OPEN ACCESS

ISAR Journal of Arts, Humanities and Social Sciences

Volume 3, Issue 1, 2025 | Page: 58-63

Abbriviate Title- ISAR J Arts Humanit Soc Sci

ISSN *(Online)*- 2583-9691

https://isarpublisher.com/journal/isarjahss

AI in the K-12 Classroom: Empowering Educators, Supporting Learners, and Tackling New Challenges

Breanna Naglich[1], Mingyuan Zhang[2*]

College of Education and Human Services, Central Michigan University, USA.

***Corresponding Author**

Mingyuan Zhang

College of Education and Human Services, Central Michigan University, USA.

Article History
Received: 28.10.2024
Accepted: 08.12.2024
Published: 16.01.2025

Abstract: This literature review explores the rapid rise of Artificial Intelligence (AI) use within K-12 education, focusing on major themes around its integration into teaching and learning environments. While AI-powered digital tools have long supported classroom instruction, the recent adoption of Large Language Models (LLMs) and chatbots such as ChatGPT and Gemini have raised new ethical and practical concerns. On the one hand, teachers benefit from AI in managing their workload and enhancing instructional practices. On the other hand, there are great concerns around student misuse of the same technologies. This literature review and synthesis examines AI's impact on personalized learning, student differentiation, and teacher application, highlighting the positive contributions that these tools offer. In addition, this review also emphasizes the need for policies that address ethical, privacy, and academic integrity issues. Educators must be prepared to not only implement AI in pedagogically sound ways, but also teach students about the responsible use of these ever evolving digital tools.

Keywords: artificial intelligence, large language models, chatbots, integration, K-12 education, academic integrity, education policy.

Cite this article:

Naglich, B., Zhang, M., (2025). AI in the K-12 Classroom: Empowering Educators, Supporting Learners, and Tackling New Challenges. *ISAR Journal of Arts, Humanities and Social Sciences*, *3*(1), 58-63.

Introduction

Background

As the topic of Artificial Intelligence (AI) continues to trend within every facet of teaching and learning, it is imperative that educators and stakeholders recognize the affordances and capabilities of AI supported tools within the K-12 classroom environment beyond the many fears that lie upon the surface. The capacity of AI to transform education, from teaching and learning to policy and reform, will continue to advance and, in return, require ongoing guidance and reflection. This profound impact requires a reexamination of the interrelationships of technology, pedagogy, and subject matter (Ning et. al, 2024). Digital learning tools are ever changing, educators and administrators are seeking additional guidance on AI policy within the classroom (Hays, Jurkowski, & Sims, 2023), and there have been many proposed frameworks to guide AI integration. Kong and Yang (2024) have stressed the importance of learners and users having a say in the policy governing AI use in the classroom.

As learners work to gain agency over how they learn and create, educators are already accustomed to frequent change within the field; the advancement in technologies such as calculators and spell check has been commonplace and made teachers' and students' jobs easier (Hays et al., 2023), and each technology in their own time have received similar pushback. Reluctancy to explore and integrate educational technologies will keep the tools from evolving and embedding into learning landscapes. Machine Learning (ML) has become a part of our everyday life, profoundly impacting our society (Gresse Von Wangenheim et al., 2022), and this trajectory will continue to weave its way into daily lives as it becomes more deeply rooted within K-12 educational spaces. While it is imperative to understand the various tools and their application, one must equally explore policy, ethics, and privacy concerns in addition to educators' hopes and fears to evaluate AI's place within teaching and learning landscapes.

Historical Context of AI in Education

Much of the theory that underpins artificial intelligence was developed by computer scientists such as Alan Turing, Marvin Minsky, and John McCarthy as far back as seventy years ago (Shiohira, 2021). The modern internet is 34 years old, yet many learning institutions still need to be convinced to embrace new technologies as productive places for public discourse (Utecht & Keller, 2019). With the discussion of AI taking precedence in the composition of policy and technology expectations for young learners, artificial intelligence methods have already been present within classroom learning. Recent discussions on the impacts of AI

on teaching and learning stem from Large Language Modes (LLMs). The recent advancement of LLMs has raised concerns for those within the field. Similar AI mechanisms such as spell check and predictive text have been seen as conveniences rather than a threat despite predating the more complex application of these technologies.

There has recently been a boom in AI tools available to students through learning devices and cell phones, which can make learning more accessible. Tools like text-to-speech, virtual assistants such as Apple's Siri, or home appliances with similar support, such as Amazon's Alexa, offer public information and solutions with a simple voice prompt. Young children today are often more familiar with the capabilities of artificial intelligence as many have explored image and camera filters through various social media sites such as Snapchat and Instagram (Touretsky et al., 2019), and it is near impossible to shield students from AI use both in and outside of the classroom.

The widespread use of generative LLMs with the rising use of chatbots has sparked educators' fears for student application, with concerns such as academic integrity and its threat to genuine student work (Lowe, 2024). In order to appreciate the big ideas of AI, both students and teachers need to be able to tinker with AI (Touretsky et al., 2019). The only way to understand the capabilities and pitfalls is to become familiar with its multiple means of use and integration in and out of formal learning spaces.

Current AI Tools Within the Classroom

School districts have increased the number of screens within K-12 classrooms, which has tasked educators with another shift in their teaching and learning practices. Today, "educators are faced with looking at the backs of devices instead of the faces of their students" (Utecht & Keller, p. 111, 2019), which has altered classroom dynamics and, in return, reliance upon technology. Due to the relatively recent history of AI tools within the classroom, many teachers may not even recognize that they regularly access learning tools that fall under the AI umbrella, such as personalized learning applications, voice-to-text, assisted grading, grammar check, and flash cards. The definition of AI has changed over the years due to rapid advancements in AI capabilities (Crompton et al., 2024), which may justify the reluctance of educators to embrace AI within teaching and learning.

Teachers support a wide range of abilities within a single lesson and have leveraged digital learning tools, learning games, and accessibility tools to differentiate for each student's needs. One of the largest impacts of educational technology to date is the use of one-to-one computing, a classroom in which every student has their own learning device; this structure creates a learner-centered form of education through differentiation (Lawrence et al., 2018). Digital learning tools, often gamified or adaptive, supply teachers with resources to meet individual student learning goals, and they utilize the same machine learning principles as their newer "AI" counterparts. The use of these AI-supported tools has shown promise to teachers by providing instruction or application of learning to mixed-ability classrooms, providing students with timely feedback, and freeing teachers of additional burdens to allow more significant time in observation, discussion, and gathering information about their students (Akgun & Greenhow, 2021). Many educators' concerns with AI do not reside within their personal use of AI or the canned digital learning resources that utilize AI but rather within student use of Large Language Models and Chatbots. This challenge is coupled with the necessity to expose students to the technologies and challenges they will encounter in the real world (Shareef, 2023). While the use of artificial intelligence may have vastly different purposes within the teaching and learning space, red flags only arose as Chatbots began to threaten teachers' ability to discern genuine student work.

Methods

This literature review follows a systematic approach to gauge the current integration of AI within K-2 learning spaces. Extensive time and focus were applied to scouring databases such as ERIC and ProQuest Education using keywords such as "artificial intelligence," "K-12", "educational technology," and "adaptive learning." Journals published between 2018 and 2024 were selected based on peer revision and their relevance to research that addressed AI applications, ethical issues, data privacy, and academic integrity within K-12 teaching and learning. Articles solely focused on higher education, non-empirical studies, and non-English publications were not selected for this review. The journal's data was extracted by gathering key details on research objectives, methodologies, and findings. Thematic analysis identified patterns within AI's instructional benefits, ethical concerns, and policy implications. A quality assessment of each study ensured that all adhered to methodological rigor while providing a reliable synthesis of AI's evolving impacts on future considerations within K-12 education spaces.

Results and Discussion

Integrating AI in K-12 education has provided opportunities and challenges within various aspects of teaching and learning. AI has proven to touch every corner of education, from instructional practice to student engagement and ethical considerations such as bias and privacy. Key findings concluded by a thematic synthesis highlight how AI tools impact personalized learning, classroom management, and student interactions while raising questions about student data privacy, academic integrity, and the need for more significant policy. The following results display these patterns, shedding light on the potential and limitations of AI in shaping the future of K-12 education.

ChatGPT and Large Language Models

Large language models are trained on a huge amount of conversational data, predicting the next word or phrase in response to a prompt (Zhang & Tur, 2023). Chatbots such as Chat Generative Pre-training Transformer (ChatGPT), which OpenAI developed, became publicly available in November 2022. Hays, Jurkoswi, and Sims (2024) describe LLMs as any tool that utilizes AI capabilities to generate human-like text that responds to the user's prompt. These chatbots have been increasingly integrated within higher education and have begun to work their way into K-12 learning environments, revolutionizing teaching and learning (Zhang & Tur, 2023). There has also been a surge in AI-based products and tools designed specifically for younger students (Touretsky et al., 2020), making AI more accessible in educational settings both to deliver instruction and support students through AI tutoring and differentiation. By automating administrative and repetitive tasks such as lesson planning, example, and quiz generation, as well as parent communication via newsletters or class updates, AI can free up teachers' time, enabling them to concentrate on addressing students' individual learning needs (Chan & Tsi, 2023). As teachers can and have leveraged bots to

reduce workload and support student learning, many worry about parallels in student use to do the same.

While there is concern about the application of this AI tool within educational landscapes, teachers and administrators have been leveraging the same technology to shoulder the many demands of teaching and learning. What is seen as an acceptable tool to streamline the many demands of instructors is also seen as a threat to traditional instructional practices. The same thing that chatbots are celebrated for, they are also scrutinized, "Artificial intelligence is rooted in the premise that digital technology can possess intelligence comparable to a human" (Hays et al., 2024, p. 282) and that intelligence is tested and used to reduce the workload of many teachers, administrators, and support staff. While ChatGPT is seen as a godsend for various, often redundant, tasks that educators face, it may also reinforce the exploitation of teachers' ability to take on even more work with the support of technology aids.

The foundations of the education system have become strained by the ever-increasing accessibility of technology. Traditional schooling began as the transfer of information from teacher to student. A student no longer learns by memorization of facts provided by direct instruction but instead creates connections through multiple modes of knowledge acquisition, exploration, and critical thinking. "Learning in connectivism terms is a network phenomenon, influenced, aided, and enhanced by socialization, technology, diversity, strength of ties, and context of occurrence" (Tschofen & Mackness, 2012, p. 125). The reliance on transactional learning decreased as additional technologies such as paper and pencil, mathematics manipulatives, overhead projectors, and pocket calculators emerged. As the structure of formative education evolves, "Knowledge, therefore, is not a set of facts but rather a learner's ability to learn, unlearn, and relearn information quickly and be able to apply that new knowledge in an ever-changing information landscape" (Utecht & Keller, 2019, p. 108), and the introduction of AI is shifting this paradigm once again.

Adaptive Learning Tools

AI adaptive learning tools are increasingly recognized for their ability to transform education by providing personalized and flexible learning experiences. These learning experiences can be taken outside of classroom and school walls, supporting distanced learners. These tools, also known as "personal learning systems" or "intelligent tutoring systems," are one of the most common and valuable applications of AI within classroom spaces for both teachers and students (Akgun & Greenhow, 2021). AI systems offer immediate feedback and "self-graded" assessments while allowing students to better understand their strengths and weaknesses, thus enabling a more targeted approach to learning (Hazari, 2024). Beyond assessments and personalized learning games, AI's capabilities can extend to supporting adaptive writing by highlighting key information within the text, which supports students in processing and comprehending complex material (Kasneci et al., 2023).

Generative AI models, in particular, enhance the adaptability and accessibility of these tools by crafting engaging and tailored learning experiences that cater to individual students' needs (Hazari, 2024). Through their many multifaceted features, AI-driven adaptive learning tools show advancements in reshaping traditional education by addressing individual learning preferences and fostering more effective learning environments.

As learners gained greater access to sources of knowledge and information, the purpose of the educators shifted from source of knowledge to instructional guides. With the more widespread use of technology, now viewed as access to screens and smart technologies in addition to AI-powered learning tools, educators' purpose must shift from being a guide to being a critic. Without placing the name "AI" upon the learning tool, "adaptive learning" or "tools that tailor content or the pace of delivery to student" (Saltman, 2020, p. 199) have been used within public education in order to differentiate instruction and allow technology to meet learners' individual needs and learning gaps. Adaptive learning tools, particularly AI-powered, date back to the 1950s with the introduction of computer-assisted instruction (Chan & Tsi, 2023).

Challenges and Concerns with AI Use in the K-12 Educational Environment

Integrating AI within learning landscapes can result in a wide range of challenges and concerns for teachers and students. These challenges go beyond the surface of academic integrity but also include societal and ethical challenges that educators and policymakers must consider. AI in the K-12 classroom has the potential to enhance learning experiences, but it also has risks that could undermine its benefits. Akgun and Greenhow (2021) note that:

The most significant risks of integrating these algorithms in K-12 contexts are (a) perpetuating existing systemic bias and discrimination, (b) perpetuating unfairness for students from mostly disadvantaged and marginalized groups, and (c) amplifying racism, sexism, xenophobia, and other forms of injustice and inequity".

The issues highlighted by Akgun and Greenhow (2024) expand on the potential for AI to reinforce existing inequities within educational systems, particularly for students from marginalized backgrounds. Lyell (2024) also points out that "the biggest impacts of the AI revolution are yet to be felt," indicating that the full scope of AI's influence in education may not yet be fully realized. Policy must quickly catch up as teachers and learners continue to embrace new technologies to enhance engagement and student learning. Teachers have to experiment with learning tools to stay ahead of trends, and many are concerned about what the machine is capable of.

AI technologies are increasingly seen as tools that could supplement or even replace some aspects of teaching, raising important questions about their impact on the traditional teacher role (Schiff, 2021). As teachers worry about AI's future impacts upon teaching and learning, students are gaining more and more experience with AI digital learning tools and how to use them to their advantage without formal introduction and instruction.

Concerns around AI's impact on academic integrity are at the forefront of educational discussions. Lowe (2024) observes that this topic troubles classroom colleagues more than most other aspects of AI in education and, therefore, receives the most attention. Despite these concerns, Akgun and Greenhow (2021) also recognize the positive contributions of AI but caution that "despite the benefits of AI applications for education, they pose societal and ethical drawbacks" (p. 432). Thus, balancing leveraging AI's advantages while addressing its significant risks is crucial.

Ethical Concerns

The integration of AI technologies like ChatGPT into K-12 education raises numerous ethical challenges, which include concerns related to transparency, fairness, and bias. Hays, Jurkoswi, and Sims (2024) note the limited research on ChatGPT's application in K-12 settings and highlight the need for more studies to understand teachers' perceptions and use of such tools (p. 282). These authors continue to emphasize the importance of considering moral and ethical codes when using AI, particularly in assessing students' emotional and motivational states, as there are concerns about whether this is ethically appropriate (p. 282). Touretsky et al. (2020) similarly argue that AI systems must be transparent, allowing their reasoning to be scrutinized to identify potential errors or biases. As Lancaster (2024) points out, "ChatGPT can generate answers that appear well-written but factually incorrect. This may be because the data used to train ChatGPT was itself incorrect. However, it may also be because ChatGPT is also trying to produce a particular form of words" (p. 4), which can further exacerbate current biases within the machine. The potential for AI to perpetuate biases against traditionally misrepresented groups, such as students of color or those from lower socioeconomic backgrounds, underscores the need for fairness and equity in AI's role as a teaching tool (Gillani et al., 2023; Hays et al., 2024, p. 282). These concerns reflect the broader conversation on ensuring AI systems in education operate ethically and without reinforcing existing inequities.

Privacy and Policy

Concerns with AI use within the public K-12 classroom go beyond the fear that students will use AI to "cheat"; there are significant safety concerns about how student information is linked to AI learning applications and student learning management systems. As Akgun and Greenhow (2021) note, "one of the biggest ethical issues surrounding the use of AI in K-12 education relates to the privacy concerns of teachers and students" (p. 434). AI policy within education must catch up with the rapid advancement of technology entering the classroom. With the AI phenomenon not new to the environment but rather highlighted, school districts are fighting to catch up while the tools keep progressing.

Policy is necessary to monitor and reinforce student use of AI technologies and address how student data is being shared and sold. Bell (2011) states that Knowledge is simultaneously seen as a commodity that can be managed and sold (p. 100), and this transfer of knowledge is being developed and sold while exploiting young learners' data and information. Saltman (2020) highlights that "some of the most prevalent for-profit endeavors of AI in education involve producing student data that is then sold, contracting with public entities to get for-profit technologies into schools" (p. 198). While many are becoming privy to the excessive amount of information and data tracking that is shared across online platforms (Akgun & Greenhow, 2021), social, personal, and professional students are still developing literacy, let alone reading the agreements that they select in order to play digital learning games. Akgun Greenhow (2021) continues to discuss the extent of the metadata people share, such as their spoken language, racial identity, biographical data, and location. This infringement on privacy concerns goes beyond the surface of the highly discussed fear of student academic integrity.

Academic Integrity

In an ideal world, AI would be used as a "thought partner" to help developing writers plan initial drafts or check for grammatical errors. Unfortunately, with the human-like outputs generated by various chatbots (Chan & Tsi, 2023), teachers have difficulty assessing students' actual efforts and understanding within written formative and summative assignments. Beyond its ability to generate responses to any provided prompt, there are concerns with the trustworthiness of ChatGPT-generated text. Teachers are asking for policies developed around chatbot and AI use to support and reinforce the importance of student competency prior to AI use for student work submission (Hays et al., 2024). In addition to how the bot is being used, there is evidence that the predictive text generated by various LLMs is not always reliable or accurate (Alberth, 2023).

Often, concerns about student work and academic integrity are fueled by fears of students earning grades they did not deserve rather than the real concern of missing out on the opportunity to learn (Lancaster, 2024). For students to take full advantage of learning assignments and opportunities to receive feedback on their original work to better their understanding, academic integrity policies regarding plagiarism must expand to include unethical uses of AI in schoolwork (Hays et al., 2024). Despite the evolution of AI within the classroom, academic integrity has always been a challenge within education. Before AI made chatbots readily available, students would hire or use third parties to complete their assessments. Text generation tools simply remove the need for students to hire someone else to complete the work for them (Lancaster, 2024). Alberth (2023) states the need to embrace this new technology cautiously and responsibly and continues to stress the importance of adhering to academic integrity and honesty.

Conclusion

The potential of AI to transform K-12 education is undeniable. AI offers educators tools to personalize learning, streamline administrative tasks, and foster engagement. With apparent advantages for instructor use, these benefits come with critical concerns. Ethical, privacy and academic integrity raise concerns that must be addressed to ensure AI is a positive and safe addition within classroom environments. AI tools such as LLMS and chatbots increase classroom use; educators, policymakers, and stakeholders must work hand in hand to establish policies and frameworks that focus on the responsible integration of AI within K-12 academic spaces.

Implications

The findings identified throughout this literature review uncovered a pressing need for comprehensive AI literacy among teachers and students. Teachers must be prepared and supported in effective implementation to combat the ethical concerns within AI integration. Developing teacher and student, AI literacy will ensure that all users understand the capabilities and limitations of AI within teaching and learning. The benefits of AI in assisting in differentiation and supporting diverse learners outweigh the concerns of the technology. However, those integrating AI within the classroom must be mindful of the ethical implications of student data collection and usage.

Recommendations for Action

Develop Clear Policies for K-12 AI Use: Both decision makers within a school and the school district should prioritize creating robust policies regarding AI use. Policy should focus on data privacy, academic integrity, and ethical use of AI. It is imperative that both the school and the school district establish clear student guidelines to help mitigate the misuse of AI-supported technology. While policy must be set, it must also be frequently reviewed and revised as the landscape of teaching and learning and the development of AI continues to change.

Invest in Professional Development: Classroom educators as well as school administrators need ongoing opportunities to engage in AI training. In order to support the policies that have been put in place regarding AI use within the classroom, teachers must be exposed to best practices for AI integration in addition to offering greater hands-on experience and discussion around teachers' concerns within its use. In order for implementation of AI tools to be productive this conversation must be ongoing. As teachers develop greater skills and are exposed to greater opportunities to embed AI within their instruction, they must build AI literacy for both self and student.

Encourage Responsible AI Practices Amongst Students: Schools must spearhead AI literacy programs for students in order to develop critical thinking, responsible use, and combat ethical concerns of AI within the classroom. By supplying students with the tools to use AI responsibly, they will be better prepared to leverage AI in ways that complement their learning, in return, reducing concerns of academic integrity.

Collaboration Between AI Developers and Educators: Educational technology companies that are developing tools for education should engage directly with school stakeholders to better understand both classroom needs and concerns. By involving the direct users, teacher and student input can guide the development of various tools and applications that are effective and meet instructional needs.

Recommendations for Future AI Literature Reviews

Broaden the Scope of Ethical and Societal Impacts: Future reviews of AI within K-12 education should examine the broader societal impacts of AI within instruction. To ensure that AI use is equitable, greater research must be conducted on its accessibility and integration within marginalized student populations to understand how AI can be made equitable across diverse educational settings.

Explore Longitudinal Data on AI Integrations: While the use of bots within the classroom has been a recent topic of discussion, future studies should seek to collect longitudinal data on AI usage within K-12 educational spaces. This data would provide insight into how AI influences student outcomes, self-efficacy, engagement as well as teacher practices over an extended period of time.

Expand to Diverse Perspectives and Global Cases: Future reviews of literature on AI within the K-12 learning space would benefit from exploring a more comprehensive range of perceptions. Examining how AI integration varies based on geographical and cultural contexts would address differences in cultural implementation practices and policy.

Focus on Emerging Pedagogies: As instructional methods evolve, future AI literature reviews should explore how AI fits within pedagogical models. AI has the potential to support progressive teaching methods such as project-based, blended learning, and competency-based education. As the use of AI within the classroom continues to evolve, so must instructional methods to embrace and positively leverage this technology.

With consideration and action upon these recommendations, educators, policymakers, and researchers can better leverage AI capabilities to support teaching and learning. By remaining vigilant to the ethical and practical challenges that AI presents within K-12 education, both users and decision-makers can ensure effective AI use within the classroom. Continued exploration is vital. Additional critical analysis on AI use within K-12 teaching and learning spaces will ensure its integration is thoughtful, equitable, and ultimately beneficial for all teachers and learners.

References

1. Akgun, S., & Greenhow, C. (2021). *Artificial intelligence in education: Addressing ethical challenges in K-12 settings. Ai and Ethics, 2, 431 - 440.*
2. Alberth. (2023). The Use of ChatGPT in Academic Writing: A blessing or a cure in disguise? Teflin Journal, 34(2), 337-352. https://doi.org/10.15639/teflinjournal.v34i2/337-352
3. Bell, F. (2011). *Connectivism: Its Place in Theory-Informed Research and Innovation in Technology-Enabled Learning. International Review of Research in Open and Distance Learning, 12(3), 98-118.* https://cmich.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/connectivism-place-theory-informed-research/docview/864941760/se-2
4. Chan, C.K., & Tsi, L.H. (2023). *The AI Revolution in Education: Will AI replace or assist teachers in higher education?* ArXiv, abs/2305.01185.
5. Crompton, H., Jones, M. V., & Burke, D. (2024). *Affordances and Challenges of Artificial Intelligence in K-12 Education: A systematic review. Journal of Research on Technology in Education, 56(3), 248-268.* https://doi.org/10.1080/15391523.2022.2121344
6. Gresse Von Wangenheim, C., Da Cruz Alves, N., Rauber, M. F., Hauck, J. C. R., & Yeter, I. H. (2022). *A Proposal for Performance-Based Assessment of the Learning of Machine Learning Concepts and Practices in K-12. Informatics in Education, 21(3), 479-500.* https://cmich.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/proposal-performance-based-assessment-learning/docview/2860855500/se-2
7. Hays, L., Jurkowski, O., & Shantia, K. S. (2024). *ChatGPT in K-12 Education. TechTrends: Linking research and practice to improve learning, 68(2), 281-294.* https://doi.org/10.1007/s11528-023-00924-z
8. Lancaster, T. (2023). Artificial intelligence, text generation tools and ChatGPT – does digital watermarking offer a solution? *International Journal for Educational Integrity, 19*(1), 10. https://doi.org/10.1007/s40979-023-00131-6
9. Lawrence, A. C., Al-Bataineh, A. T., & Hatch, D. (2018). Educator Perspectives on the Instructional Effects of One-to-one Computing Implementation. *Contemporary Educational*

Technology, *9*(2), 206–224. https://doi.org/10.30935/cet.414950

10. Lowe, M. (2024). The More Things Change: The Ethical Impacts of Artificial Intelligence in Higher Education. Research Issues in Contemporary Education, 9(2), 19-56. https://cmich.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/more-things-change-ethical-impacts-artificial/docview/3099835851/se-2
11. Lyell, I. (2024). *Artificial Intelligence and the Future of Education. Agora*, *59*(2), 7-8. https://cmich.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/artificial-intelligence-future-education/docview/3085715241/se-2
12. Ning, Y.; Zhang, C.; Xu, B.; Zhou, Y.; Wijaya, T.T. *Teachers' AI-TPACK: Exploring the Relationship between Knowledge Elements. Sustainability 2024, 16, 978.* https://doi.org/10.3390/ su16030978
13. Saltman, K. J. (2020). *Artificial Intelligence and the Technological Turn of Public Education Privatization: In defense of democratic education. London Review of Education, 18(2).* https://doi.org/10.14324/LRE.18.2.04
14. Schiff, D.S. (2020). *Out of the laboratory and into the classroom: the future of artificial intelligence in education. Ai & Society, 36, 331 - 348*.
15. Shareef (2023). The Value of Soft Skills in a World Dominated By AI: Why Human Qualities Are More Critical than Ever. The 13th VESAL conference book of proceedings.
16. Shinohara, K. (2021). Understanding the Impact of Artificial Intelligence on Skills Development. Education 2030. ().UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training. Retrieved from ERIC https://cmich.idm.oclc.org/login?url=https://www.proquest.com/reports/understanding-impact-artificial-intelligence-on/docview/2540428113/se-2
17. Touretzky, D.S., Gardner-Mccune, C., Martin, F.G., & Seehorn, D.W. (2019). Envisioning AI for K-12: What Should Every Child Know about AI? AAAI Conference on Artificial Intelligence.
18. Tschofen, C., & Mackness, J. (2012/01//). Connectivism and Dimensions of Individual Experience. *International Review of Research in Open and Distance Learning*, *13*(1), 124-143. https://cmich.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/connectivism-dimensions-individual-experience/docview/1140135888/se-2
19. Utecht, J., & Keller, D. (2019). Becoming Relevant Again: Applying Connectivism Learning Theory to Today's Classrooms.
20. Zhang, P., & Tur, G. (2023). A systematic review of ChatGPT use in K-12 education. *European Journal of Education.*