Integrating Artificial Intelligence in Education: Understanding Students' Perceptions

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ABSTRACT
The advent of cutting-edge technologies has prompted the transformation of current educational systems by integrating these advancements into contemporary teaching and learning methodologies. Given the substantial potential of Artificial Intelligence (AI) to revolutionize these practices, the consideration of its incorporation into the educational domain is inevitable. This research delves into the latest developments in AI within education, examining how secondary school students involved in this research utilize AI and for what specific purposes. Additionally, this study seeks to understand whether these students employ Artificial Intelligence for educational and learning purposes and their opinions on its inclusion in educational frameworks. The collected data provide valuable insights into students' comprehension of AI's role and objectives in education and their perspectives on its application across various scenarios. Furthermore, the study underscores the significance and challenges of integrating Artificial Intelligence into curricula, highlighting the opportunities it presents for crafting educational practices that enhance students' academic knowledge and digital proficiency while emphasizing the ethical and responsible use of such technologies.

ABSTRAK
Munculnya teknologi mutakhir telah mendorong transformasi sistem pendidikan saat ini dengan mengintegrasikan kemajuan ini ke dalam metodologi pengajaran dan pembelajaran kontemporer. Mengingat potensi besar Kecerdasan Buatan (AI) untuk merevolusi praktik-praktik ini, pertimbangan untuk memasukkannya ke dalam bidang pendidikan tidak dapat dihindari. Penelitian ini menggali perkembangan terkini AI dalam dunia pendidikan, mengkaji bagaimana siswa sekolah menengah yang terlibat dalam studi kasus ini memanfaatkan AI dan untuk tujuan spesifik apa. Selain itu, penelitian ini berupaya memahami apakah para siswa ini menggunakan Kecerdasan Buatan untuk tujuan pendidikan dan pembelajaran serta pendapat mereka tentang penyertaannya dalam kerangka pendidikan. Data yang dikumpulkan memberikan wawasan berharga mengenai pemahaman siswa tentang peran dan tujuan AI dalam pendidikan serta perspektif mereka terhadap penerapannya dalam berbagai skenario. Lebih jauh lagi, penelitian ini menggarisbawahi pentingnya dan tantangan dalam mengintegrasikan Kecerdasan Buatan ke dalam kurikulum, menyoroti peluang yang ada untuk menciptakan praktik pendidikan yang meningkatkan pengetahuan akademis dan kemahiran digital siswa sambil menekankan penggunaan teknologi tersebut secara etis dan bertanggung jawab.

Keywords: artificial intelligence; digital competence; educational technology; students' perception.
1. INTRODUCTION

1.1. Impact of Technological Advancements on Educational Policies

Rapid and transformative technological advancements have significantly reshaped educational policies and planning globally, necessitating a thorough reexamination and adaptation of teaching, learning, and assessment frameworks to align with new educational contexts. The emergence of digital environments, coupled with an array of tools and applications, has created avenues for substantial improvements in education, enhancing the quality and relevance of teaching and learning practices. Recognizing the critical need to incorporate digital capabilities into education, European Union authorities launched the Digital Education Action Plan (2021-2027) in 2020, which aims to foster the development of digital competencies among teaching staff and students (European Commission, 2020).

1.2. Role of AI in Education: Evolution and Revolution

Artificial Intelligence (AI) has been a pivotal research area within computer science, gaining considerable attention with the introduction of OpenAI’s GPT-4 text generation technology. This technology is increasingly prevalent across various sectors, including the workplace, daily life, and education. Roll and Wylie (2016) identify two main research threads in Artificial Intelligence in Education (AIED):

- The evolutionary thread, which focuses on enhancing teaching and learning practices
- The revolutionary thread, which examines integrating AI technologies into students’ everyday lives.

The widespread adoption of technology and the complexities of AI applications have driven education policymakers and educators to adopt a critical and strategic approach. This approach involves leveraging the opportunities presented by technology and ensuring that pedagogical principles are seamlessly integrated into teaching, learning, and assessment practices.

1.3. Students’ Interaction with AI: Habits and Attitudes

This paper presents findings from research conducted with primary, secondary, and university students aged 13 and above. The study investigates their habits and attitudes towards using AI tools in their daily lives and educational settings, aiming to determine how much they utilize AI for academic purposes. The research delves into students’ usage patterns of AI, the specific purposes for which they employ various programs and applications, and their perspectives on the educational system’s support for using AI in teaching and learning.

1.4. Advancing Digital Competence through AI

The overarching goal of this research is to underscore the potential of AI in education and advocate for the development of teaching practices that not only enhance subject knowledge but also build digital competence and promote the responsible and ethical use of AI technologies. By identifying these possibilities, educators can better equip students for a future where digital literacy is indispensable. This proactive approach ensures that students are not only consumers of technology but also informed and ethical users, ready to navigate the complexities of a digital world.

2. SIGNIFICANCE OF THE STUDY

The research is significant as it offers valuable insights into the current utilization of AI in secondary education, focusing on students’ familiarity and engagement with AI tools. It is crucial to comprehend the extent to which students utilize AI for academic purposes and their attitudes toward its integration into educational curricula to develop effective teaching strategies and educational policies. The findings underscore the necessity for professional development programs to enable teachers to integrate AI into their teaching practices effectively. This study adds to the growing
literature on AI in education, emphasizing its potential to enrich learning experiences and prepare students for an increasingly digitized future.

3. LITERATURE REVIEW

AI has the potential to enhance the efficiency of fraud assessment and detection. However, concerns exist that it could undermine confidence in the evaluation results if it isn't employed transparently and fairly. Moreover, a lack of understanding of AI's functionality and the algorithms involved can lead to discomfort and distrust among users (Sain, 2024).

3.1. Impact of Technological Advancements on Education

Rapid and unprecedented technological advancements profoundly impact all areas of human activity, including the workplace and professional sectors, and consequently affect the educational domain (Gavranović and Veljković Michos, 2022). Over the years, computer and information communication technologies have evolved, offering new possibilities, including various facets of the continually expanding domain of Artificial Intelligence (AI). Wartman and Combs (2018) argue that these technological advancements can significantly enhance educational practices, mainly through integrating AI in teaching and learning. Comparing the capabilities of machines to human cognitive functions in performing diverse tasks, Coppin (2004) posits that AI encompasses the ability of machines to effectively address new situations requiring problem-solving, creativity, and critical thinking skills. The rapid integration of AI, robotics, IoT, quantum computing, and other advanced technologies is poised to revolutionize work environments and societies. In light of this, the education system must confront the task of imparting a diverse set of competencies and skills, commonly referred to as 21st-century skills, to prepare individuals for an increasingly knowledge-driven society (Sain, 2024).

3.2. Expanding the Scope of AI in Education

Although AI is primarily associated with computers, research indicates that its scope has broadened beyond mere computational applications (Chen et al., 2020), leading to the emergence of Artificial Intelligence in Education (AIED). The importance and necessity of applying AI in education have been acknowledged by researchers, educators, policymakers, and international organizations like UNESCO, which advocates for the implementation of AI across educational sectors, administration, teaching, and learning (UNESCO, 2019). AI in education is a relatively nascent field; however, a substantial body of research highlights both new opportunities and challenges associated with its use in educational settings.

3.3. Paradigms of AI Application in Education

Ouyang and Jiao (2021) identify three paradigms in AI applications in education:

- The first paradigm involves AI directing the learning process, where the learner's role is mainly passive. This highlights the need for change and innovation in education.
- The second paradigm features AI-supported learning, with learners collaborating with AI as more active participants.
- The third paradigm envisions learners as leaders in their learning processes, using AI to enhance and customize their learning experiences.

3.4. Instructional Strategies and Teaching Methodologies

Given the contemporary emphasis on creating efficient, student-centred educational frameworks, it is crucial to focus on instructional strategies and teaching methodologies. Timms (2016) emphasizes that AI can significantly support teaching by providing various pedagogical tools.
whose effective use can enhance the quality of instruction. Learning, as a complement to teaching, is also greatly supported by AI, which can scaffold learners and personalize learning experiences tailored to their needs, abilities, and prior knowledge (Mikropoulos & Natsis, 2011; Pokrivcakova, 2019). Research indicates that AI can facilitate more immersive and profound learning experiences, leading to better retention of knowledge (Wartman & Combs, 2018).

3.5. Practical Applications and Ethical Considerations of AI in Education

Practical applications of AI in educational practices include intelligent tutoring systems, adaptive learning platforms, interactive learning systems, and various robotic teaching aids (Chen et al., 2020). While technology significantly influences education, AI holds substantial potential to reform educational practices (Holmes et al., 2019). However, technology integration in teaching should be guided by clear pedagogical principles. Educators need to evaluate the purpose and effectiveness of technology use within the context of learning theories and pedagogical objectives (Gvanović, 2017). Despite advanced technological capabilities, there is still a lack of conclusive evidence regarding the educational outcomes of AI use (Castañeda & Selwyn, 2018).

3.6. Student and Teacher Perceptions of AI in Education

Considerable research has explored students' perceptions of technology use in education, both pre-and post-Covid era (Gvanović & Prodanović, 2021). Emerging studies focus on students' attitudes toward AI and its educational applications. Findings indicate that while students recognize the importance of AI and are willing to use it in classes, they also express a need for proper training (Almaraz-Lopez et al., 2023). Another critical area is the ethical considerations associated with AI in education. Research has revealed students' concerns about AI's impact on employment and emotional intelligence (Ghotbi et al., 2022). These ethical challenges have prompted the development of programs to raise awareness and educate students on critical and analytical approaches to AI, fostering ethical awareness (Choi et al., 2024).

3.7. The Evolving Role of Teachers in the AI Era

The role of teachers in education has always been vital, but it has recently been redefined due to the complexities introduced by AI. Studies indicate that teachers often lack the necessary knowledge and skills to effectively incorporate AI into their teaching practices, underscoring the need for targeted professional development programs (Lee & Perret, 2022). Research into teachers' perceptions of AI reveals that while they acknowledge the importance of integrating AI into education, they also recognize a gap in their understanding of how to implement it effectively in the classroom (Chounta et al., 2022). Additionally, teachers express concerns that the shift towards AI might reduce social interactions in learning environments and raise issues of fairness and responsibility (Pörn et al., 2024; McGrath et al., 2023). By addressing these concerns and providing appropriate training and support, educators can harness the full potential of AI to create a more effective and engaging learning environment.

4. DATA COLLECTION AND METHODOLOGY

This research investigates the role of Artificial Intelligence (AI) in education, presenting findings that explore whether students utilize AI-supported applications and programs for academic purposes. It also delves into students' perspectives on integrating such technologies into teaching and learning practices. The study involved 150 secondary school students aged 17-23 who completed an online questionnaire. This survey comprised one open-ended question and six close-ended questions, created using the Google Forms platform. Multiple-choice questions gathered participants' perspectives, while the open-ended question aimed to elicit detailed, authentic responses. Respondents were assured of anonymity and informed that the collected data would be used exclusively for academic research purposes.
The survey data were meticulously analyzed and discussed. This research employs both quantitative and qualitative methodologies, with statistical data presented in percentages. Responses to the open-ended question were thoroughly examined, described, and subsequently categorized based on common features and recurring themes. This comprehensive approach not only sheds light on students’ use of AI in their educational activities but also offers valuable insights into their attitudes and perceptions regarding AI’s role in education. By integrating quantitative data with qualitative insights, this study aims to present a nuanced understanding of the impact and potential of AI in secondary education, highlighting both its benefits and challenges. The findings of this study are significant and can greatly inform future decisions in the field of education and technology. The detailed analysis of the collected data reveals a multifaceted view of how students interact with AI technologies in an educational context. This dual-method approach provides a richer, more detailed perspective on AI’s current use and future potential in education. By understanding students’ usage patterns and perceptions, educators and policymakers can better appreciate the practical implications of AI integration in secondary education. This research underscores the importance of considering both statistical trends and personal experiences to fully grasp the transformative potential of AI in the educational landscape.

5. RESEARCH FINDINGS AND DISCUSSION

The first section of the questionnaire was designed to collect demographic information about the respondents, precisely their age and gender. The study included 150 participants, 40 males (27%) and 110 females (73%), aged between 17 and 23 years and attending secondary schools. The second section of the questionnaire comprised close-ended questions to evaluate students’ familiarity with Artificial Intelligence and their usage habits. When asked, ‘Are you familiar with the term Artificial Intelligence?’ 147 respondents (98%) answered ‘yes,’ while only 3 students (2%) responded ‘no.’ Another question explored whether students have used AI-supported programs and applications, with 132 respondents (88%) indicating ‘yes,’ and 18 students (12%) saying ‘no.’ Additionally, in response to ‘Do you use AI for educational purposes?’ 108 respondents (72%) affirmed they do, whereas 42 (28%) stated they do not.

Another set of close-ended questions aimed to gather information on whether AI use is supported within their schools and the guidance provided by teachers. In response to the question, ‘Does the educational institution allow you to use artificial intelligence for education?’ 114 students (76%) confirmed they receive such support, while 36 respondents (24%) indicated they do not. Furthermore, the questionnaire included a question to gauge students’ opinions on integrating AI into school curricula with proper guidance. When asked, ‘Do you think it necessary to introduce programs supported by artificial intelligence in school curricula?’ 54 students (36%) believed it was necessary, another 54 (36%) were neutral, and 42 students (28%) felt it was unnecessary.

The open-ended question, ‘If you used or still use a program or application supported by artificial intelligence, please state which program or application you used (or still use),’ sought to identify the specific AI applications and programs students commonly use. Respondents were asked to list any AI-powered applications they had used. The data collected in Table 1 indicates the number of times the students mentioned each application. The results of this study show that nearly all participants are familiar with the term Artificial Intelligence. Moreover, the findings reveal that a significant majority of students, 136 out of 150, have used or continue to use AI applications, with many using these tools for educational purposes. The responses also indicate substantial support for AI use from both institutions and teachers in academic settings. However, a notable aspect of this study is the respondents’ varied attitudes towards the formal integration of AI applications into the school curriculum.

As shown in Table 1, the most frequently mentioned application was Chat GPT, cited eighty-six times by respondents. Google Translate was the second most commonly used application and was mentioned sixty-eight times. Grammarly was mentioned seventeen times, followed by Snapchat Bot
and Copilot, which were mentioned four and three times. Other applications like Adobe AI, Photomath, Siri, and Gamma were each discussed twice. Notably, 14 participants (9.3%) reported not using any AI-powered applications, meaning the detailed responses came from 136 respondents (90.7%). This indicates that students primarily use AI for tasks like translation and proofreading, suggesting its prevalent use in language classes.

Table 1. AI Tools and Applications Utilized by Respondents

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<tr>
<td>ChatGPT (86)</td>
<td>Copilot (3)</td>
<td>Photomath (2)</td>
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<tr>
<td>Adobe AI (2)</td>
<td>Google Translate (68)</td>
<td>Siri (2)</td>
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<tr>
<td>Grammarly (17)</td>
<td>Snapchat Bot (4)</td>
<td>Gamma (2)</td>
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Source: Created by the author.

The data from the open-ended question reveals a discrepancy in the utilization of AI for educational objectives, with a focus on language-related AI applications among students. This indicates the need to incorporate a broader spectrum of AI applications and platforms into educational settings to improve teaching and learning methodologies across various disciplines. The examination yielded no substantial gender variations in the analyzed reactions, suggesting a consistent perception and utilization of AI applications among male and female students.

6. CONCLUSION

The extensive application of Artificial Intelligence (AI) across various sectors has prompted policymakers, educators, and researchers to investigate its potential for enhancing educational practices. The participation of teachers and students is crucial in adapting and utilizing AI tools to create compelling, purposeful, and meaningful educational experiences. This study explores secondary school students' knowledge of AI, their tools, the purposes behind their use, and their attitudes towards integrating AI into education. Our findings reveal that students aged 17-23 are generally well-acquainted with the concept of artificial intelligence. Specifically, 132 respondents (88%) reported using AI-powered programs and applications, while 18 respondents (12%) had not engaged with such technologies. This high exposure and utilization suggest that AI is a significant component of students' academic and personal activities. The study identified Chat GPT and Google Translate as the most frequently used AI applications among participants, with 90.7% of the students employing these tools for educational purposes. This indicates the pivotal role of AI in facilitating tasks like language translation and text generation, which are integral to their academic work.

Another key finding of this research pertains to students' views on the necessity of incorporating AI-powered applications and programs into educational curricula. The data reveals a relatively lower percentage of respondents supporting the formal introduction of AI in curricula, which aligns with previous studies in the field (Almaraz-López et al., 2023; Ghotbi et al., 2022; Choi et al., 2024; Chounta et al., 2021; Pörn et al., 2024; McGrath et al., 2023). This outcome highlights the importance of a systematic and cautious approach to integrating AI into education. To achieve effective integration of AI, it is essential to provide robust support for teachers through various professional development programs. These programs should enhance teachers’ understanding of AI’s potential and challenges, enabling them to thoughtfully and effectively incorporate these technologies into their teaching practices. Equipping educators with the necessary skills and knowledge can better prepare students for a future where AI literacy is crucial. This proactive approach ensures that students are not only users of technology but also informed and ethical participants in an increasingly digital world.

7. FUTURE RESEARCH

Future research should investigate the enduring effects of AI integration in educational environments, particularly emphasising learning outcomes and student engagement. Studies should assess the efficacy of various AI tools in different subjects and academic levels to understand their
advantages and limitations comprehensively. Additionally, research should delve into the specific training requirements of educators to effectively incorporate AI into their teaching methods. Cross-cultural studies could yield valuable insights into the adoption and perception of AI in diverse educational contexts, facilitating the development of universally applicable strategies for AI integration in education.

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Conflicts of Interest: The authors declare no conflict of interest.

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