



THE DEMANDS OF USING ARTIFICIAL INTELLIGENCE-DRIVEN SOFTWARE IN EDUCATION TOWARDS THE INDUSTRIAL REVOLUTION 6.0: A REVIEW OF STUDIES

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ABSTRACT

Artificial Intelligence (AI) has gained significant attention among educational scholars since it helps transform and advance the way education is delivered, making it more efficient, personalized, and accessible for all students. However, the extent to which the use of AI technology is demanded in the education sector requires further review among the existing literature. This study examines the demands of Artificial Intelligence (AI) integrating software in the context of Industrial Revolution 6.0 and its impact on education. The Technology Acceptance Model serves as a basis for investigating how individuals adopt and use new technology. A descriptive method and a qualitative research approach were used to review and synthesize emerging concepts related to the demands of AI-integrating software in education. The findings suggest that AI integration can enhance personalized learning experiences and optimize resource allocation for students and educators. However, privacy concerns, bias, and ethical considerations must also be taken into account. The demands of Industrial Revolution 6.0, such as technical skills and global competence, require a focus on critical thinking, creativity, and lifelong learning. To leverage technology and innovation while fostering a culture of innovation, a holistic approach that includes project-based learning and professional development is necessary. Adapting to the demands of AI and Industrial Revolution 6.0 has significant implications for teaching methods and ethical considerations, and is crucial for preparing students for the future workforce.

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1. INTRODUCTION

Artificial Intelligence (AI) has significantly transformed various sectors of modern society, including education. As digital technologies advance, AI is reshaping the way education is delivered, making it more efficient, personalized, and accessible. The integration of AI in education has gained increasing popularity among stakeholders, driven by the urgency to address current educational challenges and the demands of the Industrial Revolution 6.0 (Ajibade et al., 2023; Garlinska et al., 2023). This urgency stems from the need to equip students with the skills required for an increasingly digital and technology-driven world while ensuring education is inclusive and adaptive to individual learning needs. AI-powered tools such as intelligent tutoring systems, automated grading software, and adaptive learning platforms are being adopted to support teachers and enhance student engagement. Moreover, AI facilitates data-driven decision-making in curriculum development and learner assessment, allowing educators to identify learning gaps more accurately. The role of educators is evolving from traditional knowledge providers to facilitators of learning experiences that leverage technology for deeper understanding and critical thinking.

One of the fundamental demands of AI in education is the creation of AI-powered learning platforms. These systems utilize machine learning algorithms to analyze data and provide students with tailored learning experiences, accommodating their unique learning styles and preferences. Such platforms empower students to learn at their own pace, thereby fostering inclusivity and meeting diverse educational needs. Similarly, the development of intelligent tutoring systems that provide personalized feedback and coaching further enhances the learning process by helping students develop critical thinking and problem-solving skills (Ajibade et al., 2022; Kooli, 2023; Negi et al., 2023; Pappas, 2023; Rabbi et al., 2022). These technologies not only support academic achievement but also boost learner motivation by offering immediate and constructive responses. Additionally, AI-driven platforms can adapt in real-time to student performance, suggesting new content or revisiting previous materials based on the learner's progress. This dynamic and responsive approach allows for a more engaging and effective learning journey, particularly for students who may struggle in traditional classroom environments.

The urgency for AI integration in education is further underscored by its potential to address disparities in learning access, a challenge highlighted during the pandemic. AI-powered virtual assistants are increasingly popular, offering support for administrative tasks like scheduling, reminders, and note-taking, while also providing tailored feedback on assignments (Bueno, 2023). Adaptive assessment tools, another key AI innovation, analyze student performance data to identify knowledge gaps and deliver customized learning materials. These tools ensure students are better prepared for their future employment (Jain et al., 2023; Tabuena et al., 2022; Tabuena et al., 2021). In addition to enhancing academic performance, these AI applications promote greater student autonomy by allowing learners to track their own progress and adjust their study strategies accordingly. As these tools become more refined, they are also being integrated into blended and remote learning environments, providing consistent support regardless of time and location.

Moreover, AI facilitates the creation of intelligent content production tools that use natural language processing and machine learning to generate personalized learning materials (Mileva, 2023). These technologies enable teachers to design engaging and dynamic educational content, thereby increasing student motivation and engagement. As AI-powered tools such as adaptive assessments, intelligent tutoring systems, and virtual assistants evolve, they make education more effective and equitable, aligning with the demands of a rapidly changing world. These tools also reduce the time and effort educators spend on repetitive tasks, allowing them to focus more on student interaction and instructional quality. Furthermore, the ability of AI to analyze student interaction with content helps refine and improve instructional materials continuously, ensuring that they remain relevant and impactful.

The Technology Acceptance Model (TAM) provides a critical lens to understand the adoption of these technologies. TAM emphasizes perceived usefulness—such as the ability of AI to improve learning outcomes and teacher productivity—and perceived ease of use, which influences how readily educators and students embrace innovations (Marangunić & Granić, 2015). For instance, intuitive interfaces and automated administrative functionalities significantly lower the barriers to adoption. When users perceive AI tools as both beneficial and easy to operate, they are more likely to integrate them into their daily educational practices. Additionally, ongoing training and institutional support play a crucial role in strengthening these perceptions, further promoting the sustained use of AI technologies in educational environments.

Given these advancements, the integration of AI is essential not only for addressing current challenges but also for preparing students to thrive in a technology-driven workforce. To satisfy the demands of modern learners and remain relevant in the digital age, the education sector must prioritize the responsible and strategic incorporation of AI technologies.

Artificial Intelligence in Education

Artificial intelligence (AI) in education refers to the incorporation of AI technologies into the learning process, such as machine learning, natural language processing, and computer vision. This integration can take a variety of forms, ranging from individualized learning systems that adapt to each student's specific requirements and talents to virtual tutors that provide real-time feedback and support. Artificial intelligence in education can also be used to create and improve educational content, such as textbooks and online courses. AI algorithms, for example, can examine student engagement and performance data to indicate places where content may need to be altered or updated. AI in education can provide numerous benefits, including improved learning outcomes, more student engagement, and more personalized and adaptive learning experiences. However, there are some drawbacks to using AI in education, such as ensuring data privacy and addressing concerns about algorithmic bias (Akgun & Greenhow, 2021).

Artificial Intelligence: Integrating Software in Education

The use of artificial intelligence (AI) technologies to enhance and optimize the performance of software applications used in education is referred to as AI integrating with software in education. For example, artificial intelligence (AI) can be used to create intelligent tutoring systems that adapt to each student's learning style and speed, delivering tailored feedback and support. AI can also be used to examine massive volumes of data produced by educational software in order to provide insights into student performance and learning outcomes. This data can be utilized to improve the efficacy of educational software and create more individualized learning experiences. AI may also be utilized to create natural language processing technologies capable of understanding and responding to student inquiries in real time. This allows students to receive quick feedback and help, which can improve their learning outcomes.

Industrial Revolution 6.0 in Education

In education, the term "Industrial Revolution 6.0" refers to the incorporation of sophisticated technologies such as artificial intelligence, machine learning, robotics, the Internet of Things (IoT), and 3D printing into the teaching and learning process. These technologies have the potential to alter education in a variety of ways, from individualized learning experiences and adaptive teaching approaches to the creation of new, technology-driven careers. In education, the Industrial Revolution 6.0 is defined by a focus on building the skills and competencies required to flourish in an increasingly digital and technology-driven environment. This includes a higher emphasis on problem-solving, critical thinking, creativity, and teamwork, as well as the development of technical skills like programming, data analysis, and digital literacy. Some examples of how Industrial Revolution 6.0 is being incorporated into education include the use of intelligent tutoring systems and adaptive learning platforms that can provide personalized feedback and support, the use of virtual and augmented reality technologies to create immersive learning experiences (Seamons, 2023), and the development of online learning platforms (Rochina-Chisag & Tabuena, 2022) that can provide access to educational resources and opportunities (Bueno, 2023).

Industrial Revolution 6.0: Integrating Artificial Intelligence in Education

The Fourth Industrial Revolution (or Industry 4.0) is a term used to describe the current era of rapid technological change, which is characterized by the integration of advanced technologies into various industries, such as artificial intelligence (AI), robotics, the Internet of Things (IoT), and 3D printing. The integration of Industry 4.0 technologies into the education sector is referred to as Industrial Revolution 6.0. This integration is changing the way we teach and learn, with an emphasis on building the skills and competencies required to succeed in an increasingly digital and technology-driven world. In education, artificial intelligence is a critical component of the Industrial Revolution 6.0. AI can be used to tailor and adapt each student's learning experience, offering real-time feedback and support depending on their unique needs and learning style (Garlinska et al., 2023). AI algorithms can evaluate vast volumes of data created by educational software in order to provide insights into student performance and learning outcomes, which may then be used to improve teaching and learning methods (Future Market Insights Inc., 2023). Artificial intelligence can also be utilized to create intelligent teaching systems and adaptive learning platforms that provide tailored feedback and support (University of Hawaii - West Oahu, 2023). These systems can detect areas where a student is suffering and provide additional resources or support to assist them in overcoming these obstacles. AI may also be utilized to develop virtual and augmented reality experiences that can assist students in better understanding complicated concepts and ideas.

Artificial Intelligence and the Industrial Revolution 6.0 in Education

Artificial intelligence (AI) is a critical component of the Industrial Revolution 6.0 in education, which refers to the incorporation of sophisticated technologies, including AI, into the teaching and learning process (Sharadgah & Sa'di, 2022). AI can be utilized to improve and modify the educational experience in a variety of ways, from individualized learning experiences and adaptive teaching methods to the formation of new, technology-driven vocations. AI can be utilized in education to develop intelligent tutoring systems and adaptive learning platforms that provide tailored feedback and support to each student depending on their unique needs and learning style (University of Hawaii - West Oahu, 2023). AI algorithms can evaluate vast volumes of data created by educational software in order to provide insights into student performance and learning outcomes, which may then be used to improve teaching and learning methods (Future Market Insights Inc., 2023). Through virtual and augmented reality technologies, AI can also be used to create immersive and engaging learning experiences. These technologies can help students understand complicated concepts and ideas in a hands-on and participatory way. Furthermore, artificial intelligence (AI) can be used to automate administrative tasks like grading and record-keeping, freeing up teachers' time to focus on higher-level tasks like curriculum development and personalized instruction.

AI in education is a new field with enormous promise to change the way we teach and learn. The incorporation of AI and software in education has the potential to alter the way we teach and learn, offering students more personalized, adaptive, and successful learning experiences. Industrial Revolution 6.0 in education, on the other hand, marks a substantial transformation in the way we teach and learn and has the ability to offer students the skills and knowledge they need to flourish in a rapidly expanding technology landscape. As part of Industrial Revolution 6.0, the incorporation of AI into education has the potential to change the way we teach and learn,

giving students more personalized and adaptive learning experiences that are better suited to their unique needs and skills (Bueno, 2023). As a result, AI is a potent instrument for the Industrial Revolution 6.0 in education, assisting in the creation of more personalized, adaptive, and engaging learning experiences for students (Koval, 2023) while also streamlining administrative duties and improving teaching and learning methods.

Technology Acceptance Model

The Technology Acceptance Model (TAM) serves as the foundation for this research, offering a robust theoretical paradigm for explaining how individuals accept and use new technology. According to TAM, two primary factors—perceived usefulness (PU) and perceived ease of use (PEOU)—influence the propensity to utilize a technology (Malik et al., 2023; Marangunić & Granić, 2015). These factors are particularly relevant in understanding the adoption of AI-integrated software in education, where technological advancements are reshaping teaching and learning practices.

Perceived Usefulness (PU) refers to the degree to which an individual believes that a technology will enhance their performance or productivity. In the educational context, PU encompasses students' and teachers' perceptions of how AI can improve learning and teaching experiences. For instance, AI-powered learning platforms offer personalized learning experiences by analyzing data to adapt content to individual needs. Similarly, intelligent tutoring systems provide tailored feedback and coaching, helping students master complex concepts and develop critical thinking skills (Ajibade et al., 2022; Bueno, 2023). The automation of administrative tasks, such as grading and scheduling, also demonstrates PU by allowing teachers to focus more on instructional responsibilities.

Perceived Ease of Use (PEOU) pertains to the degree to which a technology is considered simple to use and understand. In the context of AI-integrated software, this involves the intuitiveness of user interfaces, the clarity of instructions, and the seamless navigation of tools. Teachers and students are more likely to adopt AI-powered systems—such as adaptive assessment tools and virtual assistants—if these tools minimize cognitive load and simplify educational processes (Sharadgah & Sa'di, 2022). For example, user-friendly virtual assistants not only assist students with administrative tasks but also provide real-time feedback, ensuring ease of interaction and usability.

TAM also highlights the role of external variables, such as demographic factors, prior technological experience, and institutional support, in shaping PU and PEOU. Younger educators familiar with digital tools may find AI technologies easier to use, while targeted training programs can improve perceived usefulness among less technologically proficient users. Institutional support, including professional development opportunities and access to technological infrastructure, further drives the adoption of AI in education (Keong et al., 2016).

In applying TAM, this study identifies specific strategies to promote the integration of AI in education: (a) Tailoring Training Programs - Providing targeted training for educators on AI functionalities enhances their perceptions of both PU and PEOU; (b) Designing Intuitive Systems: Simplified interfaces and automated functionalities make AI tools more accessible and appealing to a wider audience; and (c) Demonstrating Practical Benefits - Showcasing how AI-driven tools improve learning outcomes, such as personalized feedback and increased student engagement, reinforces their perceived value (Jensen, 2012).

The TAM framework provides a systematic way to investigate factors influencing the adoption and use of AI-powered applications. By examining PU and PEOU in educational scenarios, this study aims to better understand the challenges and opportunities associated with integrating AI into education. Furthermore, the insights gained from TAM can inform strategies to increase adoption, optimize implementation, and address potential barriers to effective use (Trawnih et al., 2023; Mutisya, 2016).

This study aimed to review and synthesize the demands of Artificial Intelligence and the Industrial Revolution 6.0 and their implications for education. Specifically, this study also sought to answer the following:

1. What are the demands of Artificial Intelligence integrating software in education?
2. What are the difficulties of Artificial Intelligence in integrating the Industrial Revolution 6.0 in education?
3. What are the demands of Industrial Revolution 6.0 in education?
4. How can the demands of Artificial Intelligence be nurtured to address the demands of Industrial Revolution 6.0?

What are the implications of the demands of Artificial Intelligence and Industrial Revolution 6.0 on education?

2. METHOD

2.1 Research Design

This study employed a descriptive method to gather information on existing conditions (Subong, 2005; Tabuena & Hilario, 2021). According to Creswell & Creswell (2017), descriptive research consists of collecting data to answer questions regarding the current status of the study's subject. This research design employed the library technique (Sappe, 2020) and literature review (Balato et al., 2023; Tabuena, 2021; Tabuena, 2020) to collect and synthesize articles and scientific publications related to the demands of artificial intelligence integrating software in education. It also employed a descriptive-documentary technique alongside a qualitative research method to gain an understanding of the social condition by applying theoretical bodies accepted by the scientific community (Bravo et al., 2022; Torres, 2010). A form of research design that involves gathering and analyzing data from many sources, such as academic articles, books, reports, and other relevant material, is reviewing and synthesizing

emergent concepts. The purpose of this research design is to uncover and comprehend emerging concepts or trends in a specific field or issue.

The process of examining and synthesizing new concepts in a review-synthesis report involves multiple steps. The researcher begins by defining the study issue or topic of interest. Next, look for and collect relevant literature on the study issue or topic. This material can be found in a variety of places, including academic databases, search engines, and library catalogs (Thomson & Donn, 2002). After gathering the literature, the researcher assesses and synthesizes the information contained within it. Reading and interpreting the literature to find major concepts, themes, and trends is required. The researcher analyzed the literature using a variety of methodologies, including content analysis, thematic analysis, and narrative synthesis. The researcher synthesized the findings after examining the literature to generate a cohesive and comprehensive grasp of the emerging concepts or trends in the subject. This could include finding gaps in the literature or opportunities for more investigation.

2.2 Research Instrument

A sort of research instrument widely used in qualitative research is guide questions. These questions are intended to steer the discussion and assist researchers in gathering data on a certain issue of interest. The researchers evaluated the research question, the study aims, and the features of the issue when designing guide questions. The questions were specific, open-ended, and simple to grasp (Kadence International, 2023). To eliminate prejudice and ensure that the questions were culturally relevant and respectful, the researchers also assessed the sequence of the questions, the language, and the tone of voice. In qualitative research, guide questions are an important research device for data collection. It was deliberately crafted by the researchers to share their experiences and thoughts on a given issue.

2.3 Data Gathering Procedure

Reviewing and synthesis is a prevalent process that involves examining and combining facts from various sources to create a full picture of a certain occurrence. The techniques for acquiring data for review and synthesis normally follow a few basic steps:

Identifying and defining the study question or problem: The first stage is to define the research issue or problem that will be addressed by the study. This will assist the researchers in determining the types of data required for the study. Identifying relevant data sources: The next stage is to identify the data sources that are pertinent to the research topic. This could include current literature, papers, databases, or other information sources. Data collection and evaluation: After identifying the appropriate sources, the researcher will collect and examine the data to discover major themes, patterns, and linkages. This could include looking through written documents, conducting interviews or surveys, or using other data collection methods. Data analysis and synthesis: After collecting and reviewing the data, the researchers will analyze it to uncover common themes and patterns. The idea is to combine the facts into a coherent narrative that sheds light on the research topic or problem. Making recommendations and drawing conclusions from the data: The final phase is to draw inferences from the data and give recommendations for further research or practice. This could include identifying research gaps or offering strategies to improve practice in a certain area.

Reviewing and synthesis are important data-gathering methods that can assist researchers in gaining a more comprehensive understanding of a specific phenomenon. It enables the incorporation of data from several sources, resulting in a more comprehensive and nuanced understanding of the study issue or problem.

2.4 Data Analysis

Synthesizing emergent concepts is a key approach to data analysis, involving the identification and interpretation of significant themes and patterns that emerge from the data. This method, often employed in qualitative research, allows for a comprehensive understanding of complex phenomena or societal issues. In this study, the analysis began with data familiarization, where the researchers reviewed relevant literature, such as journal articles and reports, to gain an in-depth understanding of the topic. This step ensured familiarity with the data and its context, providing a solid foundation for the subsequent stages (Creswell & Creswell, 2017).

The next step involved initial coding, where major concepts, ideas, and patterns were identified and assigned specific codes. For example, recurring ideas like "adaptive learning," "intelligent tutoring systems," and "AI-driven assessments" were coded to organize the data systematically. Following this, the researchers performed thematic categorization, grouping similar codes into broader themes. Key themes that emerged included "personalized learning," "technological barriers," and "ethical considerations," which provided a structured framework for understanding the data.

After categorization, the researchers engaged in data interpretation, evaluating the relationships and links between themes to uncover patterns and connections. For instance, the analysis explored how AI tools enhance personalized learning while addressing challenges such as ethical concerns and resistance to technology adoption. The final stage, synthesis, involved weaving the identified themes into a coherent narrative that aligned with the study's objectives. This narrative summarized the significant findings, offered conclusions, and provided recommendations for future research and practical application.

The rationale for adopting this approach lies in its effectiveness for exploring emerging fields like AI in education. The exploratory nature of the topic required a method that could capture the complexity and richness of the data, enabling the identification of nuanced insights and trends (Buenaflor et al., 2022; Creswell & Creswell,

2017). Thematic analysis, in particular, offered the flexibility to adapt as new themes emerged, ensuring a comprehensive and systematic synthesis of the literature (Braun & Clarke, 2006). This method allowed the study to generate valuable insights into AI's transformative potential in education and the barriers and opportunities associated with its adoption.

2.5 Ethics

The researchers would want to emphasize that all parts of the research, including publishing ethics and citation principles, were thoroughly reviewed during the entire process. If there is a disagreement over the substance of the publication, the researchers bear full responsibility for it. The researchers recognize the importance of transparency and objectivity in their research. The researchers have taken precautions to ensure that the information gathered is accurate and dependable. The researchers are devoted to carrying out the research in accordance with ethical principles and procedures. The researchers also stated that the study has the potential to contribute to the field of AI in education and that the findings would be used to benefit society as a whole. The researchers are committed to using our research ethically and with integrity, and we will guarantee that our findings are distributed in a way that respects the rights and dignity of all those involved.

3. RESULTS AND DISCUSSION

The Demands of Artificial Intelligence Integrating Software in Education

The integration of Artificial Intelligence (AI) software in education can bring about several benefits, such as personalized learning, improved student engagement, and enhanced teacher productivity. However, there are also several demands that must be addressed for successful integration. Some of these demands include, as shown in Table 1:

Table 1 – The Demands of Artificial Intelligence Integrating Software in Education

Themes	Interpretations
Personalized Learning	AI-integrated software can customize learning experiences for each learner based on their learning style, progress, and needs.
Adaptive Assessment	AI can analyze student data and provide adaptive assessments that are tailored to each student's learning level, allowing teachers to provide more targeted feedback and interventions.
Intelligent Content Creation	AI can generate content and learning materials that are tailored to the needs of individual students or groups of students.
Intelligent Tutoring	AI can serve as a teacher or coach, giving students personalized feedback and support to help them overcome hurdles and achieve their learning objectives (Al Ka'bi, 2023).
Automated Administrative Tasks	Administrative chores such as grading, scheduling, and record-keeping can be automated by AI, freeing up teachers' time to focus on more significant instructional tasks.
Predictive Analytics	AI can use student data to anticipate which children are likely to fall behind or drop out, allowing teachers to provide targeted support and interventions.
Enhanced Accessibility	AI can provide accessibility features for students with disabilities or learning differences, such as automatic captioning, audio descriptions, or personalized learning plans.
Improved Learning Outcomes	AI provides adaptive learning paths, instant feedback, and personalized resources that improve student performance and engagement.
Efficient Resource Allocation	AI can analyze student data and provide insights on how to allocate resources such as time, personnel, and materials, to maximize student learning outcomes.
Predictive Learning	AI can anticipate student needs, learning progress, and patterns of behaviour to offer effective support before it is needed.

The "Improved Learning Outcomes" theme is central to understanding how AI enhances education. Research has shown that AI can significantly improve student performance through personalized and adaptive learning environments. For example, AI-powered learning platforms such as Knewton and DreamBox adjust the learning

material in real-time based on the student's progress and understanding. These platforms can identify gaps in knowledge and provide tailored lessons that are better aligned with individual learning paces (Jain et al., 2023). Intelligent tutoring systems, like Carnegie Learning's MATHia, are another example of how AI enhances learning outcomes. These systems use machine learning algorithms to provide real-time, personalized feedback, helping students develop problem-solving skills and grasp complex concepts more effectively (Ajibade et al., 2022). Studies have demonstrated that students using these AI-driven tools have shown a significant increase in test scores and retention of the material compared to traditional methods of instruction (Garlinska et al., 2023). Additionally, AI tools that provide adaptive assessments allow for more precise evaluation of student progress. AI uses performance data to adapt the assessment difficulty and provide targeted feedback. For instance, Socrative and Quizlet use AI to adjust question difficulty based on previous answers, offering a more accurate measure of a student's understanding (Tabuena et al., 2022). These tools also help identify learning gaps, enabling teachers to focus their interventions on areas where students need the most support.

AI's ability to analyze data and provide real-time feedback is especially impactful in predictive analytics. For instance, Civitas Learning uses data analytics to predict student outcomes and identify at-risk students. In terms of identifying potential issues early, educators can intervene before students fall behind, significantly improving retention rates and academic success (Jensen, 2012).

These examples clearly illustrate how AI technologies can improve learning outcomes by offering personalized, adaptive, and data-driven educational experiences that cater to individual needs. As AI continues to evolve, its integration in education will likely lead to even more significant improvements in student performance and engagement.

The integration of Artificial Intelligence into educational software can bring a host of benefits that can significantly improve the learning experience of students and the teaching process of educators. It provides students with personalized learning experiences, adaptive assessments, intelligent content creation, and efficient resource allocation. AI also supports teachers in various aspects of their work, including grading, scheduling, and administrative tasks, providing opportunities to enhance the quality of their teaching.

Difficulties of Artificial Intelligence Integrating the Industrial Revolution 6.0 in Education

The integration of Artificial Intelligence (AI) into education toward the Industrial Revolution 6.0 also presents several challenges and difficulties. Some of the difficulties of AI in education include the following, as shown in Table 2:

Table 2 – Difficulties of Artificial Intelligence Integrating the Industrial Revolution 6.0 in Education

Themes	Interpretations
Privacy Concerns	AI requires large amounts of data to function effectively, raising concerns about student privacy and data security. There are concerns about who has access to the data and how it is being used.
Bias	AI systems have the potential to perpetuate prejudices and injustices, especially if they are trained on biased data (Kooli, 2023). There are concerns about AI systems perpetuating racial, gender, and other biases that can affect student outcomes.
Technical Challenges	AI requires significant technical infrastructure and expertise, including high-performance computing resources and data scientists. There may be limited availability of these resources and expertise in many schools, particularly in underfunded schools.
Human Connection	Education is a social experience that relies heavily on human interaction and personal relationships. There are concerns that AI in education could lead to a loss of human connection, particularly in areas such as social and emotional learning.
Resistance to Change	Integrating AI into education requires significant changes in teaching methods, curriculum design, and administrative tasks. There may be resistance to change from teachers, students, and parents who are used to traditional methods of education.
Lack of Transparency	AI systems can be complicated and difficult to comprehend, particularly for non-technical stakeholders such as teachers and parents. There are concerns about a lack of transparency in how AI systems make decisions and recommendations.
Ethical Concerns	Artificial intelligence poses ethical questions concerning the use of technology in education,

notably in areas such as data privacy, bias, and transparency. There may be ethical problems with utilizing AI systems to make judgments regarding students' academic success and future chances.

Consequently, the difficulties of AI in education toward the Industrial Revolution 6.0 include privacy concerns, bias, technical challenges, human connection, resistance to change, a lack of transparency, and ethical concerns. These difficulties need to be addressed to ensure that AI is integrated into education in a responsible and effective manner.

The Demands of Industrial Revolution 6.0 in Education

The demands of Industrial Revolution 6.0 in education are focused on preparing students for the workforce of the future, which will be heavily influenced by technological advancements and digital transformation. Some of the key demands of Industrial Revolution 6.0 in education include the following:

Table 3 – The Demands of Industrial Revolution 6.0 in Education

Themes	Interpretations
Technical Skills	The Industrial Revolution 6.0 demands a highly skilled workforce that is proficient in technology and digital skills. These skills include coding, data analysis, cybersecurity, artificial intelligence, and other emerging technologies.
Critical Thinking	Students must use critical thinking skills in order to examine and evaluate information, solve issues, and make sound judgments. This includes skills such as problem-solving, creativity, innovation, and collaboration.
Lifelong Learning	The workforce of the future will require continuous learning and upskilling. By instilling a growth mindset, a passion for learning, and the ability to adapt to new technologies and trends, education must prepare students for lifelong learning.
Entrepreneurial Mindset	The Industrial Revolution 6.0 demands an entrepreneurial mindset, with the ability to identify opportunities, take risks, and innovate. Education must develop students' entrepreneurial skills, such as creativity, risk-taking, and business acumen.
Soft Skills	Soft skills such as communication, teamwork, leadership, and empathy are critical for success in the future workforce. Education must focus on developing these skills alongside technical and digital skills.
Global Competence	The workforce of the future will be globalized, with increased collaboration and competition across borders. Education must prepare students for global competence by instilling cultural awareness, language skills, and the ability to work with people from diverse backgrounds.
Sustainable Development	Industrial Revolution 6.0 demands a focus on sustainable development, with a commitment to reducing environmental impact and promoting social responsibility (Joshi et al., 2023). Education must develop students' understanding of sustainability and prepare them to be responsible global citizens.

Accordingly, the demands of the Industrial Revolution 6.0 in education require a focus on technical skills, critical thinking, lifelong learning, an entrepreneurial mindset, soft skills, global competence, and sustainable development. These demands must be met to ensure that students are prepared for the challenges and opportunities of the future workforce.

Nurturing the Demands of Artificial Intelligence in Addressing the Demands of the Industrial Revolution 6.0

To nurture the demands of Artificial Intelligence (AI) and address the demands of Industrial Revolution 6.0, education must adopt a forward-looking approach that leverages technology and innovation. Here are some ways in which the demands of AI can be nurtured to address the demands of Industrial Revolution 6.0:

Invest in Technology Infrastructure

To nurture the demands of AI, education institutions must have the necessary technology infrastructure, such as high-speed internet, advanced hardware, and software. This infrastructure will enable students to access digital resources and collaborate with peers in real-time.

Integrate AI and Machine Learning

AI and Machine Learning can be integrated into the education system to personalize learning and provide students with immediate feedback. This technology can also help identify gaps in student understanding and provide targeted interventions to address them.

Foster a Culture of Innovation

Education institutions must foster a culture of innovation that encourages students and faculty to experiment with new technologies and teaching methods. This will help students develop an entrepreneurial mindset and prepare them for the demands of the Industrial Revolution 6.0.

Incorporate Project-based Learning

Students can benefit from project-based learning in terms of critical thinking, problem-solving, and cooperation (Jensen, 2012). By working on projects that incorporate AI, students can develop technical skills that are in demand in the workforce.

Provide Professional Development

Teachers and faculty members must be provided with professional development opportunities to help them integrate AI into their teaching. This will help ensure that learners are obtaining a high-standard education that satisfies the demands of the Industrial Revolution 6.0.

Foster Global Competence

The Industrial Revolution 6.0 demands a global workforce, and education must prepare students for this reality. By incorporating global perspectives and promoting cultural awareness, education can help nurture global competence in students.

Encourage Lifelong Learning

To keep up with the demands of Industrial Revolution 6.0, students must be prepared for lifelong learning. Education institutions must instill a passion for learning and provide opportunities for students to continue their education beyond the classroom.

Thus, nurturing the demands of AI to address the demands of Industrial Revolution 6.0 requires a holistic approach that leverages technology and innovation while fostering a culture of innovation, project-based learning, professional development, global competence, and lifelong learning.

The Implications of the Demands of Artificial Intelligence and Industrial Revolution 6.0 in Education

Artificial Intelligence (AI) and the Industrial Revolution 6.0 have already had a significant impact on education, and their influence is probable to uphold thriving in the time to come in areas such as personalized learning, improved efficiency, enhanced student engagement, new teaching methodologies, and increased access to education. The implications of the demands of Artificial Intelligence (AI) and Industrial Revolution 6.0 in education are significant and far-reaching, such as the following:

Shift in Teaching Methods

The integration of AI in education will require a shift in teaching methods from traditional lecture-style instruction to more personalized and student-centered approaches. This shift will require teachers to be proficient in using AI technologies and developing curriculum that aligns with the demands of Industrial Revolution 6.0.

Increased Focus on Technical Skills

Because of the increasing demand for technological skills in the workforce, education must place a greater emphasis on teaching technical skills such as coding, data analysis, and machine learning. This will assist learners in developing the abilities required to succeed in future careers (Garlinska et al., 2023).

Increased Collaboration

The integration of AI in education will require increased collaboration between educators, researchers, and industry professionals. This collaboration will help ensure that education is keeping pace with the demands of Industrial Revolution 6.0 and that students are being prepared for the jobs of the future.

Increased Demand for Lifelong Learning

As the pace of technological change accelerates, the demand for lifelong learning will increase. Education must prepare students for a lifetime of learning and provide them with the skills and tools necessary to adapt to the changing demands of the workforce.

Increased Demand for Critical Thinking and Creativity

While technical skills are important, education must also focus on developing critical thinking and creativity skills. These skills will be essential in solving the complex problems of Industrial Revolution 6.0.

Increased Demand for Global Competence

The demands of Industrial Revolution 6.0 are global in nature, and education must prepare students to work in a global context. This will require education to focus on developing global competence, cultural awareness, and language skills.

Ethical Considerations

The incorporation of artificial intelligence (AI) within the realm of education gives rise to ethical concerns pertaining to matters such as the safeguarding of data privacy, the presence of bias, and the level of transparency in algorithms. Education must address these issues and prepare students to navigate the ethical challenges of the Industrial Revolution 6.0.

Hence, the demands of AI and Industrial Revolution 6.0 in education have significant implications for teaching methods, technical skills, collaboration, lifelong learning, critical thinking, creativity, global competence, and ethical considerations. Education must adapt to these demands to ensure that students are prepared for the jobs of the future and can thrive in the changing landscape of Industrial Revolution 6.0.

4. CONCLUSION

The integration of Artificial Intelligence (AI) into educational software offers numerous benefits that can significantly enhance the learning experience for students and improve the teaching process for educators. AI provides personalized learning experiences, adaptive assessments, intelligent content creation, and efficient resource allocation. It also supports teachers by automating tasks such as grading, scheduling, and feedback, thereby enabling educators to focus more on teaching (Ogbonnaya, 2020). While these advancements hold great promise, the integration of AI in education towards Industrial Revolution 6.0 also presents challenges, including privacy concerns, bias, technical barriers, resistance to change, and ethical considerations. Addressing these difficulties is crucial to ensure that AI is integrated in a responsible, effective manner that benefits all stakeholders.

This study highlights the unique contributions of AI in education, demonstrating its potential to improve learning outcomes, foster innovation, and support lifelong learning. AI-driven tools offer valuable opportunities for personalized education and can play a pivotal role in bridging the skills gap that is becoming increasingly prominent in today's digital economy (Jain et al., 2023). Moreover, the Technology Acceptance Model (TAM) reveals that the perceived usefulness and ease of use of AI technologies are key factors driving their adoption in educational settings (Marangunić & Granić, 2015).

For practical implementation, this research recommends that educational institutions focus on professional development for educators to enhance their understanding and use of AI tools (Keong et al., 2016). Additionally, AI systems should be designed with user-friendly interfaces to minimize cognitive load and make them more accessible for both educators and students (Sharadgah & Sa'di, 2022). A phased approach to AI integration, including pilot programs and continuous assessment, will help address challenges and ensure that AI technologies are implemented effectively (Jensen, 2012).

The demands of the Industrial Revolution 6.0 in education require a focus on technical skills, critical thinking, lifelong learning, entrepreneurial mindsets, soft skills, and global competence. These needs must be met to adequately prepare students for future careers. Nurturing the integration of AI to meet these demands requires a holistic approach that leverages technology and fosters a culture of innovation, project-based learning, professional development, and global collaboration. Education systems must adapt to these evolving demands to ensure that students are equipped with the skills necessary to thrive in an increasingly technology-driven world.

Thus, AI holds significant potential to transform education, making it more personalized, accessible, and efficient. However, successful integration requires addressing challenges, providing ongoing support for educators, and ensuring that ethical considerations are prioritized. Through thoughtful implementation, AI can help prepare students for the workforce of the future, fostering the skills and competencies needed to navigate the changing landscape of the Industrial Revolution 6.0.

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