Use of Artificial Intelligence in Education: English Language Teachers' Identity Negotiation in Higher Education

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Abstract
The crucial question regarding English language teaching (ELT) and learning is: does overuse of AI or other technology become an attack on the educational process in disguise? This study intends to explain the excessive use of AI in education and its upcoming negative aspects on ELT teachers' identity and students' creativity. The researchers used qualitative phenomenology to investigate how ELT teachers perceived AI's impact on their leadership roles within the educational setting. As part of the research design, semi-structured interviews were conducted with sixteen ELT teachers and students from different districts in Punjab to obtain rich and detailed descriptions of their experiences and points of view using a purposive sampling technique. Under research question no.1 (Why does it seem that AI can be dangerous for ELT teachers' identity in the future?), this study finds that AI can be hazardous for ELT teachers' identity because it has shifted teachers' roles from knowledge providers to facilitators only. In light of the second research question (what is the influence of AI on students' self-motivation for creativity?), the significant finding is that AI negatively impacts students' thinking abilities, and their creative skills diminish gradually. The study suggests that educational institutions must take drastic measures to address teachers' apprehensions, misperceptions, and identity issues and clarify their roles and responsibilities in AI-driven educational scenarios where they may continue promoting creativity in the students under their charge.

Keywords: Artificial Intelligence; English Language Learning; Technology Overuse.

Introduction

The 21st century has witnessed a general acceleration of globalization due to advancements in information and communication technologies (ICTs). A strategy for implementing such advancements in the language classroom has significantly eased a few key worries concerning excess overcrowding, a lack of resources, and difficulties with classroom management. In recent years, growing interest has been shown in integrating artificial intelligence (AI) into various fields. Additionally, artificial intelligence (AI) has emerged as a notable breakthrough in several fields, including education. English language teaching (ELT) is one field where artificial intelligence (AI) has demonstrated significant promise. Artificial Intelligence (AI) technologies and apps have been incorporated into language learning platforms, classrooms, and other educational settings due to the rapid advancement of technology, leading to identity issues.

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Identity crises, construction, and negotiation are ongoing processes. This is specifically true for English language teachers in modern times due to the fast-emerging AI hit scenario in education and English language teaching. Hussain et al. (2012) said, "In this diverse scenario of global economy, both the teachers and the learners are faced with the crisis of identity. Hundreds and thousands of teachers are busy teaching the English language to millions and millions of students. This teaching and learning community consists of different nationalities, ethnic groups, a huge variety of languages and extremely diverse cultural norms, values, motives and aspirations" (p.94). In addition, the teaching-learning community faces the baffling and fascinating phenomenon of artificial intelligence. The teachers, in particular, have been forced to rethink their role, negotiate their identity and reconstruct it.

In its broadest definition, artificial intelligence (AI) is the intelligence displayed by machines, especially computer systems, instead of the innate intelligence of living things. According to Russel and Norvig, as reported in Chen, artificial intelligence is the ability of machines or computers to mimic cognitive tasks related to the human mind, such as learning and problem-solving (Chen et al., 2020). This area of computer science research focuses on creating and analyzing tools and software that allow machines to sense their surroundings and use intelligence and learning to make decisions that increase their chances of accomplishing specific objectives. These devices are referred to as AIs. Schools are using artificial intelligence (AI) more and more to improve different facets of education (Chen et al., 2020). Besides evaluating performance-related data, AI algorithms can improve personalized learning that caters to the needs of specific students (Hwang et al., 2020).

Furthermore, school administrators are utilizing AI to assist with administrative duties, including student enrollment, grading, and scheduling (Johnson et al., 2021). AI also significantly increases student motivation and engagement by offering interactive learning opportunities like gamification and chatbots (Fidan & Gencel, 2022). This not only improves the learning experience but also makes educators feel inspired by the potential of AI to engage students in new and exciting ways.

On the other hand, the steady and quick rise in AI threatens future teachers' demands in the job market and students' creativity. There is a general perception that teachers will no longer be necessary for students. With AI tools like Chatgpt and chatbots, students can manage their academic assignments independently. Thus, the fact that teachers primarily act merely as facilitators raises concerns about their identity going forward. However, when it comes to students, it is impossible to dispute AI's beneficial effects because it helps them solve problems whenever needed. However, it also puts their creativity at serious risk. Since we are the last generation to have reading habits, students' reading habits are also in jeopardy. These AI tools have replaced books. Students no longer bother studying directly from books. They are utilizing these shortcuts quickly. With these impending dangers in mind, the primary goal of this research is to determine how AI adversely affects students' creativity and teachers' identity.

Significance and Scope of the Study

This study focuses on using AI as a valuable tool in the future. Artificial intelligence (AI) improves information availability by managing complex work, analyzing vast amounts of data, and making judgments with little to no human input. It will help us comprehend AI's detrimental effects and how it influences teachers' identities and students' creativity. More importantly, it will allow us to identify and implement countermeasures to this threat. The urgency of this task cannot be overstated, as the negative aspects of AI can only be controlled through proactive measures. The investigation is restricted to whether AI threatens educators' identity and their pupils' creative output. Data from graduate students and instructors from different districts of Punjab province are collected for this purpose. Each gender, that is, men and women, are among the participants. Students are 25 years old, and teachers are 35 on

average. Public and private colleges and universities from different districts of Punjab comprise the participant pool.

Aim, Objectives and Research Questions of the Study
The researchers will not investigate the full extent of AI's danger because the study is limited to determining whether or not it will threaten teachers' identity and students' creativity in the future. Future researchers should perform research to verify the approximate measurements. Furthermore, it is recommended that future researchers investigate whether organizations are taking preventative steps to lessen the risks associated with AI's adverse effects.
The sole goal of this study is to ascertain how artificial intelligence affects education.
There are two reasons/objectives why this research is being conducted:
1. To understand how AI is impacting teachers' identity
2. To comprehend how students are relying on AI and becoming lazy
The following are the research questions that will be used to conduct this study:
1. Why does it seem that AI could be dangerous to teachers' identities in the future?
2. How does AI influence students' self-motivation for creativity?

Literature Review
Artificial intelligence (AI) integration into various fields has gained popularity in recent years. Additionally, AI has emerged as a significant technological advancement in many industries, including education. Artificial intelligence is the application of computers to simulate human intelligent behaviour and thought processes, resulting in a comprehensive discipline. Additionally, according to Baker et al. (2019), artificial intelligence is the performance of computer cognitive tasks typically associated with human minds, especially learning and problem-solving. According to the definition, artificial intelligence imitates human behaviour by computer systems or applications. Intelligent behaviour is typically connected to human minds, especially in learning and problem-solving.
AI in education has the potential to significantly improve learning, teaching, assessment, and educational administration, among other areas of the field (Xia et al., 2022). It can offer students tailored and flexible learning experiences so they can learn in a way that best meets their needs. Teachers can also use it to understand better their students' learning (Fang, 2021). Furthermore, it makes machine-supported queries and immediate feedback available and accessible from any location at any time (Gonzalez & Guzman, 2020). It has brought significant ease and comfort to practitioners in the teaching field and researchers in doing accurate and reliable analysis for informed and reflective teaching.
Artificial intelligence also greatly aids in creating a favorable learning environment for English language learners. It can create customized learning environments where students can actively practice their English according to their interests, professional needs, and degree of proficiency. AI provides a platform for authentic simulation conversations, including spoken English, and improves writing practice. AI demonstrates its efficacy as a tool for fostering English language proficiency by optimizing the impact of English language teaching in ELT and promoting students' practice capacity.
Artificial Intelligence (AI) has become an essential aspect of our lives, whether we realize it or not. However, in recent months, reports about the quick advancement of AI technology have garnered international attention due to their potential advantages and disadvantages. Everyone is discussing and debating about it. There are worries that our future generation is at significant risk. For instance, generative AI, or artificial intelligence that can produce text and other content automatically in response to user commands, may be able to automate about 300 million full-time jobs globally, according to a recent Goldman Sachs report (Hatzius et al., 2023). A significant drawback of many AI systems is their one-size-fits-all methodology,

which may impede the growth of vital interpersonal abilities, inventiveness, and sophisticated comprehension resulting from face-to-face interactions (Berendt et al., 2020). All this has forced the teachers to reconstruct their roles and identity.

Researchers have noted that the technology exhibits sparks of artificial general intelligence and is strikingly close to human-level performance (Bubek et al., 2023). However, a heavy reliance on AI may result in an over-reliance on technology, which would diminish the importance of teachers in providing students with guidance, mentoring, and emotional support in addition to subject knowledge (Chen & Lin, 2023). Educators are also concerned about its implications for instruction and evaluation (Williams, 2023). With the release of ChatGPT-3 in November 2022, the public could now use this technology and test it out for themselves for the first time. Although its capabilities impressed many, the most attention has been drawn to the launch of Version 4, which took place on March 14, 2023. When the full potential of this technology became apparent, initial awe gave way to concern.

The dependence of AI on the educational process is another significant drawback of AI in education. Due to artificial intelligence's near-instantaneous completion of challenging, long assignments, students risk becoming unduly reliant on technology for tasks that could instead be helping them learn and grow cognitively. As they complete assignments in their academic careers, students develop a work ethic and problem-solving abilities that will help them. In the long run, when AI cannot think for itself, relying on it to perform these tasks where people should be learning can be dangerous. Thus, the primary goal of this research is to determine how AI is negatively affecting society and what timely strategies can be used to address these issues and prevent humanity from extinction.

Research Methodology

The study uses a phenomenological qualitative research design to describe and analyze the data without drawing broader conclusions. Exploring and comprehending natural phenomena is the study's goal, and this design supports that goal. The researchers sought to explore the complex facets of teachers' experiences and perceptions of the investigated concept using a qualitative approach (Eddles-Hirsch, 2015). Since phenomenology focuses on comprehending people's lived experiences and the meanings they assign to those experiences, it was selected as the research methodology, as advised by (Vagle, 2018). Using this method, the study sought to understand the varying subjective viewpoints and insights of educators who had firsthand experience using AI in the workplace.

The researchers used qualitative phenomenology to investigate how the teachers perceived AI's impact on their leadership roles within the educational setting. As part of the research design, semi-structured interviews were conducted with participating teachers to obtain rich and detailed descriptions of their experiences and points of view. This allowed for a comprehensive understanding of the impact of AI on teacher leadership by capturing a range of experiences and perspectives.

Participants

Purposeful sampling was used to find graduate and postgraduate participants (teachers and students) from colleges and universities where AI has been used for at least three years. For semi-structured interviews, participants were gathered from the various districts of Punjab Province. A consent form was used to share some information with the participants before conducting interviews, such as:
1. They had at least two to three years of experience with AI.
2. Their institutions used AI technology for both teaching and learning.
3. They had at least five years of experience (for teachers only).

Sixteen of the 27 positive responses to requests we received indicated that they were interested in appearing for an interview. As a result, the study sample included 16 individuals from different districts of Punjab province.

Research Instrument
Considering this study's aim, a semi-structured interview plan was developed that ensured that important topics were covered. The interviewers were allowed to delve into unexpected or noteworthy areas that arose during the session. Additionally, the semi-structured design ensured consistency in the questions, which helped with similarity across different meetings. Expert feedback and iterative refinement and modification made it more viable and significant for the examination review.

Table 1: Interview Schedule

Introduction	Introductions, welcome, subject synopsis, informed consent, and ground rules. Intro of AI.
Main body	(1) Three questions to be asked from students for objective no. 1: (1.1) What effects does the growing use of AI technologies in education have on the identities and roles of teachers? (1.2) As AI becomes more common in educational settings, what are the perceived threats to teachers' professional autonomy and authority? (1.3) What measures can academic institutions take to assist educators in adapting to the rapidly changing AI-shaped landscape? (2) Three questions to be asked from teachers for objective no. 2: (2.1) How are students' capacities for creative thought affected by the pervasive use of AI in educational settings? (2.2) How can educational institutions strike a balance between encouraging students to use their creative thinking skills and integrating AI tools? (2.3) What tactics can teachers use to help students maximize AI's benefits for learning while minimizing any potential harm to their creativity?
Closure	Any idea which you want to add here as your feedback

Three MS scholars reviewed the interview schedule. They felt some questions were already included in other questions, so the number of items was reduced based on their feedback. Given that the study had two objectives, there were three research instrument items for each. At the same time, expert feedback for research instrument credibility was sought from a professor who shared the same traits as the study sample. The specialist feedback helped the researchers estimate that the interviews would take 25 minutes.

Table 2: Participants List

Teachers	Students
7 (3 males + 4 females)	9 (2 males + 7 females)
One male PhD teacher from Lahore, one male educator from Islamabad One male is from the University of Gujrat	Two males are PhD scholars from Lahore
One female teacher is from Gujrat, and one is from Narowal. Whereas two teachers are from Punjab College Sialkot out of 4 females	Four students are MS scholars of Sialkot University, one female scholar is a medical student, 1 is an MS Scholar from UMT, and one is a PhD scholar from USKT out of 7 female scholars

In addition, some rephrasing was done to improve the clarity of the interview items. The interviews were carried out in a cross-directional manner. As for objective no.1, the data was gathered mainly from the students to reach their viewpoint regarding teachers' needs in the future AI-driven scenario. In the same way, for objective no. 2, the data was collected from the teachers from colleges and universities to discover what they thought about students' creativity while teaching them with AI tools. The interview schedule and the participant list are presented in the table 1 & 2:

Data Analysis and Discussion

The respondents' replies were first transcribed, and then their answers were examined to derive conclusions from the data, which was gathered through semi-structured in-person. The transcribed data were coded, and a thorough thematic analysis was conducted. Five questions were posed to the respondents in total; three of those questions were used in this study and were further examined.

To explore how AI impacts teachers' identity, the participants were asked questions recorded and transcribed after the informed consent. When asked about the effects of AI on teachers' roles and identity, most responded by highlighting similar issues, such as a shift in teachers' roles from being primarily knowledge providers to facilitators of learning. However, one participant responded, "even with AI tools, teachers are still important due to their care, ideas, and thinking skills. Also, AI cannot explain text with gestures. So, the teachers are still super important for classrooms." Similarly, a participant denied the use of AI by her students, and even if they go for AI help, they still need confirmation from their teachers. Another recorded response highlighted that AI can automate administrative tasks, such as grading and scheduling, freeing teachers' time to focus on instruction.

As far as the perceived threats to the professional autonomy and authority of teachers are concerned, the participants informed that the use of AI could reduce teacher-student interaction and empower students to take more control over their learning process, thus minimizing teachers' role in the classroom and potentially diminishing the hierarchical relationship between teachers and students. This practice ultimately would alter the classroom dynamics as well. Another respondent revealed that "teachers may feel sidelined by automated systems" and that "their role reverses from instructor to facilitator only" and that AI can pose ethical and privacy concerns for schools using it in education marketing".

When the respondents were asked about the measures that academic institutions could take to assist educators in adapting to the rapidly changing AI-shaped landscape, they responded that educational institutions could support teachers by providing them with ongoing training and professional development opportunities. This could include workshops on incorporating AI tools effectively, fostering digital literacy skills among teachers and students, and creating spaces for dialogue about the ethical implications of AI in education. Additionally, institutions could encourage collaboration between teachers and AI developers to co-create educational solutions that complement teachers' expertise. Moreover, academic institutions could implement strategies to support teachers in adjusting to the changes brought by AI. This could include providing professional development opportunities focused on AI integration, offering mentorship programs for teachers to exchange best practices, fostering a culture of innovation and experimentation, and ensuring teachers have the necessary resources and support to use AI technologies effectively in their teaching practices.

Furthermore, three questions were examined out of five to comprehend how students were growing reliance on AI and becoming lazy. First, they were asked, "how are students' capacities for creative thought affected by the pervasive use of AI in educational settings?" The respondents believed it could impact students' creative thinking abilities by providing new,

unmindful opportunities for exploration and problem-solving tools that could assist in generating ideas, offering feedback, and facilitating collaboration, potentially enhancing students' creative thinking skills through exposure to diverse perspectives and methodologies if monitored by well trained and reflective teachers. The participants highlighted the adverse effects of unmonitored AI use on critical thinking as there were no strict criteria for a plagiarism checklist; the students got involved in copy-pasting and getting help from AI to generate such fantastic material that even the teachers would be thoroughly deceived. Moreover, one participant said that AI negatively impacted students' thinking abilities, and their creative skills would diminish gradually, and they would just rely on "paki pakai kheer".

Secondly, it was inquired, "How could educational institutions strike a balance between encouraging students to use their creative thinking skills and integrating AI tools?" they responded that it could be done by embedding creativity across the curriculum, providing professional development for educators, fostering a culture of innovation, and evaluating and adapting strategies as needed. Moreover, institutions could use AI tools to help students think of new and exciting ideas and, by giving students fun projects, teach them how to use AI creatively and encourage them to think out of the box. However, one respondent emphasized the restricted and controlled environment by the institutions for this purpose.

Lastly, it was explored "what were some tactics that teachers could use to help students make the most of AI's benefits for learning while minimizing any potential harm to their creativity?" and the responses revealed that the educators could mitigate the adverse effects of AI on students' creativity, by encouraging diverse learning experiences, offering open-ended challenges, promoting collaboration, providing real-world problem-solving opportunities, and offering feedback on creative work. One respondent says that students should know that AI depends on us as it gives what is already added.

Undoubtedly, AI has transformed the teaching and learning process, and the participants feel its advantages. Some recent studies shed light on this aspect as well. For instance, Ayeni et al., (2024) point out that AI in education can adapt to the needs and learning styles of the students and facilitate real-time data analysis. Moreover, AI algorithms also analyze vast amounts of data, including students' progress, performance and preferences, to adjust educational experiences. This study also concludes that integrating AI in education, primarily focusing on personalized learning and educational technology, holds the utmost significance and can transform the academic landscape. In another study, Al-Mughairi and Bhaskar (2024) state that AI can help to explore innovative education technology, foster professional development, save time and increase the personalization of teaching and learning. On the other hand, some inhibiting factors have also been highlighted, i.e., concerns about reliability and accuracy, privacy and data security, reduced human interaction, and lack of institutional support.

Rhiman and Kodikal (2023) discuss that the integration of AI in education should be done with proper planning and diligence, and ethical considerations should be followed. Moreover, this study also identifies the application of AI in higher educational institutions by considering the instances and experiences of different Asian countries. As far as the role of technology in higher education is concerned, the facility conditions create a positive impact on users adopting AI in their routine academic practices. Faculty members' awareness of the significance and application of AI-based technology in their educational activities can positively influence their work engagement. In this way, adequate facilities and understanding of new technology can transform higher education by providing more personalized learning experiences, improving student outcomes, and enhancing the efficiency of administrative processes.

Findings

Under research question no.1 (Why does it seem that AI can be dangerous for teachers' identity in the future?), this study finds that AI can be hazardous for teachers' identity because it has shifted teachers' role from "knowledge providers to facilitators" only.

It is sorted out in light of the second research question (What is the influence of AI on students' self-motivation for creativity?): AI negatively impacts students' thinking abilities, and their creative skills diminish gradually.

Conclusion

The study revealed glaring differences in participants' opinions about how AI would affect teachers' identity and students' creativity. While some expressed concerns that AI might reduce autonomy and collaboration, others saw opportunities for improvement. This discrepancy may be related to variations in approaches to integrating AI in institutions and teachers' preparation. Some educators may be fearful due to their lack of AI experience and education, affecting how they view their professional agency. Moreover, students need to be more active and only sometimes rely on AI, which can be a significant risk for rationalizing their intellectual skills. What is heartening to know is that educators with a positive view of AI prevail as they believe that receiving thorough training and exposure to the technology would help them recognize its advantages for students' learning outcomes, personalized learning, and decision-making. More research is advised to examine contributing factors to bring order to AI-driven education chaos. Additionally, future research should not overlook examining the long-term effects of AI implementation on teachers' identity and students' creativity in developing the skills needed to navigate the world of AI. Invaluable targeted qualities include technological literacy, flexibility, coaching and teamwork abilities, data-driven decision-making, and human-centered methods. These competencies would enable educators to prioritize the human element in education, foster cooperative learning environments, navigate the constantly changing technological landscape, and understand and harness the potential of AI tools.

Recommendations

1. AI is dependent on us. We should not depend upon AI. It is high time we got ready and be updated to dominate AI instead of losing the initiative and being its slave.
2. Educational establishments should play a proactive role by integrating creativity into the curriculum, offering professional development to teachers, and encouraging an innovative culture.
3. Educational establishments should also implement measures to assist educators in adapting to the shifts brought about by artificial intelligence. These measures may include providing opportunities for professional growth, mentoring programs for educators, and encouraging an innovative and experimental culture.
4. Educational institutions should also enhance plagiarism checks and host workshops to help students use their creative and innovative skills.
5. The curriculum should be designed so that students receive only assistance and not full text from AI tools, and they must use their creative thinking to complete assignments and other academic tasks.

References

- Al-Mughairi, H., & Bhaskar, P. (2024). Exploring the factors affecting the adoption AI techniques in higher education: insights from teachers' perspectives on ChatGPT. *Journal of Research in Innovative Teaching and Learning*. https://doi.org/10.1108/JRIT-09-2023-0129

- Ayeni, O.O, Al Hamad, N.M., Chisom, O.N., Osawaru, B., Adewusi, O.E. (2024). AI in education: A review of personalized learning and educational technology. *GSC Adv Res Rev. 18*(2), 261–271. https://doi.org/10.30574/gscarr.2024.18.2.0062
- Baker, T., & Smith, L. (2019). *Educ-AI-Tion Rebooted? Exploring the Future of Artificial Intelligence in Schools and Colleges.* London: Nesta https://www.nesta.org.uk/report/education-rebooted/
- Berendt, B., Littlejohn, A., & Blakemore, M. (2020). AI in education: Learner choice and fundamental rights. *Learning Media and Technology, 45*(3), 312–324
- Chen, J. J., & Lin, J. C. (2023). Artificial intelligence as a double-edged sword: Wielding the POWER principles to maximize its positive effects and minimize its negative effects. *Contemporary Issues in Early Childhood,* 14639491231169813
- Chen, X., Xie, H., Zou, D., & Hwang, G. J. (2020). Application and theory gaps during the rise of artificial intelligence in education. Computers and Education: Artificial Intelligence, 1, 100002. of artificial intelligence in schools and colleges. Nesta. *Retrieved from: https://Media. Nesta. Org. Uk/Documents*
- Eddles-Hirsch, K. (2015). Phenomenology and educational research. *International Journal of Advanced Research, 3*(8).
- Fang, Y. (2021). A systematic review of Natural Language Processing Applications in writing instruction. *Journal of Educational Computing Research, 59*(3), 527–548.
- Fidan, M., & Gencel, N. (2022). Supporting the instructional videos with chatbot and peer feedback mechanisms in online learning: The effects on learning performance and intrinsic motivation. *Journal of Educational Computing Research, 60*(7), 1716–1741.
- Gonzalez, J., & Guzman, J. (2020). The Use of Voice Recognition Technologies for Administrators in Education. *Journal of Education and Learning, 9*(1), 1–15.
- Hatzius, J., Briggs, J., Kodnani, D., & Pierdomenico, G. (2023). *The Potentially Large Effects of Artificial Intelligence on Economic Growth*. Goldman Sachs Economics Research, 26/03/2023. https://www.key4biz.it/wp-content/uploads/2023/03/Global-Economics-Analyst_-The-Potentially-Large-Effects-of-Artificial-Intelligence-on-Economic-Growth-Briggs_Kodnani.pdf
- Hussain, M. S., Hussain, M. M., Awan, M.A., & Farid, A. (2012). Teachers' identity in the Modern World and the Factors which Shape them Professionally and Psychologically. *Journal of Language Teaching and Research, 3*(1), 93-101.
- Hwang, G. J., Xie, H., Wah, B. W., & Gašević, D. (2020). Vision, challenges, roles and research issues of Artificial Intelligence in Education. *Computers and Education: Artificial Intelligence, 1*, 100001.
- Johnson, A., Mishra, P., & Ruggiero, D. (2021). Artificial intelligence and education: Challenges and opportunities. *Journal of Educational Technology Development and Exchange, 14*(1), 1–16.
- Rahiman, H, & Kodikal, R. (2023). *Revolutionizing education: Artificial intelligence empowered learning in higher education,* Taylor & Francis.
- Vagle, M. D. (2018). *Crafting Phenomenological Research* (2nd ed.). New York, NY: Routledge. https:// doi.org/10.4324/9781315173474
- Williams, T. (2023). GPT-4's Launch 'Another Step Change' for AI and Higher education. *Times Higher Education*. https://www.timeshighereducation.com/news/gpt-4s-launch-another-step-change-ai-and-higher-education
- Xia, Q., Chiu, T. K., Zhou, X., Chai, C. S., & Cheng, M. (2022). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computers and Education: Artificial Intelligence,* 100118.
- Zhai, X., Chu, X., Chai, C. S., Jong, M. S. Y., Istenic, A., Spector, M., & Li, Y. (2021). A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*, 2021, pp. 1–18.