



TOWARDS THE INCORPORATION OF ARTIFICIAL INTELLIGENCE IN EDUCATION – STUDENTS' PERCEPTIONS

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Abstract:

The development of recent technologies has instigated the reformation of the existing educational systems by their incorporation into modern teaching and learning practices. As Artificial Intelligence has the potential to change these practices considerably, the question of introducing it into the educational sector arises. For that reason, this study focuses on recent trends in the field of Artificial Intelligence in education, with the aim to investigate whether, and for what purposes Artificial Intelligence is used by a group of secondary school students who participated in this case study. Another aim of this study is to investigate whether the respondents use Artificial Intelligence for education and learning and whether they believe it should be introduced in educational systems. The data obtained from this study give direct insight into students' understanding of the place and purpose of Artificial intelligence in education and their perception of how it is used in different contexts. It also draws attention to the importance and challenges of introducing Artificial Intelligence in curricula, the possibilities it offers for designing teaching practices that promote not only students' subject knowledge but also digital competence, and the responsible and ethical use of these possibilities.

Keywords:

Artificial Intelligence, Students' Perception, Contemporary Teaching and Learning Practices, Digital Competence.

INTRODUCTION

Rapid and transformative technological advancements have greatly influenced policies and planning at all educational levels around the world, resulting in the reexamination of the existing teaching, learning, and assessment organizations and their adaptation to the newly created educational contexts. Digital environment possibilities and numerous tools and applications have created opportunities for educational improvements and the enhancement of high-quality, purposeful, and meaningful teaching and learning practices. The relevance of understanding and incorporating digital possibilities in education has been recognized by the European Union authorities, and in 2020 the Digital Education Action Plan (2021-2027) was adopted, aiming at promoting the development of digital competencies of teaching staff and students [1].

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Artificial Intelligence as a field of research in computer science has often been emphasized and discussed; nonetheless, it drew both public and academic attention when the OpenAI's text generation technology released the GPT-4, the use of which is increasingly becoming a common practice among all generations, in the workplace, everyday life, and education. Roll and Wylie identify two main threads present in research papers investigating the field of Artificial Intelligence in Education (AIED) - evolutionary and revolutionary, the first focusing on teaching and learning practices, and the latter on incorporating technologies in students' everyday lives [2].

The pervasiveness of technology and the complexities of Artificial Intelligence applications have spurred education policymakers and educators to take a critical approach towards not only the various possibilities technology can offer but also to integrate pedagogical rationale and tenants in teaching, learning, and assessment practices. This paper reports on the case study conducted with a group of primary, secondary, and university students, aged 11+, and their habits and attitudes towards the use of Artificial Intelligence tools in everyday lives and at school, with the aim to investigate whether the respondents use Artificial Intelligence for educational and academic purposes. The case study focuses on students' habits of using Artificial Intelligence, the purposes for which they use various programs and applications, and whether, and to what extent, in their opinion, the educational system promotes the use of AI for teaching and learning. The overall aim of this research paper is to draw attention to the importance of identifying possibilities Artificial Intelligence offers and designing teaching practices that will support students develop not only subject knowledge but also digital competence and responsible and ethical use of these possibilities.

2. ARTIFICIAL INTELLIGENCE IN EDUCATION STUDIES

Rapid and unprecedented technological changes happening today in all segments of human endeavor, including the workplace and professional world, have also affected the educational domain [3]. Over the years, computer and information communication technologies have developed and offered new possibilities, including various aspects and domains of the ever-changing Artificial Intelligence domain. Wartman and Combs claim that technological advancements can contribute

to improvements in education greatly. They particularly focused on the incorporation of Artificial Intelligence in teaching and learning practices [4]. Comparing machines to human cognitive abilities to perform various tasks, Coppin states that artificial intelligence implies the ability of machines to respond effectively to newly created situations demanding problem-solving, creative, and critical-thinking skills [5].

Even though Artificial Intelligence is associated with computers, research has shown that its domain has expanded and moved away from exclusively being connected to the computer alone [6], leading to the development of the field of Artificial Intelligence in Education. The relevance and necessity to apply Artificial Intelligence in education have been recognized not only by researchers and educators but also by policymakers and relevant international institutions, such as the United Nations Education Scientific and Cultural Organization (UNESCO), whose recommendations include the implementation of AI in the education sector, administration, teaching, and learning [7].

Artificial Intelligence in Education is a relatively young field; still, there is a considerably vast body of research that emphasizes new possibilities and opportunities being available, as well as challenges we need to be aware of when using AI for educational purposes. Ooyang (2021) identifies changes in AI uses and applications in education, distinguishing three different paradigms. In the first paradigm, AI directs the process of learning, and the role of a learner is passive; namely, they are recipients of information created by AI. Furthermore, the second model is AI-supported, wherein a learner is a collaborator in the process of learning, a more active agent compared to the role they have in the first model. Finally, the third paradigm implies a learner as a leader in the process of learning, they are active agents who use AI to empower their learning and adapt it to their own learning needs [8]. Since one of the main aims in education today is to create an efficient framework for a student-centered approach, thus empowering learners and supporting them to tailor and direct their studies according to their personal and professional goals, the key aspects to consider lie in the area of giving instructions and teaching. Timms highlights that AI can greatly support teaching by providing various pedagogical tools, whose efficient and knowledgeable use can improve the quality of instruction and teaching [9]. Additionally, since learning is complementary to teaching in an educational framework, AI has been recognized as a powerful tool that can be used to support learning and



scaffold learners. One of the key aspects that has been identified in research related to the possibilities AI offers to support personalized learning [10], tailored according to students' needs, abilities, and previous learning experiences and knowledge [11]. Another aspect of learning that has been discussed among researchers relates to creating a positive learning experience, leading to more immersive and deeper learning and the retention of the acquired knowledge [4]. Some good examples of applying AI in teaching practices include various intelligent systems, such as tutoring systems, adaptive learning systems, learning interaction systems, and various tools including teaching robots [12].

Although technology has a great impact on education, and AI has the potential to reform education [13], pedagogical implications and philosophy should drive the use of technology in teaching, and educators need to assess the purposefulness of technology integration with clear pedagogical aims [14]. Therefore, the study of the application of AI in education should incorporate not only available tools, their possibilities, and technical issues but also the connection between learning theories, pedagogy, and AI application in teaching and learning organizations [8]. What has been also emphasized in the research is that despite the advanced technological possibilities, there is still a lack of evidence about educational outcomes resulting from the use of Artificial Intelligence [15].

Much has been written about students' perception of the use of technology in education, during pre- and post-Covid era [16], and there is an emerging body of research studying students' attitudes towards AI and its various aspects of the application in education. The results show that students are aware of the importance of implementing and willing to use AI in classes, but also claim that they need training [17]. Another aspect that emerged as relevant and challenging pertains to ethical considerations while implementing AI in education. Results obtained from a study that examined students' moral attitudes toward the use of Artificial Intelligence show their concern about its impact on employment and emotional intelligence [18]. Such results and challenges arising from the ethical aspect of AI use spurred researchers to create programs for raising awareness and educating students to approach this issue critically and analytically, thus developing students' ethical awareness of AI and AI intelligence [19].

Teacher's role in education has always been identified as crucial, but it has been redefined lately with the rising complexities affecting modern educational sys-

tems. Teachers and educators are facing new demands emerging with the pervasive presence of Artificial Intelligence in everyday lives. Studies have shown that teachers lack sufficient knowledge and expertise to tackle the challenge of AI effectively, and therefore the recommendations for creating new professional development programs have been proposed in recent studies [20].

Teachers' perceptions about Artificial Intelligence have also been in focus of study lately, and research results show that teachers are also aware of the necessity of incorporating AI in education, but they identify a lack of knowledge on how to implement AI in their classes, emphasizing the need for professional training in the use of AI [21]. Additionally, research findings also show that teachers are concerned that teaching and learning will move away from social interaction and that learners will experience a shift towards mere interaction with machines [22]; another concern of teachers relates to fairness and responsibility [23].

3. RESEARCH METHODOLOGY

This research focuses on the field of Artificial Intelligence in education. It presents the results obtained from a case study that investigates whether the respondents use applications and programs supported by Artificial Intelligence for educational and academic purposes. It also analyzes students' perspectives toward the use of such applications and programs in teaching and learning practices. The case study was conducted with a group of 123 secondary school students, aged 15-19. The students did an online questionnaire that contained one open-ended and eight close-ended questions. The survey was created with the use of the Google Forms platform. The multiple-choice questions were used to collect participants' perspectives and the open-ended question was used to gather authentic responses. The respondents were informed that the provided questionnaire was anonymous, and the data collected were to be solely used for academic purposes.

The data were collected, analyzed, and further discussed. The method used in this research is both quantitative and qualitative, whereby the statistical representation is given in percentages. The answers obtained from the open-ended question have been analyzed and described, and further categorized according to the common features and denominators.



4. RESEARCH RESULTS AND DISCUSSION

The first part of the questionnaire contained questions aimed at collecting respondents' profile data based on age and gender. The total number of respondents who participated in this case study amounts to 123 - 27 were male (22%) and 96 female (78%), aged 15-19, all attending secondary schools.

The second part of the questionnaire contained close-ended questions whose aim was to find out whether the students were familiar with Artificial Intelligence and to investigate their habits of using it. To the question "Are you familiar with the term Artificial Intelligence?" 121 respondents (98.4%) opted for the answer "yes," while only 2 students (1.6%) chose the option "no". Another question from this group aimed at finding students' habits of using Artificial Intelligence programs and applications. Namely, to the question "Have you ever used a program/application supported by Artificial Intelligence?" as many as 109 respondents (88.6%) answered "yes" and 14 students (11.4%) opted for the option "no". The last question from this group, "Do you use AI for educational purposes?," focuses on students' habits of using Artificial Intelligence for learning, and the results show that 100 respondents (81.3%) use AI for educational purposes, while 23 of them (18.7%) do not.

Another set of close-ended questions aimed at obtaining information on whether the use of Artificial Intelligence is supported at school and their opinion related to the appropriate guidance they receive from their teachers. To the question "Does the educational institution provide you with the opportunity to use Artificial Intelligence for the purpose of education?" 94 students (76.4%) stated that they get this support at school, while 29 respondents (23.6%) answered that they do not have such support from their teachers.

And, finally, the research also contained one close-ended question aiming to investigate students' attitudes towards the usefulness and meaningfulness of using Artificial Intelligence at school, if conducted systematically and with proper guidance. To the question "Do you think that it is necessary to introduce programs supported by artificial intelligence in curricula at schools?" 49 students (39.8%) answered that they believed it is

necessary; the same number of students answered that they did not have any opinion on the matter, while 25 students (20.3%) considered it unnecessary to incorporate Artificial Intelligence programs and applications in teaching and learning practices.

The only 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)" provides the answer to the types of applications and programs the students usually use. The respondents of this study were given the opportunity to state which application or program supported by artificial intelligence they used or still use. Table 1 shows the programs and applications the respondents stated in their answers, and the number in brackets indicates how many students wrote these answers.

The results of this case study show that almost all participants are familiar with the term Artificial Intelligence. Furthermore, it also reveals that the majority of students, as many as 109, have used or still use some program or application of Artificial Intelligence; a slightly lower number, but still the vast majority of the respondents use such programs and applications for educational purposes. The respondents' answers also show that the use of Artificial Intelligence is highly present in their education institutions and supported by their teachers. However, what comes as a significantly different result from this study relates to the respondents' attitude towards the use of applications and programs of Artificial Intelligence at school, within a formal education framework.

As Table 1 shows, the most widely used application by the respondents of this study is Chat GPT - it was mentioned sixty-six times in the respondents' answers. The second most commonly used application is Google Translate, which was mentioned fifty-eight times. Next comes Grammarly, which was mentioned seven times. Next are Snapchat Bot and Copilot, the former was mentioned five times, and the latter was mentioned two times. Adobe AI, Photomath, Siri, and Gamma were only mentioned once by respondents of this study. It is also worth noting that 16 (13.01%) of 123 participants stated that they have not used any application or program powered by AI, and therefore, the

Table 1. Programs and applications used by respondents.

Chat GPT (66)	Google Translate (58)	Grammarly (7)
Snapchat Bot (5)	Copilot (2)	Adobe AI (1)
Photomath (1)	Siri (1)	Gamma (1)



abovementioned answers are collected solely from the sample of 107 (86.99%) respondents. This result shows that the respondents mainly use Artificial Intelligence for translation and proofreading, which indicates its use in language classes.

The information obtained from the open-ended question reveals inconsistency in the use of the possibilities of Artificial Intelligence for school purposes because the vast majority of students are familiar with only language-related AI applications. This result may serve as an encouragement for the adaptation and integration of applications and programs supported by Artificial Intelligence for the purpose of education and therefore improvement of the teaching and learning processes in all subjects.

What should be also noted is that there were no significant differences found between respondents of different genders in any of the analyzed answers.

5. CONCLUSION

The widespread use and application of Artificial Intelligence in all segments of modern life has spurred policymakers, educators, and researchers to investigate the possibilities AI has for improving teaching and learning practices. The role of teachers and learners is crucial in adapting and utilizing AI tools for effective, purposeful, and meaningful teaching and learning. In this study, we investigated what secondary school students know about Artificial Intelligence, which tools they use and for what purpose, and their attitudes toward the use of AI tools in education.

We have concluded that participants of this study, aged 15 – 19 are familiar with the concept of artificial intelligence. When it comes to using artificial intelligence, we also concluded that 109 (88.6%) of the respondents use programs and applications powered by artificial intelligence, and 14 (11.4%) of the respondents have not used such programs and applications.

This study has also found that the most used applications, powered by artificial intelligence, by the participants of this study are Chat GPT and Google Translate and that 81.3 % of the participants use those for educational purposes.

Another finding to emerge from this study is the answer to the question of whether there is a need for the introduction of AI-powered applications and programs to be introduced in educational curriculums for academic purposes. There is a considerably lower percent-

age of positive answers that support the introduction of AI in curricula. This result complies with the findings presented in research in the field [17], [18], [19], [21], [22], [23]. The analysis and comparisons of the answers draw attention to the need for a systematic approach and careful introduction of AI in education. It can be achieved through support provided for teachers through various professional development courses to enhance their better understanding of AI possibilities and challenges.

6. REFERENCES

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