023 using CiteSpace," in *ACM International Conference Proceeding Series*, Dec. 2023, pp. 733–738, doi: 10.1145/3660043.3660174.
- [85] M. B. Ihsan, "Artificial Intelligence for preserving Indonesian regional languages: machine learning approaches to documenting endangered dialects and cultural linguistic heritage," *Journal of Southeast Asia Studies*, vol. 7, no. 1, pp. 1–22, 2026.
- [86] S. van den Berg and P. M. Papadopoulos, "Summative assessment with artificial intelligence: qualitative analysis and comparison of technology acceptance in student and teacher populations," *Innovations in Education and Teaching International*, vol. 62, no. 5, pp. 1529–1544, Sep. 2025, doi: 10.1080/14703297.2024.2436613.
- [87] C. K. Y. Chan and L. H. Y. Tsi, "The AI revolution in education: will AI replace or assist teachers in higher education?" *arXiv:2305.01185*, 2023.

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