Impacts of AI on Educator Planning Time

A Review of the Literature

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Introduction

In my typical work week, I have a structured schedule that includes one conference period of 45 minutes each day, spread across five days. Out of these daily conference periods, one is committed to our weekly professional learning community (PLC) meeting, where we collaborate on educational strategies and share insights to enhance our teaching practices. Another period is dedicated to my responsibilities as a sponsor for the sophomore class, which involves planning activities, supporting student initiatives, and engaging with both students and their families. The third conference period is reserved for important parent-teacher meetings, which can vary in nature but often include admission meetings, review discussions, and dismissal (ARD) meetings, all of which are crucial for student progress and support.

As an educator, I am allotted a total of 225 minutes of planning time each week during my work hours. However, I find that 135 of those minutes are consumed by essential tasks that arise throughout the week, such as grading assignments, attending to administrative duties, and responding to emails. This leaves me with a mere 90 minutes to prepare for the upcoming week's lessons, which need to effectively cover 225 minutes of instructional time for my 168 students. Like many in the teaching profession, I grapple with the challenges posed by these time constraints, which often inhibit my ability to fully develop engaging and comprehensive lesson plans. Furthermore, a study highlighted in Dillon's (2018) article, "Just Wasting Time," reveals that educators typically spend more than nine hours each week on tasks that fall outside of direct teaching responsibilities—tasks that, while necessary, detract from the time we could be investing in our students' learning and development. This reflects the broader struggle faced by educators to balance their numerous responsibilities within the limited time available to them.

Review of the Literature

Definition of AI

Artificial Intelligence (AI) is a technology designed to learn in ways that resemble human cognition. It emulates various skills, including problem-solving, language processing, and data analysis, thereby transforming numerous fields, particularly education (Triantafyllou, 2024). In education, AI can be further categorized into several specific areas, such as personalized learning, educational tools, and assessment and evaluation. Given AI's expansive nature, new information continuously emerges, leading to the creation of additional categories. Each of these categories encompasses various tools that educators can utilize to enhance their teaching methods.

Types of AI in Education

Personalized Learning Systems

Two primary categories of personalized learning systems exist: Intelligent Tutoring Systems (ITS) and Adaptive Learning Technologies. Intelligent Tutoring Systems (ITS) offer real-time feedback to students, facilitating adaptive learning tailored to individual needs (Lin et al., 2023).

Educational Tools and Resources

Within the realm of educational tools and resources, two types of AI can be identified: generative AI tools and robotic teaching assistants. Generative AI tools, such as Khanmigo and Magicschool.ai, assist educators by creating relevant content (Cano & Troya, 2023). In contrast, robotic teaching assistants are AI-driven solutions that support teachers by automating routine tasks (Malik et al., 2018). Recently, tools like Q-Chat have emerged as robotic teaching assistants that provide personalized tutoring for students.

Assessment and Evaluation

Moreover, in the assessment and evaluation domain, AI-based grading systems are becoming increasingly prevalent, offering accurate evaluations of student performance and streamlining the assessment process (Shrungare, 2022). Comprehensive quality evaluation models also exist to assess students' *overall capabilities, providing valuable insights into their strengths and weaknesses (Lin et al., 2023).*

Advantages of Using AI in Educator Planning

The literature on the use of AI in education highlights numerous advantages, particularly in the area of planning. Some of the key benefits frequently mentioned are personalized learning, improved lesson planning, data-driven insights, increased efficiency and automation, and superior feedback mechanisms.

Personalized Learning

AI plays a significant role in helping educators personalize student learning. This can be achieved in various ways, such as by assisting in the development of Individualized Education Plans (IEPs) tailored to each student based on input data, thereby aligning the learning experience with individual needs and enhancing both engagement and understanding. Engagement is assisted due to AI's ability to enable differentiation in the classroom (Bobro, 2024; Kaur et al., 2024). Additionally, intelligent tutoring systems can be integrated into the classroom to accommodate each student's learning pace. This approach ensures that students receive appropriate support or challenge levels as needed (Alam et al., 2024).

Improved Lesson Planning

AI tools, such as ChatGPT, can assist educators with lesson planning by ensuring that lessons align with learning objectives and cater to student demographics while reducing the time

educators spend on planning (Karpouzis et al., 2024; Kehoe, 2023). One of the main advantages for educators is the time-saving aspect. Many reports indicate that using AI-driven tools during the lesson planning process not only enhances satisfaction but also significantly conserves time (Karpouzis et al., 2024). The "Tailoring Education with GenAI: A New Horizon in Lesson Planning" report highlights improvements in both effectiveness and efficiency, thanks to AI's ability to customize content to meet student needs and provide necessary feedback. Overall, AI tools like ChatGPT are valuable resources for educators, improving lesson planning while saving time and enhancing the learning experience.

Data-Driven Insights

Data-driven instruction is a prominent topic in educator professional development. Artificial intelligence (AI) can enhance this approach by creating personalized learning experiences tailored to assessment data or specific demographics selected by the educator (Durães et al., 2024). By leveraging multiple demographics, educators can challenge students effectively while ensuring that no child is left behind, as it allows for the early identification of at-risk students and the implementation of suitable interventions (Alsbou & Alsaraireh, 2024). AI facilitates this process by offering educators insights into learning patterns and helping to pinpoint gaps in student knowledge (Farahani & Ghasmi, 2024).

Increased Efficiency and Automation

When it comes to efficiency and automation, AI can help with grading and attendance tracking. This assistance enables educators to focus more on teaching and engaging with students, ultimately giving them more personal time (Bobro, 2024; Hasan et al., 2024). By allowing AI to automate administrative tasks, teachers can dedicate more time to lesson planning and providing support to students (Lampou, 2023).

Superior Feedback Mechanisms

Personalized feedback is invaluable for students, as it enables educators to address the specific learning needs of each individual. According to KAYALI and Balat (2024), AI programs like GPT-4 effectively support student literacy by offering tailored feedback on grammatical errors, which assists students in their self-review processes. Additionally, personalized feedback enhances student engagement, particularly among non-native speakers, due to the accessibility and clarity of the feedback provided (Pang et al., 2024).

Barriers to Implementing AI in Education

Implementation barriers primarily include ethical concerns, resistance issues, capacity challenges, and financial constraints.

Ethical Concerns

When addressing ethical concerns, experts express apprehensions regarding data privacy and bias mitigation. The use of AI with student data raises significant data privacy issues, necessitating stringent policies to ensure confidentiality (Salloum et al., 2023). Conversely, bias mitigation calls for the establishment of ethical guidelines to navigate potential biases in AI algorithms that could impact educational outcomes (Munawar et al., 2024).

Resistance and Capacity Issues

Resistance and capacity issues in education stem from both educator skepticism and the need for training. The rapid rise of AI in the educational realm has led to many educators questioning its effectiveness. This skepticism often arises from a lack of understanding and a fear of job displacement (Schiff & Rosenberg-Kima, 2023; Bobro, 2024). To fully harness the benefits of AI, adequate training for both students and educators is essential. However, many institutions struggle to provide this necessary training due to limited resources (Saputra et al., 2023).

Financial Constraints

As mentioned in the previous section, the cost of implementation poses a significant barrier to adopting AI in educational institutions. The financial strain associated with AI technologies can lead many schools, particularly those that are underfunded, to refrain from integrating AI solutions (Saputra et al., 2023).

Summary

Artificial intelligence (AI) is not a novel concept; however, it is increasingly infiltrating the educational sector. What impact will AI have on educators' planning time and classroom instruction? Do its advantages outweigh the challenges? In the realm of education, AI can serve as a valuable tool for differentiation, automation, time management, and content creation for educators, regardless of their experience level. Nevertheless, many educators express ethical concerns, while numerous institutions face financial dilemmas regarding AI implementation. The role of AI is rapidly becoming a prominent topic of discussion among both educators and administrators.

This Review and the Field of Education

Artificial intelligence (AI) has been a concept in development for many years, but its integration into the educational sector is a relatively recent phenomenon that is gaining substantial traction. As AI technologies evolve, they have the potential to significantly transform educators' planning time and classroom instruction. This raises important questions: How will AI reshape the way educators develop lesson plans and deliver content? Moreover, do the benefits that AI promises outweigh its inherent challenges?

In the realm of education, AI can prove to be an invaluable asset. For instance, it offers opportunities for differentiation, enabling educators to tailor their teaching strategies to meet diverse student needs. AI tools can assist in automating administrative tasks, thereby freeing up teachers' time for more meaningful interactions with students. Furthermore, AI can enhance time management, allowing educators to organize their schedules more efficiently. Content creation is another area where AI shows promise, as it can facilitate the development of customized learning materials that align with individual student objectives.

However, the integration of AI in education is not without its obstacles. Many educators voice ethical concerns related to data privacy, algorithmic bias, and the potential for over-reliance on technology, which may undermine the role of human interaction in teaching and learning. Additionally, institutions often encounter financial barriers when attempting to implement AI technologies, which can hinder widespread adoption, particularly in underfunded school systems. As discussions surrounding the role of AI in education intensify, it has become a significant topic of interest for both educators and administrators. This literature review aims to summarize recent research findings regarding the impact of AI in educational settings. By continuously updating and maintaining access to this information, AI can serve as a valuable resource for educators seeking to navigate the complexities of modern teaching dynamics and harness the potential of technology to improve educational outcomes. Artificial intelligence (AI) is not a new concept, yet it is increasingly permeating the educational sector. What impact will AI have on educators' planning time and classroom instruction? Do the benefits outweigh the challenges? In the field of education, AI can be a valuable resource for differentiation, automation, time management, and content creation, regardless of educators' experience levels. However, many educators express ethical concerns, and numerous institutions face financial challenges related to AI

implementation. The role of AI is quickly gaining prominence in discussions among both educators and administrators. This literature review brings together recent studies on the topic of AI in education. By ensuring that information is current and readily accessible, AI can become an essential tool for educators.

Strengths and Weaknesses of this Body of Literature

The strengths of the existing body of literature are evident in its reliance on recent and unbiased sources that adeptly outline both the benefits and the obstacles associated with the integration of AI into educator planning. By presenting a comprehensive view that captures both sides of the issue, the literature review contributes to a more balanced and nuanced understanding, ultimately guiding the action research that follows. On the other hand, a significant weakness is the relative novelty of AI utilization within classroom settings, which complicates the search for pertinent and in-depth information on this evolving topic. This lack of established research can hinder the development of robust conclusions and actionable insights. The limited amount of existing research focused on the integration of artificial intelligence in educational settings may lead to data bias, as well as the potential for future studies to yield varying results. As AI technologies continue to evolve rapidly, the frameworks and methodologies used in current research may become outdated or inadequate, resulting in findings that do not accurately reflect the complexities of implementing AI in diverse classroom environments. This gap in research not only risks skewing our understanding of AI's effects on teaching and learning but also highlights the need for ongoing investigation to ensure that educational practices remain relevant and equitable over time.

Focus of the Current Study

This comprehensive body of research has provided valuable insights into the various types of artificial intelligence that can be effectively integrated into educational settings, as well as the specific methodologies for their successful implementation. Moreover, it has underscored the numerous barriers that educators may encounter, which I should remain vigilant about, and has equipped me with crucial information to relay to my institution regarding these challenges. With this foundation, I will be integrating these insights into my action research project, particularly focusing on the before-and-after surveys designed to evaluate the understanding of both my fellow educators and students concerning the potential benefits and obstacles associated with AI. I've observed that many students are already interacting with AI technologies in their academic pursuits; however, they often express astonishment at the range of capabilities these systems possess, as well as the ethical considerations that should guide their use. Additionally, the literature reviewed has played a significant role in crafting a structured plan aimed at educating my peers and students about the ethical applications of AI, emphasizing not only its advantages but also the critical impact it can have on effective time management in educational contexts. This initiative seeks to foster a deeper appreciation and understanding of AI, ensuring that all participants are informed of both its potential and its limitations.

References

Anya, S., Evmenova., Kelley, Regan., Reagan, L., Mergen., Roba, Hrisseh. (2024). Improving Writing Feedback for Struggling Writers: Generative AI to the Rescue?. Techtrends, doi: 10.1007/s11528-024-00965-y

Bünyami, KAYALI., Şener, Balat. (2024). Assessment, Evaluation, and Feedback in Online Education With Artificial Intelligence-Supported Tools. Advances in computational intelligence and robotics book series, 124-135. doi: 10.4018/979-8-3693-4268-8.ch008

Carlos, Alberto, Gómez, Cano., Ana, Lucía, Colala, Troya. (2023). Artificial Intelligence Applied to Teaching and Learning Processes. 1:2-2. doi: 10.62486/latia20232

Dalila, Durães. (2024). AI-Driven Educational Transformation in Secondary Schools: Leveraging Data Insights for Inclusive Learning Environments. doi: 10.1109/educon60312.2024.10578910

Daniel, Schiff., Rinat, B., Rosenberg-Kima. (2023). AI in Education: Landscape, Vision and Critical Ethical Challenges in the 21st Century. 804-814. doi: 10.4337/9781803928562.00081

Dr., Sumaira, Munawar., Jahanzeb, Ghouri., Fouzia, Jahanzeb. (2024). Challenges of Using Artificial Intelligence at the University Level. doi: 10.46662/jass.v11i1.463

Exploring the Educational Applications of AI-Based Feedback: Focusing on the Beginner Learner Corpus. (2024) doi: 10.17296/korbil.2024..96.63

Frank, Kehoe. (2023). Leveraging Generative AI Tools for Enhanced Lesson Planning in Initial Teacher Education at Post Primary. Irish journal of technology enhanced learning, doi: 10.22554/ijtel.v7i2.124

Garima, Malik., Devendra, K., Tayal., Sonakshi, Vij. (2018). An Analysis of the Role of Artificial Intelligence in Education and Teaching. 407-417. doi: 10.1007/978-981-10 8639-7_42

Ghasa, Faraasyatul, ‘Alam., Bambang, Budi, Wiyono., Burhanuddin, Burhanuddin., Muslihati, Muslihati., Ani, Mujaidah. (2024). Artificial Intelligence in Education World: Opportunities, Challenges, and Future Research Recommendations. Fahima, 3(2):223 234. doi: 10.54622/fahima.v3i2.350

Indra, Saputra., Murni, Dwi, Astuti., Muhammad, Abd., Sayuti., Dyah, Kusumastuti. (2023). Integration of Artificial Intelligence in Education: Opportunities, Challenges, Threats and Obstacles. A Literature Review.. Indonesian Journal of Computer Science, doi: 10.33022/ijcs.v12i4.3266

James, J., Dillon. (2018). Just Wastin’ Time. 125-141. doi: 10.1007/978-3-030-23347-1_8

Jeenisha, Shrungare. (2022). AI in Education. doi: 10.1145/3067682.3067685

Jialu, Guan., Jingying, Zhang., Xiule, Zhang. (2023). The Influence of Generative Artificial Intelligence on High School Students Academic Planning ChatGPT. Lecture Notes in Education Psychology and Public Media, doi: 10.54254/2753-7048/24/20230705

Kostas, Karpouzis., Dimitris, Pantazatos., Joanna, Taouki., Kalliopi, Meli. (2024). Tailoring Education with GenAI: A New Horizon in Lesson Planning. doi: 10.31219/osf.io/9b4su

Milad, Shahvaroughi, Farahani., Ghazal, Ghasmi. (2024). Artificial Intelligence in education: A comprehensive study. 2(3):1379-1379. doi: 10.59400/fes.v2i3.1379

Mohammed, Alsbou., Ra’Ed, Abdalhafed, Ibrahim, Alsaraireh. (2024). Data-Driven Decision Making in Education: Leveraging AI for School Improvement. 1:1-6. doi: 10.1109/ickecs61492.2024.10616616

Nahid, Hasan., Johora, Akter, Polin., Md., Rayhan, Ahmmed., Md., Mamun, Sakib., Md., Farhan, Jahin., Md., Mahfuzur, Rahman. (2024). A Novel Approach to Analyzing the Impact of AI, ChatGPT, and Chatbot on Education Using Machine Learning Algorithms. Bulletin of Electrical Engineering and Informatics, 13(4):2951-2958. doi: 10.11591/eei.v13i4.7158

Natalia, Bobro. (2024). Advantages and Disadvantages of Implementing Artificial Intelligence in the Educational Process. Molodij včenij, 72-76. doi: 10.32839/2304-5809/2024-4-128-38

Rania, Lampou. (2023). The Integration of Artificial Intelligence in Education: Opportunities and Challenges. doi: 10.37497/rev.artif.intell.educ.v4i00.15

Role of AI in Education. (2023) 2(3):260-268. doi: 10.58631/injurity.v2i3.52

Rosales, Adriana, Rodríguez. (2024). The Impact of Statistics and Probability on Educational Artificial Intelligence. 1(1):001-004. doi: 10.17352/aasp.000001

Said, A., Salloum., Ayham, Salloum., Raghad, Alfaisal. (2023). Objectives and Obstacles of Artificial Intelligence in Education. Studies in big data, 605-614. doi: 10.1007/978-3 031-52280-2_38

Sarabjot, Kaur., Komal, Budhraja., Anurag, Pahuja., Varun, Nayyar., Shefali, Saluja. (2024). Leveraging Artificial Intelligence in Education. Advances in marketing, customer relationship management, and e-services book series, 125-140. doi: 10.4018/979-8-3693 6660-8.ch010

Sarah, Youssef, Abou, Karroum, -., Nour, Eldin, Mohamed, Elshaiekh., Khalfan, Al-Hijji. (2024). Exploring the Role of Artificial Intelligence in Education: Assessing Advantages and Disadvantages for Learning Outcomes and Pedagogical Practices. International journal of innovative research in engineering & multidisciplinary physical sciences, 12(4)

doi: 10.37082/ijirmps.v12.i4.231000

Toh, Yen, Pang., Alex, Kootsookos., Chi-Tsun, Cheng. (2024). Artificial Intelligence Use in Feedback: A Qualitative Analysis. Journal of university teaching and learning practice, doi: 10.53761/40wmcj98