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ŠIUOLAIKINIŲ TECHNOLOGIJŲ INTEGRAVIMAS Į UGDYMO PROCESĄ: NAUDA, IŠŠŪKIAI IR RIZIKA

Integration of Cutting-Edge Technological Advancements
into the Educational Process: Benefits, Challenges and Risks

SUMMARY

The ongoing integration of education and technology holds the potential to transform traditional educational paradigms, making learning more accessible, engaging, and tailored to individual needs. Advances in technology have revolutionised the delivery of education, increasing accessibility, personalisation and productivity. At the same time, education serves as a key catalyst for technological progress, equipping individuals with the necessary skills to succeed in an increasingly technology-driven society. Recently, educational institutions have encountered the scenario of students incorporating Chat GPT into their learning methods, a practice that has significant educational benefits. However, it has also introduced certain conflicting elements that could impede the learning process and, to some extent, adversely affect the development of critical thinking skills and the overall mental development of young individuals. The article examines various concerns about the interaction between technology and the educational process, with a particular focus on the impact of a newly introduced AI called ChatGPT in the educational sphere.

SANTRAUKA

Nuolatinė švietimo ir technologijų integracija gali pakeisti tradicines švietimo paradigmas, padaryti mokymąsi prieinamesnį, patrauklesnį ir labiau pritaiktą prie individualių poreikių. Technologijų pažanga sukėlė revoliuciją švietimo paslaugų teikimo srityje, padidindama jų prieinamumą, individualizaciją ir produktyvumą. Be to, švietimas yra pagrindinis technologinės pažangos katalizatorius, suteikiantis žmonėms įgūdžių, reikalingų, norint sėkmingai veikti vis labiau technologijomis besivadovujančioje visuomenėje. Neseniai švietimo įstaigose imta taikyti dirbtinio intelekto įrankį („ChatGPT“). Ši dirbtinio intelekto technologija labai naudinga

RAKTAŽODŽIAI: švietimas, technologijos, ChatGPT, nauda, iššūkiai.

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švietimui. Tačiau taip pat atsirado ir tam tikrų prieštarų elementų, kurie gali trikdyti mokymosi procesą ir tam tikru mastu neigiamai paveikti kritinio mąstymo įgūdžių ugdymą ir bendrą jaunų žmonių švietimo raidą. Straipsnyje nagrinėjami įvairūs klausimai, susiję su technologijų bei ugdymo proceso sąveika. Ypač daug dėmesio skiriama naujai įdiegto dirbtinio intelekto įrankio, vadinamo „ChatGPT“, poveikiui švietimo srityje.

INTRODUCTION

Education and technological advancements are closely intertwined and have a symbiotic relationship. Technological advancements have a significant impact on education, and education, in turn, plays a vital role in fostering and utilizing these advancements. This is a continuous and non-stop process which shapes the prospects of education and offers opportunities for change and innovation, improvement and upgrade in the teaching and learning experience.

Numerous authors have analyzed the relationship between technologies and education. They have provided insights into the impact, challenges, benefits, and potential risks of integrating technology into the educational process.

At the turn of the 21st century an American writer and speaker on education Marc Prensky introduced the term “singularity” which he described as fundamental changes meaning that there was no going back. This so called “singularity”, according to the author, was the arrival and rapid dissemination of digital technology in the last decades of the 20th century (Prensky 2001). Prensky discussed the role of technology in the lives of contemporary students and proposed strategies for effective teaching. The author noted that “today’s students (he calls them Digital Natives) represent the first generations to grow up with this new technology. ... the result of this ubiquitous environment ... is that today’s students think and process infor-

mation fundamentally differently from their predecessors” (Prensky 2001: 2). And this situation, according to the author, invites teachers and educators to reconsider both the content and methodology of teaching, and adapt the materials to the language of Digital Natives.

Larry Cuban, the author of “Teachers and Machines: The Classroom Use of Technology Since 1920” provides a historical perspective on the relationship between teachers and technology, examining how educational technologies have been adopted and used over the years (Cuban 1986). The book approaches learning from a constructivist perspective and relates it to the use of technology for meaningful learning. It focuses on how technology can be used as a thinking tool to enhance the learning process.

Clayton M. Christensen, Michael B. Horn, and Curtis W. Johnson in their work “Disrupting Class: How Disruptive Innovation Will change the Way the World Learns” explore the potential for disruptive innovation in education through technology and suggest principles in which online learning could transform traditional education models. The authors present ideas on how to help students succeed through personalized learning, how to meet the demand for new technologies in student-centered classrooms, how to use disruptive innovation to overcome barriers and help students get ahead in the global marketplace, and more. The authors challenge

the conventional understanding of intelligence and empower educators to re-think their teaching programs (Christensen et al. 2008).

The author of "Education and Technology: Key Issues and Debates" Neil Selwyn explores the complex of interplay between education and technology, addressing such key issues as what the future holds for digital technology and education, what can be learnt from the history of the use of technologies in education, or can technologies replace a teacher, school, or university in the educational process (Selwyn 2021). The author of the book emphasizes that "the use of technology – and in particular the use of digital technology – is an integral aspect of education. Yet, making sense of education and technology is not a straightforward task. ... Like all other technologies, educational technology is linked intrinsically with social, cultural, economic, and political aspects of society" (Selwyn 2021: 20).

Sherry Turkle is another author working on the theme how technology is warping our social lives and our inner ones. In her book "Alone Together" and other works, Sherry Turkle examines the impact of technology on human relationships, including the impact of technology on education. She delves into how digital technologies influence the way students learn and how the interaction between technology and education process unfolds (Turkle 2017).

James Gee explores the educational potential of video games. The author looks at how their design principles can be the basis for effective learning strategies. In his work "What Video Games Have to Teach Us About Learning and Literacy" the author highlights the

learning principles that video games can generate. The author's call is for a change in pedagogy. He identifies the learning principles involved in designing a good videogame and suggests that they be used in the classroom. (Gee 2003).

Cathy N. Davidson believes that a revolution in higher education is urgently needed if our students are to not only survive but thrive in the challenges that lie ahead. In her book "The New Education: How to Revolutionize the University to Prepare Students for a World in Flux" the author considers the need for educational reform and how technology can play a role in creating more innovative and responsive learning settings. Emphasis is placed on the idea that we need a new theory and practice of learning that emphasizes achievement not as test scores, but as the ability to navigate a constantly changing world. (Davidson 2022).

Seymour Papert is known for his works in educational technology and constructionism. His book "Mindstorms: Children, Computers, and Powerful ideas" highlights the benefits of primary and secondary computer education. The author's argument is that computers have completely changed the way we teach our children. The idea is that there is more socialization in the technology-rich classroom and that technology is often a catalyst for greater interaction between pupils and between teachers and pupils (Papert 2020).

The report on digital media and learning delivered by a group of scientists (Henry Jenkins et al.) discusses the role of digital media and participatory culture in shaping modern education. The authors focus on "digital divide" and consider such questions as access to technologies and how to provide all young

people with opportunities to develop the cultural competencies and social skills needed. Fostering these skills, according to the authors, requires a systematic approach to media education where educational institutions, afterschool programs and parents all have their distinctive roles (Henry Jenkins et al. 2009).

The review of research presented above provides a comprehensive landscape of different perspectives on the relationship between technology and education, addressing both the potential benefits and the challenges associated with integrating technology into educational practice.

LINKING EDUCATION TO TECHNOLOGICAL PROGRESS

The link between education and technology is profound. It is constantly evolving and shaping the way we teach and learn. It represents a transformative change in the way knowledge is communicated and acquired. This ongoing evolution promises to create more effective learning environments that prepare learners to meet the challenges and opportunities of the modern age. The rapid digitalisation of the education system and the development of artificial intelligence (AI) also pose many challenges and demands on existing and future educators, who need to continuously learn and develop in order not to lose their spiritual connection with their students and, at the same time, to find themselves in the realities of a world in constant flux (Danilevicius 2023). With the continuous development of technological advances to enhance the educational process, educators are faced with the responsibility of adapting pedagogical approaches, keeping abreast of evolving tools, and fostering a dynamic learning environment that effectively integrates these innovations to meet the diverse needs of students. The ways in which education and technological advancements are interconnected include:

Access to information. Technology, especially the Internet, has revolu-

tionized access to information. Education has become more accessible and affordable as students can now access a vast array of educational content, research materials and online courses from around the world.

Personalized learning. Technology helps to tailor the educational process to individual needs. This allows learners to progress at their own pace and level.

Distance learning. The Covid-19 pandemic highlighted the importance of technology in enabling remote and online learning. Virtual classrooms, video conferencing and collaboration tools became essential in times of social distance.

Blended learning. Many educational institutions are adopting a blended learning approach, combining traditional face-to-face teaching with online resources and tools. This approach provides flexibility and enhances the learning experience.

Other options include:

Data analytics. Institutions and educators can use data analytics to track student performance, identify areas for improvement, and make data-driven decisions to improve educational outcomes.

Global collaboration. Technology facilitates global collaboration between students and researchers. Virtual international collaborations and joint research projects are easier than ever, fostering a more connected and globalized education landscape.

Research and innovation: Education is a key driver of technological innovation. Universities and research institutions play a critical role in advancing technology through research and development.

Digital literacy: As technology becomes more integral to daily life, digital literacy is a fundamental skill. Educational institutions play a key role in teaching students how to use technology effectively, ethically, and safely.

Virtual reality and Augmented reality. These technologies are increasingly being incorporated into education to create immersive and interactive learning experiences. They simulate real-world scenarios, and their use promotes the understanding in different science subjects and vocational training.

Gamification. Educational games can make the learning process more enjoyable and motivating. The elements such as competitions and rewards can benefit in faster learning and skill development.

The interconnection between education and technologies is more than a mere integration of tools. It is a transformative force that empowers learners with unprecedented access to information, personalized and collaborative opportunities. Technology has transformed the ways how education is delivered, making it more accessible, personalized, and productive. Education, on the other hand, is a primary driver of technologi-

cal innovation and equips individuals with the skills they need to do well in an increasingly tech-driven world. Technology and education, the two domains that have shaped the new landscape for the development of knowledge, continues to redefine traditional paradigms, ushering in an era of dynamic learning, innovation, and global connectivity.

Technological advancements in education offer a wide range of benefits, but they also come with certain risks and challenges. Understanding the risks and challenges related to technological advancements in education is crucial since awareness of potential risks allows educational institutions and educators to make informed decisions when implementing new technologies. It helps to assess whether the benefits outweigh the potential risks.

Several reasons can be identified that may bring concerns associated with the risks brought using technologies. They include:

Digital divide. Not all students have equal access to technology and the internet, creating disparities in educational opportunities. This can foster inequality among students.

Privacy and security. Concerns about data privacy and security arise when students' personal information and online activity are collected and stored by educational institutions and technology providers.

Information overload. The abundance of online information can be overwhelming, and students may struggle to discern reliable sources from misinformation.

Tech addiction: Some students may become addicted to digital devices and online content, leading to distractions and reduced productivity.

Some more risks can involve loss of human interaction, screen time and health, ethical concerns. Overreliance on technology can reduce face-to-face interaction and negatively impact social and emotional development. The failure to keep balance between screen-based learning and physical well-being can lead to health issues, and ethical issues can raise ethical questions, such as surveillance, data ownership, etc.

It is important for educational institutions to have clear policies and strategies in place to harness technological advances and mitigate risks. Understanding the risks and challenges associated with technological advances in education is essential for making informed decisions, safeguarding student welfare, promoting equity and ensuring that technology is used responsibly to enhance the overall educational experience.

CHATGPT

Educational institutions have recently been faced with the situation of students using Chat GPT in their learning process, which is highly beneficial in an educational way, but it has also brought together a few contradictory aspects that may hinder the learning process and, in some ways, may have unfavourable impact on the development of critical thinking in young people and their mental development in general.

Let's first briefly define what ChatGPT is. In November 2022, San Francisco-based artificial intelligence lab "OpenAI" released an AI chatbot – ChatGPT. It has been designed to understand and generate human-like text based on the input it receives. People have put the chatbot to all kinds of creative uses, including writing articles and emails, designing websites, and many other ways. However, concerns have arisen about potentially unacceptable aspects related to the use of this application in educational settings: students started to cheat on tests and other assignments. This has raised questions about the authenticity of the work produced by students since students could misuse ChatGPT to gen-

erate content for assignments, essays, or exams, leading to issues of plagiarism and academic dishonesty.

However, ChatGPT has brought many positive moments to the education sector, including homework assistance and learning support. This AI can provide students with explanations and guidance on various topics, enhancing their understanding and complementing classroom learning. ChatGPT can be used as a creative tool to brainstorm ideas, generate story prompts or assist in the creative writing process. Students can use ChatGPT to access information on a wide range of topics. This can be useful for getting overviews, definitions or explanations when students need quick access to information. Interacting with ChatGPT can help students develop digital communication skills, including formulating clear questions, understanding the context of a conversation and receiving coherent answers. Educators can harness the positive aspects of ChatGPT by thoughtfully integrating it into the curriculum, providing guidelines for responsible use, and encouraging students to use the tool as a complement to their overall learning experience.

This means that ChatGPT is a helpful tool in the educational process in several ways, however, its effectiveness depends on the ways it is used and integrated into the learning experience. Here are some ways distinguished by researchers in which ChatGPT can be beneficial:

Information and Explanation: ChatGPT can provide explanations and information on a wide range of topics. Students can ask questions and get answers quickly, making it a valuable resource for clarifying concepts and understanding difficult subjects.

Homework and Assignment Help: It can assist students with homework, assignments, and research by providing insights, suggestions, and relevant information.

Practice and Testing: ChatGPT can generate practice questions and quizzes to help students test their knowledge and skills. It can also provide feedback on answers to reinforce learning.

Brainstorming and Idea Generation: Students can use ChatGPT to brainstorm ideas for essays, projects, or creative endeavors, helping them kickstart their thought process.

Tutoring and Personalized Learning: Some educational platforms use AI chatbots like ChatGPT to offer personalized tutoring, adapting to the learner's pace and style, and addressing their specific needs.

Access to Information: It provides access to a vast amount of information, helping students stay up to date with the latest research and developments in their field (Baidoo-Anu et al. 2023)

Although ChatGPT was launched just a year ago, there already have appeared

comprehensive studies on the use of ChatGPT in educational background. Researchers agree that ChatGPT has the potential to serve as a useful and beneficial assistant to the tutors in educational institutions (e.g., to generate course materials and provide suggestions) and a virtual tutor for students (e.g., to answer questions and facilitate collaboration) (Lo 2023). Simultaneously, researchers identify challenges associated with using Chat GPT. For instance, Mhlanga points out that educators experience concerns regarding the use of ChatGPT in education. Due to the lack of verification with authoritative sources and any validated knowledge base, the model can answer very detailed and serious questions that are completely meaningless without assessing if they are realistic. The model may also make errors in reasoning, and draw incorrect conclusions, although the text looks coherent and convincing. The model can generate very realistic fake articles, for example, it can cite real people and non-existent papers for confirmation (Mhlanga 2023).

At the same time, these researchers point out that it is important to use ChatGPT as a supplementary tool and not as a replacement for traditional teaching methods and human interaction. They say that students should be encouraged to think critically and check the information they get from ChatGPT. It isn't flawless and can sometimes give incorrect or out-of-date information. They also point out that interacting with ChatGPT does not provide the same social and emotional learning experiences as face-to-face interactions. An important issue for researchers is over-reliance. There's a risk of over-reliance on ChatGPT, which could

lead to a lack of independent problem-solving skills. Researchers emphasise that ChatGPT should be used as a tool to complement learning, not to replace it.

In summary, ChatGPT can be a valuable addition to the educational process,

but it should be used thoughtfully and in conjunction with other educational resources and methods. They can enhance learning, but they cannot replace the guidance and social interaction that are vital components of a complete education.

IN CONCLUSION

The relationship between education and technology is dynamic and transformative. It is constantly reshaping traditional learning paradigms, fostering innovation, and paving the way for greater accessibility, collaboration, and personalised educational experiences. ChatGPT has become a valuable tool in educational settings. It can promote interactive learning, provide additional support for students in different subjects, encourage creativity in both students and teachers, and

develop their conversational skills. Educators can strategically integrate ChatGPT into the curriculum, offer guidance on its responsible utilization, and motivate students to use the tool as a supplementary component in learning activities. Educators and institutions need to guide students in the conscientious and ethical use of ChatGPT, emphasising the importance of critical thinking, maintaining academic integrity, and the responsible integration of technology into the learning experience.

References

- Baidoo-Anu, D.; Owusu Ansah, L. (2023). Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning. Internet access: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4337484 (accessed 2023 09 11).
- Christensen, M. Clayton et al. 2008. *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*. McGraw Hill Education.
- Cuban, Larry. 1986. *Teachers and Machines: The Classroom of Technology Since 1920*. Teachers College Press.
- Danilevičius, E. (2023). Mokytojo pašaukimas – atsakas į šiuolaikinius kultūrinis globalizmo iššūkius (The Vocation of the Teacher – A Response to Contemporary Cultural Challenges of Globalism). *Logos-Vilnius* 116, p. 68–76. <https://doi.org/10.24101/logos.2023.51>
- Davidson, C. N. (2022). *The New Education: How to Revolutionize the University to Prepare Students for a World in Flux*. Basic Books.
- Gee, James Paul. 2003. *What Video Games Have to Teach Us About Learning and Literacy*. Macmillan.
- Jenkins, H. (2009). *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*. The MIT Press.
- Lo, Chung Kwan. (2023). What is the Impact of ChatGPT on Education? A Rapid Review of the Literature. Internet access: <https://www.mdpi.com/2227-7102/13/4/410> (accessed 2023 09 11).
- Mhlanga, D. (2023). Open AI in Education, the Responsible and Ethical Use of ChatGPT Towards Lifelong Learning. Internet access: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4354422 (accessed 2023-09-11).
- Papert, S. (2020). *Mindstorms: Children, Computers, and Powerful Ideas*. Basic Books.
- Prensky, Marc. 2001. *Digital Natives. Digital Immigrants*. MCB University Press, Vol 9. No 5. Internet access: <https://marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf> (accessed 2023-09-11).
- Selwyn, Neil. 2022. *Education and Technology – Key Issues and Debates*. Bloomsbury Academic.
- Turkle, Sherry. 2017. *Alone Together*. Basic Books.