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Research Article

Critical Analysis of the Impact of AI in Higher Education and Its Consequences on Students

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ABSTRACT

Introduction: The introduction of Artificial Intelligence (AI) in the education sector has sparked a lot of controversy opinions regarding its effectiveness in shaping student learning process and systematic mental growth. While AI has immense potential to transform learning experiences by providing personalised learning, immediate feedback, and access to enormous information, but fears have also been aired that overreliance on artificial intelligence will stifle the problem-solving and critical thinking capabilities of students by providing pre-programmed answers instead of encouraging independent thoughts.

Objectives: The purpose of this paper is to rigorously explore the impacts of AI on higher education, with an inspection of how it impacts learning processes, intellectual growth, and the further expectations from students, academics and universities. This research aims to develop AI tools and programs through mixed approaches for the higher education environment that function as collaborative partners rather than just tools. The goal is to establish guiding principles and frameworks for a creative AI practice, incorporating computational tools, benchmarking of successful experiments, and their future applications. The current focus is on presenting early-stage research findings.

Methods: Given this research focus on impact of AI in higher education, overviewing several studies, the backgrounds, and research findings achieved through exploratory research to gain a deeper understanding of a topic, develop practical guidelines, and develop more focused research questions for future investigation.

Results: By investigating different studies, the examined strategies can be consolidated to address the promise of ethical AI implementation in education and in a manner to enhance and sustain cognitive capabilities among students and other stakeholders while offsetting risks associated with over-reliance and degrading of the human capacity.

Conclusions: By embracing AI's potential while upholding core educational values, institutions can ensure AI enhances the learning experience. Successful implementation requires a balanced approach, developing adaptable and culturally sensitive AI tools while investing in teacher training for effective human-AI collaboration. This thoughtful approach considers students' diverse backgrounds and learning preferences, along with the vital role of educators, maintaining human agency, critical thinking, and ethical considerations as central to education. AI in higher education offers significant potential benefits, but responsible integration is key to maximising its positive impact. This approach ensures AI serves educational purposes effectively.

Keywords: Artificial Intelligence, Higher Education, Student Learning, Cognitive Development, Ethical Implications.

INTRODUCTION

With the rapid advancements in artificial intelligence and its increasing adoption in various sectors, the field of higher education has also witnessed a significant transformation. The emergence of AI-powered technologies has the potential to redefine the way students learn, teachers instruct, and institutions manage their operations. (Popenici and Kerr, 2017)

One of the greatest inputs of artificial intelligence to post-secondary education is making learning personalised. AI-powered adaptive learning systems can analyse students' learning habits, interests, and accomplishments to adapt the content and teaching style to the specific requirements of an individual student. The customised learning can enable students to learn at their own pace, overcome their individual challenges, and achieve better learning outcomes (Gawande, et al., 2020).

Besides that, AI can also be used to improve university teaching and administration. AI can be leveraged to enhance teaching and administration through AI-powered grading and feedback systems can assist instructors in providing timely and personalised feedback to students, reducing the workload and allowing them to focus more on quality instruction (Popenici and Kerr, 2017). Furthermore, AI-powered chatbots and virtual assistants can provide 24/7 support to students, addressing their queries and concerns promptly, and improving the overall student experience.

In addition, the integration of artificial intelligence in learning can augment efficiency and economic viability. Automated grading and assessment software based on AI can significantly reduce time and effort required in testing, thereby allowing instructors to focus more on instruction and student guidance (Kamalov, et al., 2023). This enhanced effectiveness also opens doors for increased accessibility and international availability of quality education since AI-driven online learning websites can overcome geographical constraints and serve students from all walks of life.

But the infusion of artificial intelligence in the higher learning system also involves some issues and challenges. Whereas AI can supplement learning experiences, care must be taken to make its application ethically and inclusively, where the needs of all students are met, and particularly those coming from underrepresented groups.

The other significant concern pertains to how artificial intelligence may affect the work of teachers. With the ongoing development of AI technology, there is a risk that teachers may perceive that they are being replaced, or their competence being eroded, thus facing employment insecurity and a reduction in the quality of instruction. To mitigate this, an investment in teacher professional development and training programs that enable teachers to successfully incorporate AI into their teaching practices is required. (Onesi-Ozigagun et al., 2024)

The higher education institutions and universities are also have been facing to mediate the challenges related to provide such an environment to meet data privacy and the ethical use of open-sources data by all participants, as AI-powered systems give both privileges and struggles to educational environment.

The use of artificial intelligence within the higher education system holds phenomenal potential to revolutionise the system of education, attain operational efficiency, and impart a general improvement in the experience of learning. However, there is a need to examine the ethical, societal, and functional implications of adopting AI to ensure that the technological potential is redistributed fairly, and the education system is still able to serve the myriad interests of the students (Kamalov and Gurrib, 2023) (Ojha et al., 2023).

RESEARCH OBJECTIVES

The research objectives aim to ensure that the integration of AI in higher education enhances, rather than undermines, the learning experience by focusing on a balanced approach that harnesses the potential of AI while preserving the fundamental values of education. By categorising examined strategies for students, educators, and universities this paper recommends the list of approaches to enhance students' learning experience, empower educators to utilise AI tools into their own teaching methodologies, adopt learning process optimisation and customisation, exercise teaching methodologies transformation, and promote ethical considerations for all related stakeholders.

The focus on cultural background and ethical considerations aligns with the discussion promoting responsible AI implementation. Additionally, the emphasis on teacher development resonates with the challenges and recommendations highlighted in this paper regarding upskilling educators and fostering collaboration. The objectives related to enhancing learning experiences and transforming teaching methodologies reflect the potential benefits of AI in education discussed in some studies and papers. Finally, the objective of optimising administrative processes aligns with the broader discussion of AI's potential in various sectors and considering future exploration of new approaches.

METHODS

The methodology in this paper is to be a combination of literature review and practical recommendations based on established educational aims and principles. The document extensively discusses existing literature and research findings related to utilising AI tools in education, followed by analysing cultural considerations and ethical implications. After synthesising collected information, this research proposes practical strategies and offers actionable recommendations for integrating AI into higher education. Furthermore, the emphasis on cultural considerations and ethical implications accompanied with the broader discussion of responsible AI implementation aligns with the concept of exploratory research which emphasises gaining initial insights and understanding of a phenomenon to focus on practical guidelines and best practices

DISCUSSION

Different aspects of AI contribution to enhance or hinder the cognitive skills of students

The use of AI in higher education brings up real worries about how it affects students' ability to think and solve problems. On the other side, AI can make these key thinking skills enhanced when students use it in a balanced way. Some fear students might lean too much on AI tools, which could take their mind off learning and endanger academic honesty and integrity. Yet, if students use these tools, they can improve personal learning, do tasks more efficient, and get assistance in the challenging areas. As AI tools show up more in schools, there's a chance students might depend on them too much to do homework, figure out problems, or create content. This reliance can pull their focus away from learning, as they might care more about getting good grades or finishing work fast than building important thinking and analysis skills (Karimi, 2023).

Additionally, when students use AI writing helpers or essay makers, it can threaten the realness and honesty of their work. This might go against the ideas of academic integrity and critical thinking which are key criteria to higher education. Teachers might struggle to tell the difference between work students did themselves and content made by AI. This makes it harder to check how well students are learning and growing (Karimi, 2023).

The Role of AI in Education: Opportunities and Challenges

There is no doubt that AI can be a powerful double-edged tool for enhancing or undermining the cognitive skills based on its utilities. The AI implementation requires careful consideration. How AI can contribute positively to the educational environment can be itemised as:

- **Time and Cost Efficiency**

  AI tools can be efficiently utilised for the automation of manual tasks. The introduction of AI in education has resulted in a paradigm shift, with potential to dramatically improve time and cost efficiency for both students and educators. The automation of teachers' duties will provide time savings that would allow greater focus of personalised learning. As it is shown in the Figure 1, the primary barriers for educators to provide personalised feedback to student are categorised in six main scopes which mainly are connected to time shortage.

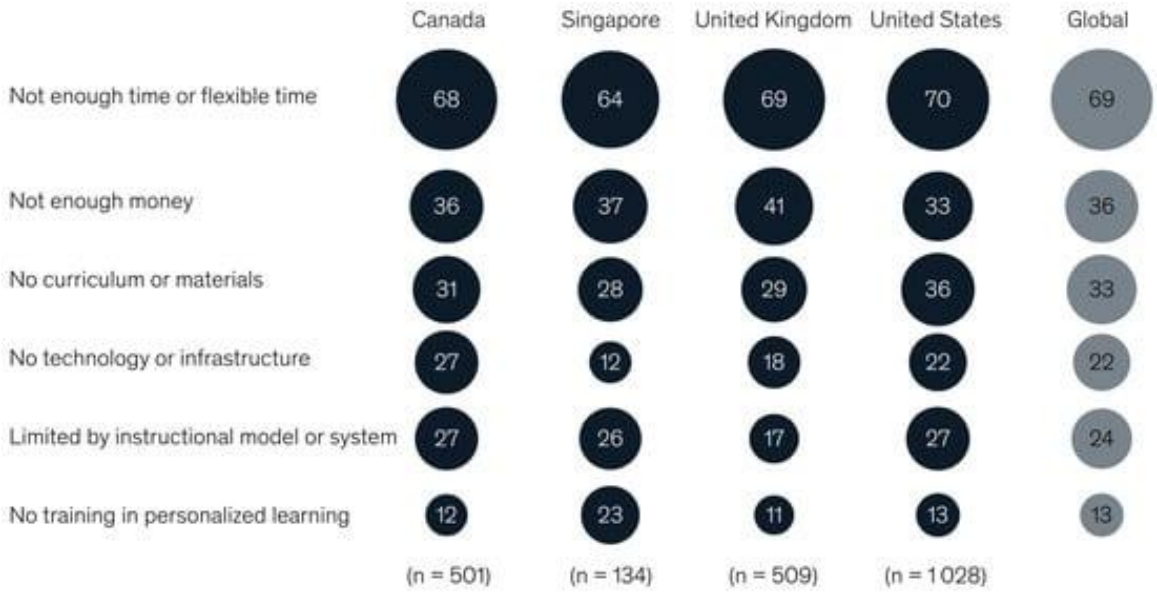

Figure 1. Top barriers to providing personalised learning of teachers identifying area as a primary barrier (Bryant et al., 2020)

- **Personalised Learning and Adaptive Feedback:**
  - AI can tailor learning experiences to individual student specific needs, providing customised content and pacing. This allows students to learn at their own speed and focus on areas where they need more support (Crimaldi and Leonelli, 2023).
  - AI-powered tutoring systems can offer immediate feedback, guiding students through challenging concepts and helping them identify areas for improvement. This personalised feedback can be more effective than traditional one-size-fits-all approaches on how AI is making tutoring more accessible. (Kamalov, et al., 2023)
- **Enhancing Problem-Solving and Critical Thinking:**
  - AI can present students with complex problems and simulations that require critical thinking and problem-solving skills. AI can also provide feedback on students' approaches, helping them refine their strategies.
  - By automating routine tasks, AI frees up students' cognitive resources to focus on higher-level thinking skills. (Klopfer et al., 2024) discussed how AI can support repetitive tasks, allowing students to focus on more complex aspects of learning.
- **Fostering Creativity and Innovation:**
  - AI tools can provide students with inspiration and new perspectives, sparking creativity and innovation. For example, AI-powered art tools can introduce students to new artistic styles and techniques. (Kong, 2020)

    AI can facilitate collaborative learning experiences, allowing students to work together on creative projects and share ideas.(Felix and Webb, 2024), (Rong, et al., 2022), (Wendrich, 2020)
- **Improving Metacognition and Self-Regulated Learning:**
  - AI can provide students with insights into their own learning processes, helping them develop metacognitive skills and become more self-regulated learners. AI can track students' progress, identify their strengths and weaknesses, and provide personalised recommendations for improvement. (Anantrasirichai and Bull, 2021)
  - AI-powered learning platforms can offer tools for goal setting, time management, and self-assessment, empowering students to take control of their learning (Yang, 2020).

However, the overreliance on AI tools may diminish students' focus on the learning process itself, as they prioritise completing tasks quickly or achieving good grades over developing essential intellectual abilities.(Kamalov, et al.,

2023) Some studies have found that over-automated assessment and feedback can discourage critical thinking and self-regulation in students (Lai et al., 2023). To address this concern, instructors should strike a balance between leveraging AI's strengths and ensuring students engage in deep learning, problem-solving, and knowledge construction. (Elstad, 2024)

Furthermore, the use of AI-powered writing assistants or essay generators can undermine the authenticity and integrity of students' work, potentially compromising the values of academic honesty and critical thinking that are crucial in higher education. Distinguishing genuine student work from AI-generated content can also be a challenge for instructors, making it difficult to accurately assess student learning and progress.

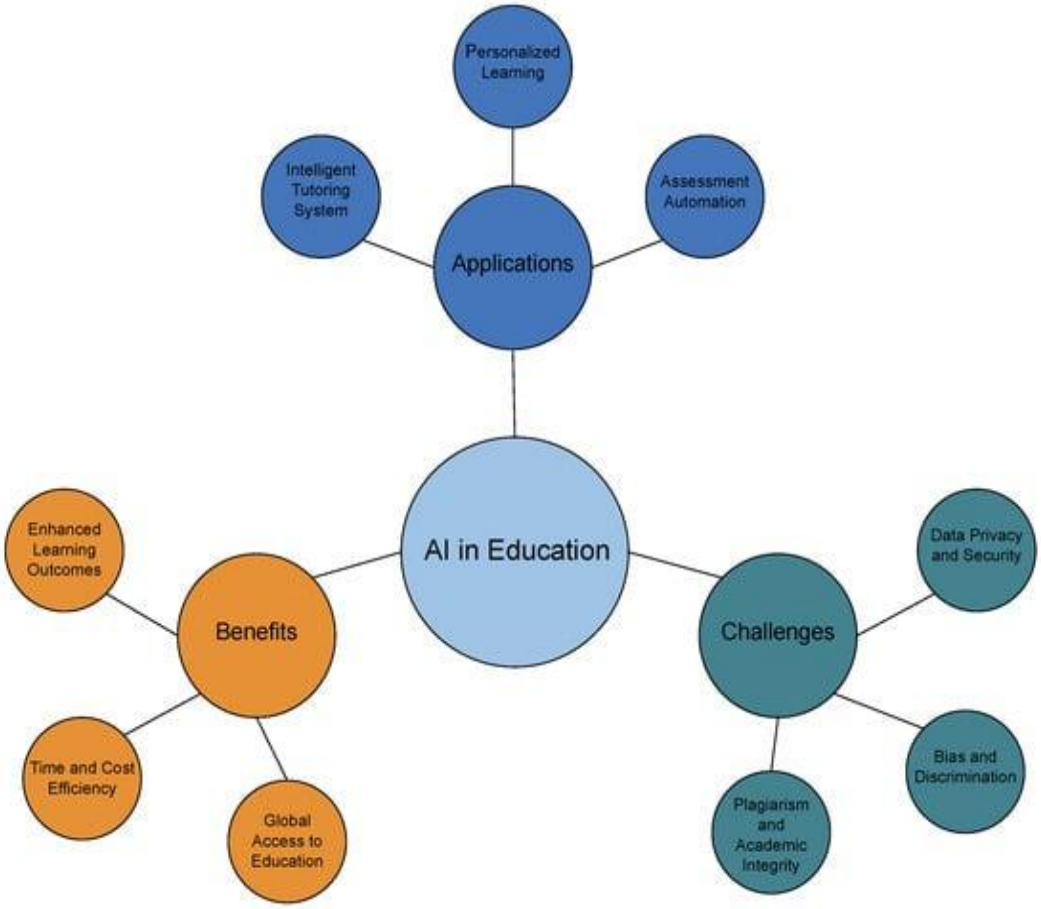

Figure 2. Multifaceted impact of AI in education (Kamalov, et al., 2023)

There are some recommended safeguards by different scholars to prevent hindrance of AI tools to develop human skills:

- **Balancing AI with Human Interaction:** While AI can provide valuable support, it's crucial to maintain human interaction in the learning process. Teachers play a vital role in fostering social-emotional learning, providing mentorship, and creating a supportive learning environment. (Edwards and Cheok, 2018) discusses the importance of human teachers in the age of AI.
- **Focusing on Process Over Product:** Emphasise the learning process rather than just the final product. Encourage students to explore different approaches, experiment with new ideas, and learn from their mistakes.(Klopfer et al., 2024)
- **Promoting Critical Evaluation of AI:** Teach students to critically evaluate the output of AI systems, recognising potential biases and limitations. This helps students develop critical thinking skills and avoid over-reliance on AI.(Mäkelä and Stephany, 2024)
- **Addressing Ethical Considerations:** Integrate discussions of ethical implications into the curriculum. Explore topics like algorithmic bias, data privacy, and the societal impact of AI.

Approaches to integrating AI in education while preserving human agency and critical thinking skills

To tackle these barriers, educators need to discover the right point where AI-based technologies meet human capabilities and intellectual skills in advanced education systems. Academic institutions need to establish rules which direct proper and responsible AI applications in educational settings. The appropriate usage guidelines for AI tools must be provided by institutions which also need to implement plagiarism detection measures and promote academic integrity education for students (Abbas et al., 2023). Educational staff need both necessary training and access to relevant resources to master responsible implementation techniques for artificial intelligence in their classroom work. Students' knowledge evaluation practices need assessment strategies that combine testing systems which detect AI-generated content while allowing AI to enhance educational experiences. Knowledge assessment measures that focus on critical thinking skills together with problem-solving capabilities hold better resistance against AI misuses. AI implementation in higher education needs clear understanding of its possibilities alongside operational hazards while maintaining a pure dedication to basic academic quality alongside intellectual development. (Perkins et al., 2023) (Kshirsagar et al., 2022) (Grieve et al., 2021) (Elstad, 2024) Educational professionals need training to blend AI-enabled tools appropriately into their instructive practice so this technology supports human interactions and intellectual development while protecting original activities. AI tools should serve students as supporting technologies within higher education which enables them to combine artificial intelligence capabilities with independent cognitive development for enhanced learning outcomes alongside real academic challenges and intellectual advancement according to Karimi (2023).

Personalise learning paths by using AI assistance

By fostering a balanced approach to AI integration in higher education, institutions can ensure that students not only benefit from the personalization and efficiency offered by AI-powered technologies but also develop the essential critical thinking, problem-solving, and collaborative skills required for their personal and professional success in the ever-evolving landscape of the 21st century. Moreover, institutions should consider providing students with the autonomy to personalise their learning paths by selectively utilising AI-powered tools and resources. This approach can encourage students to take an active role in their learning, fostering a sense of ownership and responsibility for their academic progress. (Mello et al., 2023)

While the benefits of AI in education are clear, it is crucial to implement strategies that ensure students are actively engaged in their learning process. Here are some approaches to achieve this balance:

1. **Promoting Inquiry-Based Learning**: Instead of using AI merely as an answer provider, educators can leverage AI to facilitate inquiry-based learning. For example, AI can present challenging questions or scenarios that require students to apply critical thinking and research skills to arrive at solutions.
2. **Encouraging Metacognition**: Metacognition, or thinking about one's own thinking, is a critical skill for cognitive development. AI can support this by prompting students to reflect on their learning process, ask questions about their understanding, and evaluate the strategies they use to solve problems.(Zhu, 2022)
3. **Collaborative Learning**: AI can be used to enhance collaborative learning experiences. For instance, AI tools can facilitate group projects by helping students organise their work, communicate effectively, and provide peer feedback. This not only enhances cognitive skills but also social and emotional learning.
4. **Scaffolded Support**: AI can provide scaffolded support, where assistance is gradually reduced as students become more proficient. Initially, AI might offer more guidance and hints, but as students gain confidence, the AI can challenge them with less support, encouraging independence. (Liu and Han, 2022)

By leveraging these strategies, institutions can harness the power of AI to personalise learning and support students, while simultaneously fostering the development of essential cognitive and social-emotional skills. Also, there is no doubt that all approaches are expected to be comply with ethical practices and concerns. To utilise ethical AI tools, students can leverage AI assistance to personalise their learning paths as long as certain guidelines are followed.

As a central concern, unethical use of AI tools or struggles to optimise its utilities may lead to several challenges in the educational environment: data privacy issues, reinforcement of biases, and replacement of meaningful human learning experiences. Therefore, it's crucial to strike a balance between the benefits of AI and the preservation of human agency, critical thinking, and academic integrity.

These ethical guidelines for Personalised Learning with AI can be categorised under certain areas including:

- **Data Privacy and Security:** Students should be fully informed about how their data is being collected, used, and protected by AI learning platforms. Transparency and control over personal data are crucial.
- **Algorithmic Bias Awareness:** It's important for students to understand that AI algorithms can reflect biases present in the data they are trained on. Critical evaluation of AI-generated recommendations is essential and should be revised by students at the end. (Villegas-Ch et al., 2022)
- **Academic Integrity:** AI tools should be used to enhance learning, not to circumvent academic integrity policies. Students must understand the ethical boundaries of using AI for assignments and other assessments.
- **Informed Consent:** Students should have the option to opt out of using AI-powered learning tools if they have concerns about data privacy or other ethical implications.
- **Equitable Access:** Universities should strive to ensure equitable access to AI-powered learning resources for all students, regardless of their background or socioeconomic status.(Hooda et al., 2022)
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For students, there are approaches helping them to ethically personalise their learning process with AI mainly:

- **Supplementing, Not Replacing, Human Interaction:** AI tools should be used to complement, not replace, interactions with instructors and peers. Human connection remains crucial for learning and development.
- **Critical Evaluation of AI Recommendations:** Students should develop the skills to critically evaluate the recommendations provided by AI systems, considering their own learning goals and preferences.
- **Focusing on Skill Development, Not Just Content Consumption:** AI can personalise content delivery, but students should actively engage with the material and focus on developing critical thinking and problem-solving skills.
- **Seeking Human Guidance When Needed:** Students should not hesitate to seek guidance from instructors or advisors if they have questions or concerns about using AI learning tools.
- **Respecting Intellectual Property:** Students should use AI tools in a way that respects intellectual property rights and avoids plagiarism.

By adhering to these ethical guidelines, students can harness the power of AI to create personalised learning experiences that enhance their educational journey while upholding academic integrity and responsible data practices. (Xia and Li, 2022) discusses the importance of ethical considerations in the context of AI in education.

Successful cases of Personalised Learning Paths and AI Assistance: A Delicate Balance

AI technologies available for learning hold promise for personalized education but their use in higher institutions may negative influence student ability in critical thinking and problem solving. AI-based learning systems use individual student data to design customized content along with learning delivery options that both accommodate personal advancement and help with specific academic hurdles. When customized education approaches are implemented, the results often improve student learning success. Data-driven educational methods that use Artificial Intelligence technologies yield effective outcomes under specific learning situations. Students using intelligent tutoring platforms benefit from immediate feedback along with adjustable task difficulty adjustments which allow them to learn at their own time (Maghsudi et al., 2021). Essel and colleagues (2022) studied how the implementation of a chatbot teaching assistant affected learning outcomes during a multimedia programming course. The study involved two cohorts of students: Students were split into two groups: the experimental cohort had access to the chatbot system, and the control group did not receive the same benefits. Face-to-face instruction with content-related questions through WhatsApp was available to all students while the experimental group could interact with their

chatbot. The researchers applied split-plot ANOVA alongside independent-samples t-test when studying test score statistics from students while conducting focus group interviews for assessing student reactions to the chatbot. Student education performance and satisfaction improved according to findings. Students who interacted with the chatbot through the platform demonstrated statistically relevant better learning achievement in the quantitative results. According to focus group participants the chatbot earned positive feedback for its helpful functionality and convenient accessibility by students along with quick responses.

The Institute of Computer Technology and Information Security (ICTIS) at Southern Federal University (SFedU) develops its own educational standard to build up greater efficiency within its educational provisions. Through its federal status the university maintains the flexibility to regenerate its educational outcomes using up-to-date requirements from the industry. The educational program presents flexible elements which respond to changing professional competency needs from technology developments and study areas combined with industrial partnership demands and domestic educational requirements. The working group produces these competencies targeting master's and bachelor's programs, so studies align with national and global professional standards while appealing to student needs and meeting future demands in information security and underwater robotics.

University partners supply actual cases and production assignments to students which serve as the foundation for developing variable professional competencies through project activities.

Soft skill development remains essential for humanitarian professional's startup founders and specialists working across all fields particularly engineering. The rate at which information exchanges while computer programming technologies transform necessitates essential skill development for current and future highly skilled professionals. These competencies comprise environmental adaptation skills along with curse-learning agility to handle skill deficits and efficient large-dataset analysis and rapid critical assessment and team collaboration under scarce resource dependencies and hypothesis development and testing practices and delivering clear value presentations to both clients and work associates. Acquiring the mentioned skills helps specialists execute their ideas more effectively across market-focused and organizational situations with improved workplace productivity as their outcomes. (Veselov et al., 2022)

Xia and Li (2022) conducted research to assess the current condition of Artificial Intelligence implementation throughout Higher Education. The researchers analysed current Artificial Intelligence implementations in higher education that involve personalized learning platforms along with automated grading mechanisms and student support chatbots. The researchers analysed AI integration's negative aspects, paid attention to concerns about ethics and data protection and potential human teacher displacement so colleges could effectively use AI. Scientific investigators developed efficient methods to incorporate AI systems across higher educational institutions. Teacher training along with curriculum development and supportive learning environment construction represent key elements among their recommendations. The research group highlights the necessity of ethical focus toward developing equitable AI educational resources access.

The research performed by Shu and Gu (2023) demonstrated how Edu-Metaverse's smart education model improves student educational outcomes. This study evaluated educational results by conducting a comparison between traditional teaching methods and a modern smart education model which was implemented in college English classes at Zhejiang Open University through analysis of 60 participating students. The Edu-Metaverse system empowered deep learning and higher-order thinking through its immersive educational experience and multimodal functionality and resource sharing capability.

Students who experienced learning in the Edu-Metaverse scored noticeably better in their oral English and vocabulary tests and grammar lessons and reading assignments and translation assignments and writing assignments than traditional instruction students. The Edu-Metaverse delivers features which improve educational success metrics. To maximize the benefits of the Edu-Metaverse for education institutions research suggests that institutions should move forward by improving teaching scenario design and assessment methods and teacher education regarding understanding the Edu-Metaverse architecture (Shu and Gu, 2023).

Research focusing on educators established how AI technology transforms academic learning spaces. AI-based learning analytics tools enable instructors to detect students who need help so they can direct appropriate interventions (Kshirsagar et al., 2022). Through real-time analysis of student engagement data along with comprehension results and performance metrics AI platforms can identify which students require extra help and

personalized learning sequences. AI assessment platforms deliver immediate response and instruction to students which enhances their learning capability (Gao et al., 2023).

Research examined how artificial intelligence technology might help decrease the workload faced by teachers in educational settings. Throughout the week teachers dedicate approximately 50 hours to their profession though they spend only half of that time directly interacting with students as Bryant et al. (2020) underline. The completed analysis of teacher workloads served as input for an assessment of automation potential in each activity zone while considering existing technologies and expert interview insights. Our evaluation determined preparation administration evaluation and feedback demonstrated the greatest levels of automation potential. Students receive minimal benefit from automated teaching methods so actual instructional activities have better resilience to automation despite digital progress (Bryant, J. et al., 2020).

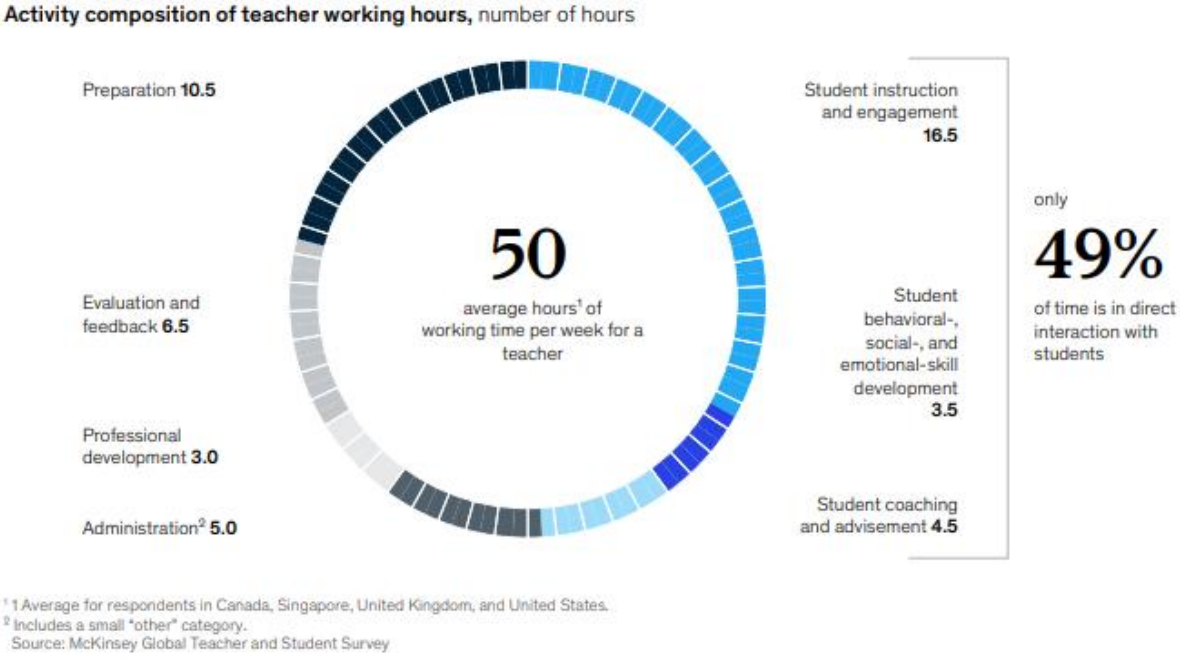

Figure 3. Educators' performing tasks average time (Bryant, J. et al., 2020)

The DfE's 2023 report showed how excessive workload has affected 73 percent of the teaching workforce with teachers spending only 34 percent of their time delivering instruction to students. The Workload Reduction Taskforce from DfE started its work while the department purchased AI-based educational resources from Oak National Academy. Education software enabled by AI technology enables simplified text processing alongside definition development and quiz generation along with automatic administrative duties and student guidance and support systems. Results from Teacher Tapp's 2023 November survey showed that AI had already become a part of 42% of educators' school activities according to Felix and Webb (2024).

Schools using Artificial Intelligence effectively enhance educational achievements while creating customized teaching methods and relieving staff members from administrative tasks.

Mitigating the Risks of AI Dependency

To achieve a balance and address these risks, higher education institutions should build frameworks which protect responsible AI usage and boost plagiarism detection systems while promoting academic respectfulness among students and educator training programs to make AI evolve student learning without destroying human teacher-student relationships. Higher education will fully benefit from AI through its potential yet maintain academic integrity standards by allowing students complete independence over their learning programs (Nguyen et al., 2022).

Educators need thorough preparation to seamlessly implement AI-assisted technology tools throughout their classrooms, so these tools serve to strengthen instead of diminishing human teaching methods together with intellectual analysis. Institutions should allow students to use AI tools as aids yet maintain a focus on cognitive skill

development since such educational approaches match AI's power for outcome improvement without compromising scholarly integrity and student mental development according to García-Martínez et al., 2023.

RESULTS

In conclusion, the integration of AI in higher education presents both opportunities and challenges. AI can enhance learning experiences, transform teaching methodologies, and optimise administrative processes. However, the effective and responsible use of AI in education requires a nuanced approach that takes into account the cultural backgrounds and learning preferences of students, as well as the unique role of teachers in the educational process.

Universities should strive to develop AI-powered tools and systems that are adaptable, culturally sensitive, and respectful of diverse learning styles and communication patterns. Simultaneously, institutions must invest in comprehensive teacher training programs to empower educators to effectively collaborate with AI and mitigate the risks of over-reliance.

By adopting a balanced approach that harnesses the potential of AI while preserving the fundamental values of education, institutions can ensure that the integration of AI in higher education enhances, rather than undermines, the learning experience.

Recommendations

To address these challenges and ensure the responsible integration of AI in higher education, Kuleto et al., (2021) recommended certain approaches that universities can take to integrate AI in education while preserving human agency and critical thinking skills. This balanced approach requires integrating AI effectively while maintaining human agency and critical thinking for all involved parties and universities can consider these below strategies for educational environments:

1. **AI as a Supplement, Not Replacement:**

   Position AI tools as enhancements to human instruction, not replacements for educators. AI can handle tasks like automated grading or providing personalised feedback, freeing up instructors to focus on higher-level activities like fostering critical thinking and creativity. mentions examples of AI assisting teachers and lecturers.

2. **Focus on Critical Evaluation of AI:**

   Teach students to critically evaluate the output of AI systems. This includes understanding the limitations of algorithms, recognising potential biases, and developing the skills to discern credible information from AI-generated content.

3. **Promote Human-AI Collaboration:**

   Design learning experiences that encourage collaboration between students and AI tools. This could involve using AI-powered research assistants, collaborative writing platforms, or simulations that require human interpretation and decision-making.

4. **Emphasise Ethical Considerations:**

   Integrate discussions of ethical implications into the curriculum. Explore topics like algorithmic bias, data privacy, and the societal impact of AI. This helps students develop a responsible and ethical approach to using AI and touches upon the ethical constraints of AI use.

5. **Cultivate Human Skills:**

   Focus on developing uniquely human skills that are difficult for AI to replicate, such as critical thinking, creativity, emotional intelligence, and complex problem-solving. These skills will become increasingly valuable in an AI-driven world.

6. **Transparency and Rationality:**

   Utilise AI systems that offer transparency and explainability. Understanding how an AI arrives at a particular conclusion helps students develop trust and learn to critically assess its output.

7. **Continuous Evaluation and Adaptation:**

   Regularly evaluate the effectiveness of AI tools and adapt their implementation based on student feedback and learning outcomes. This iterative approach ensures that AI is used in a way that genuinely enhances the learning experience.

8. **Revolutionising teaching techniques:**

   Teaching skill is a multifaceted embodiment of a teacher's comprehensive qualities, encompassing their ability to fulfil teaching tasks, achieve objectives, and employ effective methods. It combines creativity with an understanding of student psychology, learning characteristics, and personalities. Effective teaching promotes student learning, reflecting a teacher's professionalism and accomplishment. Teaching skills include design, classroom instruction, assessment, guidance, evaluation, and research. (Tan and Subramonyam, 2023) AI can systematically enhance these skills, integrating technology with theoretical knowledge and practice to create a robust teaching behaviour system. Improving teacher quality leads to primary teaching skills, while repeated practice develops advanced, automated skills, ultimately fostering effective and innovative teaching. (Ng et al., 2023)

To prevent students from becoming overly dependent on AI, educators and developers should consider the following strategies:

1. **Setting Clear Boundaries**: Clearly define when and how AI assistance is appropriate. Encourage students to first attempt problems on their own before seeking help from AI tools.
2. **Integrating Human Interaction**: AI should complement, not replace, human interaction. Regular teacher-student interactions are essential for providing personalised guidance, emotional support, and fostering a sense of accountability.
3. **Emphasising Problem-Solving Skills**: Design AI tools that prioritise problem-solving processes over final answers. This can involve breaking down complex problems into manageable steps, encouraging students to think critically about each stage.
4. **Developing Ethical AI**: Ensure that AI systems are designed with ethical considerations in mind, prioritising the long-term cognitive and emotional development of students over short-term performance metrics.
5. **Cultivate Critical Thinking and Problem-Solving Skills:**

- **Emphasis on Process over Product:** Shift the focus from simply finding the right answer to understanding the process of arriving at a solution. Encourage students to analyse, evaluate, and synthesise information rather than relying on AI for direct answers.
- **Higher-Order Thinking Tasks:** Design assignments that demand critical thinking, creativity, and problem-solving skills. This could include open-ended questions, research projects, debates, and case studies that require deeper engagement with the subject matter.

6. **Adapt Teaching Methodologies:**

- **Active Learning Strategies:** Implement active learning techniques that encourage student participation and collaboration. This can include group discussions, peer-to-peer learning, and project-based learning, reducing the opportunity for sole reliance on AI.
- **Blended Learning Approach:** Integrate AI tools strategically as learning aids rather than primary sources of information. Use AI for personalised feedback, adaptive learning platforms, and access to diverse resources, but ensure students actively engage with the material.

7. **Promote Digital Literacy and Ethical Awareness:**

- **Information Evaluation:** Teach students how to critically evaluate information from various sources, including AI-generated content. Emphasise source credibility, bias detection, and the importance of verifying information.

- **AI Ethics and Responsible Use:** Discuss the ethical implications of AI use, including plagiarism, data privacy, and algorithmic bias. Encourage responsible AI practices and academic integrity.

8. **Rethink Assessment Strategies:**

   Authentic Assessment: Design assessments that evaluate higher-order thinking skills and cannot be easily completed by AI. This could include essays, presentations, projects, and performance-based tasks that demonstrate understanding and application of knowledge.

9. **Focus on Analysis and Interpretation:**

   Encourage students to analyse and interpret AI-generated information rather than simply accepting it at face value. Ask them to explain the reasoning behind AI's outputs and evaluate its limitations.

10. **Foster Teacher Development:**

- **Upskilling Educators:** Provide professional development opportunities for teachers to effectively integrate AI tools into their teaching practices and address the challenges of overreliance.
- **Collaboration and Sharing Best Practices:** Encourage collaboration among educators to share effective strategies for mitigating AI overdependence and promoting responsible AI use in education.

By adopting a balanced approach that harnesses the potential of AI while preserving the fundamental values of education, institutions can ensure that the integration of AI in higher education enhances, rather than undermines, the learning experience. Additionally, by implementing these strategies, universities can leverage the power of AI while ensuring that human agency, critical thinking, and ethical considerations remain central to the educational experience.

Students' cultural background and utilising AI assistance ethically

Based on a series of studies, it can be concluded that there is a definite correlation between how AI can be effectively employed in education and students' cultural backgrounds. Several factors come into play:

- **Learning Styles and Preferences:** Different cultures may have varying approaches to learning. Some cultures might prioritise rote memorization, while others emphasise collaborative learning or critical thinking. AI tools need to be adaptable to accommodate these diverse learning styles. For example, AI-powered tutoring systems could be customised to provide feedback in a way that resonates with students' cultural expectations.
- **Language and Communication:** Language barriers can significantly impact the effectiveness of AI tools. Natural language processing algorithms need to be trained on diverse languages and dialects to ensure that all students can benefit from AI assistance. Furthermore, cultural nuances in communication styles should be considered when designing AI-powered educational interfaces.(Chaudhry and Kazim, 2021)
- **Cultural Values and Beliefs:** AI systems should be designed to respect cultural values and beliefs. For instance, AI-powered feedback mechanisms should avoid language or imagery that could be considered offensive or inappropriate in certain cultures. Content used in AI-driven learning platforms should be culturally sensitive and representative of diverse perspectives. (Prabhakaran, Qadri and Hutchinson, 2022) discusses cultural incongruencies in AI and provides further insights into this topic.
- **Digital Literacy and Access:** Several challenges hinder the integration of AI in education. Access to technology and digital literacy skills can vary significantly across different cultural groups. Universities need to address these disparities to ensure that all students have equal opportunities to benefit from AI in education.

  Moreover, teachers may lack comprehensive understanding of AI concepts and effective pedagogical approaches for its integration. Their teaching methods remain traditional, and they haven't mastered collaborating with AI in the classroom. This can lead to blurred roles and increased student autonomy, potentially side-lining the teacher. The rapid evolution of AI and negative public opinion can also affect

teachers' understanding and adoption of the technology. While AI can handle modular tasks, it cannot replace the emotional support and value cultivation that human teachers provide. To overcome these challenges, comprehensive training programs for teachers are essential. (Xia and Li, 2022)

- **Teacher-Student Interaction:** The role of teachers in the learning process can be perceived differently across cultures. (Edwards and Cheok, 2018) discusses the role of teachers in the context of AI in education. In some cultures, teachers are seen as the primary source of knowledge, while in others, a more collaborative approach is emphasised. AI tools should be implemented in a way that complements existing teacher-student dynamics and respects cultural norms.
- **Assessment and Evaluation:** Cultural biases can also influence assessment practices. AI-powered assessment tools should be carefully designed to avoid perpetuating these biases and ensure fair and equitable evaluation for all students and understandable for the educators.(Wang and Lester, 2023)

By considering these cultural factors, educators can leverage AI to create more inclusive and effective learning experiences that cater to the diverse needs of all students.

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