Investigating the use of AI-based Tools among High School Students in the Partium Region. Results of an experimental Micro-research

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Abstract

Education is undergoing a radical shift. Students are embracing Artificial Intelligence (AI) tools that go beyond traditional learning aids. Interaction with AI can enhance learning skills and help students to develop critical thinking, problem-solving, algorithmic thinking, and tech literacy. They also can boost productivity with the help of virtual assistants; manage schedules, organization, and time. This growing trend of AI-powered learning fuels our research. We aim to explore the impact of these tools on education by examining both traditional e-learning technologies and their AI-powered counterparts. This survey lays the groundwork for a larger study investigating how high school students utilize Information and Communication Technology (ICT) tools. Our research targets high school students in the Partium region, namely Bihor and Satu Mare counties, located along the northern Hungarian-Romanian border. This multilingual and religiously diverse region is home primarily to Romanians and Hungarians, with significant Romani populations and smaller Slovak and Swabian communities. This unique mix offers potential for future comparative analyses and a valuable opportunity to explore educational trends. To initiate this exploration, we have conducted by now a micro-survey among students at the theoretical high school in Săcueni, a central town within the region.

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Introduction

In this paper, we use the term e-learning in the sense of education that relies on electronic technology or devices, or is carried out with the help of them. According to the broadest interpretation, this includes all learning activities that take place using some kind of ICT tool. Its use contributes to the development of the knowledge market in such a way that it provides new and additional answers to meet emerging needs.

Relevance of the topic

One of the main sources of the relevance of our topic is the rapid technological development of ICT devices and their ever wider spread, which entails an increasingly radical transformation and complication of the digital ecosystem of the formal school institutional system. (Molnár & Szűts, 2019; Szűts, 2020a; Zakota, 2019) Formal school institutions are increasingly being replaced by virtual environments of open education, as a result of which interactive learning environments and content created by users have become prominent issues in education (Benedek, 2008). Their study is also important because by learning about their use and effects, we can get a more comprehensive picture of the role of e-learning in education.

The general framework

The emergence of new ICT tools, smartphone applications and digital platforms has aroused the curiosity of teachers to use them in education. Although this curiosity has led to many good practices, the question remains whether the continuous and detailed measurements enabled by digital tools really significantly improve educational practice, or whether the appeal of quantitative data obscures the essential aspects, resulting in unnecessary developments and acquisitions. Concepts and experiences related to AI today are extremely mixed and AI-based solutions can be used not only to support and automate teaching and learning algorithms, but also for monitoring and evaluation, for example the evaluation and summation of AI-based knowledge-based tests. (Molnár & Szűts, 2022)

The primary direction in the development of e-learning is learning with the help of large amounts of data and adaptive approaches at any imaginable pace. AI, augmented and virtual reality are among the most sought-after technologies. However, it is important to keep in mind that the wide and rapid spread of these techniques and the opening of new ways of education can only be successful if the institutions concerned (schools, companies, etc.) show sufficient willingness and motivation. Institutions will have no excuse to avoid mobile-friendly, personalized and attractive e-learning content, and although the development of technology brings unstoppable, promising innovations and spectacular developments, it cannot replace learning (Zakota, 2019).

AI tools in education

The impact of AI on education is profound and multifaceted, affecting both teaching and learning processes. In the following, I will list some key areas where the impact of AI can already be considered significant, or at least suggests a significant potential:

- *Personalized learning*: through data analytics, AI systems can offer customized resources, allowing students to focus on areas where they most need improvement.

- *Automated administrative tasks*: AI can handle routine administrative tasks such as grading, scheduling, or managing student records, freeing up time for educators to focus more on teaching and interacting with students.
- *Intelligent Tutoring Systems*: these can provide instant feedback and explanations, helping students understand complex topics at their own pace.
- *Improved accessibility*: AI can make education more accessible to students with disabilities. Tools like speech-to-text, text-to-speech, and AI-driven language translation services help break down barriers for students who face additional challenges in traditional educational environments.
- *Data-driven insights*: AI provides educators with valuable insights into student performance and behaviour through data analysis, and it can predict future learning outcomes based on past performance data.
- *Virtual learning environments*: AI can create immersive and interactive virtual learning environments that use simulations and virtual reality to provide experiential learning opportunities.
- *Continuous learning and professional development*: AI-driven platforms offer educators the opportunity for continuous learning and professional development, by analysing educational trends and emerging needs.

Despite these benefits, integrating AI into education also presents challenges, such as privacy concerns about data collection, the need for significant investment in technology infrastructure, and ensuring equitable access to AI tools for all students. In addition, educators must develop new skills to effectively integrate AI into their teaching practice.

Research antecedents

Our research is considered to be a continuation of a series of researches carried out in recent years among the students of the region, investigating the transformation of e-learning. Related to the topic, there was a research conducted by one of the authors which examined the use of ICT tools and the content generated by students. (Zakota, 2020) Another was conducted by Tímea Ardelean in 2021, the central topic of which was the use of ICT tools in English language learning (Ardelean, 2021). In response to the COVID-19 pandemic's shift to virtual learning environments, we explored the rise of interactive learning and user-created content within education over the past few years (Szűts, 2020; Zakota, 2020a; Zakota & Fogarasi, 2022).

But today, this process has been accompanied by the wide spread of AI tools in education (Molnár & Cserkó, 2022), (Molnár & Szűts, 2022), (Zakota, 2023). There was even a recent research conducted in the region that examined the perception of AI among university students (Ardelean & Veres, 2023). For a broader outlook, we can mention the Hungarian research of Impetus Research (HR Portal, 2024), or the surveys of RAND (Diliberti et al., 2024), ACT (ACT, 2023) or Brainly (Brainly, 2023) in the US.

Methodology

In May 2024, we conducted a micro survey among students at the "Petőfi Sándor" Theoretical High School in Săcueni, a central town within the Partium region. The region consists of two counties along the northern half of the Hungarian-Romanian border, Bihor and Satu Mare. The main argument in favour of the selection of the two counties is that they form a specific region, the unity of which can be traced back to factors that connect the area according to cultural, historical, geographical and economic aspects.

Our purpose was to investigate the impact of AI-based software that has already appeared in school practice and was rapidly gaining momentum. The target group consisted of 32 students, who all completed the questionnaire. They came from two 10th grade classes, one Hungarian and one Romanian. The students completed an online questionnaire under teacher supervision.

To compile the questionnaire itself, we used the LimeSurvey engine, a flexible, reliable and relatively easy to use application. Further on, we used the Excel spreadsheet editor to create descriptive statistics and graphics from the data extracted from LimeSurvey.

Results

In what follows, I present the descriptive statistics based on the answers to the questionnaire. Based on the answers of the students, we can say that they use AI-based applications or services in their everyday life, the majority of respondents (30%) only a few times a week, 13.33% once a day, but 20% even several times a day. Among the respondents, there are also those who use this option only a few times a month (26.67%).

Among the AI-based applications or services used by students, social media algorithms are the most used (90%), followed by streaming platforms (70%), then chatbots (50%), and virtual assistants (46.67%). Among those listed in the questionnaire, the least used AI-based applications or services are online shopping recommendation engines (40%), educational applications or platforms (36.67%), and gaming AI (33.33%).

Almost two-thirds of the respondents (60%) are happy to use AI technologies and only 10% of the students are not concerned about the question. 30% of them use it only when it is unavoidable. There was no respondent who did not consciously use these technologies.

56.67% of respondents have not yet participated in programming or AI-themed activities or courses outside the school curriculum. Those who have already participated in similar activities mostly did so in the field of software/programming (36.67%), hardware/electronics (16.67%), and automation/robotics (10.00%). Only 3.33% of them took part activities related to the MI topic.

When asked whether AI technologies will significantly influence their future studies and careers, most of them answered that they thought it would only to a small extent (40%). Half of them answered that they think it will to a large extent (26.67%) and half of them that they don't know (26.67%). Only 6.67% believed that AI technologies will not affect their future studies and careers at all.

16.67% of respondents are not concerned about the social and economic consequences of AI technologies, such as cessation of occupations or loss of jobs. Most of them (43.33%) are moderately worried, but there are half-and-half people who think about the topic at extremes, i.e. those who are very worried (20%), and those who are not even concerned about this issue (20%).

The proportions of the answers to concerns about the ethical consequences of AI technologies are very similar to those for the previous question. Half of the students are moderately concerned about the ethical consequences of AI technologies, 20% are not even concerned with this issue, 16.67% are very concerned, and 13.33% are not at all concerned.

In the last part of the questionnaire, we examined the students' attitude towards AI tools using a 5-point Likert scale.

When asked whether they have sufficient knowledge of AI tools to solve their school tasks, most of them (60%) answered neutral, followed by the rather agree

(16.67%), and completely agree answers (13.33%). Only 10% of respondents believe that they do not have sufficient knowledge of AI tools to solve their school tasks. Not a single respondent thought that they completely disagreed with the statement, i.e. that they did not have at all adequate knowledge.

Not a single respondent disagreed with the statement that they are completely satisfied with the equipment of their school's AI tool. Similar to the previous statement, in this case too most of them chose the neutral position (40%), but a very large proportion (33.33%) did not agree at all, or rather disagreed (16.67%) with the statement, which indicates that there are overall more people who are not satisfied with their school's AI equipment.

In the case of the responses regarding the readiness of teachers to use AI tools, we can observe that they are very similar to the answers regarding the equipment of the school's AI tools, with slightly different ratios. 56.67% have a neutral position regarding this statement, 23.33% do not agree at all, 16.67% rather disagree and only 3.33% rather agree with the statement.

In the case of the last statement, most students (46.67%) preferred the neutral position. 10% strongly agree with the statement that you can find everything you need to use AI tools on the Internet, but the same proportion strongly disagree, and 23.33% rather agree.

Discussion

Due to the small number of respondents, we did not formulate hypotheses, only some research questions closely related to the topic. These and our conclusions are presented, as follows:

- K1. How do students relate to the use of AI technologies?
  Students use a wide spectrum of AI-based applications and services: social media algorithms, streaming platforms, as well as chatbots and virtual assistants. Online shopping recommendation engines, educational applications or platforms, and games are used less. Almost two thirds of the respondents are happy to use AI technologies and only one tenth of them are not concerned about the question. There was no respondent who did not consciously use these technologies.
- K2. How do students judge the influence of AI technologies on their future studies and careers?
  40% of the surveyed students consider that AI technologies will only slightly influence their future studies and careers. There were an equal proportion of those who answered that they thought they did to a large extent and that they did not know. Not even a tenth of them believed that AI technologies would have no impact on their future studies and careers.
- K3. How do students judge the social and economic consequences of AI technologies (e.g. cessation of occupations, loss of jobs)?
  One sixth of the respondents are not at all concerned about the social and economic consequences of AI technologies, such as cessation of occupations or loss of jobs. Most of them (43.33%) are moderately worried, but there are equal proportions of extreme thinkers on the subject, i.e. those who are very worried (20%) and those who are not concerned about this issue (20%).
- K4. How do students judge the ethical consequences of AI technologies (e.g. biased algorithms, violation of privacy)?
  The proportions of the answers to concerns about the ethical consequences of AI technologies are very similar to the answers indicated for the previous

question. Half of the students are only moderately concerned about the ethical consequences of AI technologies, and a fifth of them are not even concerned with this issue.

- K5. How do students judge the Internet as a source of information needed to use AI tools?
  The Internet is moderately trusted as a source of information about AI devices. 60% of the respondents took a neutral position and almost a third of them prefers or completely accepts the source. Only 10% of them believe that they do not have adequate knowledge of AI tools to solve their school tasks and no respondent thought that they did not have adequate knowledge at all.

Conclusion

Although, due to the questionnaire technique used, specifically the self-reported answers, the results can sometimes be treated with reservations, it is definitely clear that the students have sufficient self-confidence in the use of AI tools. What is missing in their case is a critical approach, which their teachers can help a lot in developing and most of them expect this help.

It seems that the conquest of AI in schools is now unstoppable. Most of the students already use it regularly for information and to solve their assignments. Today, even teachers understand this and even reluctantly accept it, the only problem for them is how to relate to the phenomenon. At the same time, teachers are also starting to incorporate these tools into their toolkits and they are becoming more and more aware of the problems that need to be solved, generated by their technological changes. Many, not only pedagogical, but also technical, ethical, and even existential problems must be solved in the near future, for teachers, administration, parents and students together.

The acquisition of a suitable level and scope of digital literacy should already be realized during the school years, as this is when the attitude that will be decisive in their relationship to the digital space is founded, formed and solidified throughout their lives. And here I am not primarily thinking of technical and technological knowledge, but of the ethical, legal and ecological implications of using AI tools.

It is also important to acquire the appropriate level of digital literacy at school, as it is an essential tool later on, i.e. for university education, as well as adult education at the workplace or even outside of it, in other words lifelong learning.

In our opinion, the results of the research can be used in studies that seek or try to offer solutions to questions raised by new, radically changed situations that both students and teachers have to face now and in the near future. I am thinking of projects that look for alternatives on both the micro and macro level, both short and long term, to deal with radical changes or possible disasters, such as:

- using the results of the research to develop and implement online or mixed education and training programs;
- application of research results in the development of modern teaching materials, e.g. online courses or microlearning materials for companies;
- further training of teachers in the areas of modern ICT device use, Internet use, computer ethics and law;
- further training of parents so that they are on the "common denominator" with their school-aged children at least at the basic level;
- compilation of a package of recommendations for decision-makers to deal with future crisis situations.

The fundamental question is not about how we answer current questions, but about how we prepare to handle unforeseen challenges. On the one hand, we can either

wait and see if someone solves the problems at some point, or we can create a new, dynamic, adaptive way of life that integrates online and direct contact forms.
Projecting these into the field of education, we have to ask ourselves the question of continuing to patch together traditional forms of education or moving forward towards the integration of digital, online forms of education that use AI, since with the help of these we can create a new, much more flexible structure that can react quickly for crisis situations.
Today, it is easy to imagine that rapidly developing areas such as the Internet of Things, robotics and especially artificial intelligence will generate changes in the field of education that we can only imagine and that will make our previous achievements obsolete. Let's not make the same mistake as our predecessors, that is, let's not identify the future of education with some technology. The *ultima ratio* of education lies not in the technology, not in the tools, but it remains what it has always been, that is, the formation of creative individuals with the appropriate knowledge and skills who can integrate effectively into society.

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