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Challenges Posed by Artificial Intelligence to the Learning Habits of Vocational Secondary School Students

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Annotation. This article is devoted to identifying and improving models for the use of artificial intelligence in the learning process of vocational school students. Research shows that vocational school students often use artificial intelligence, but not to create new knowledge or improve the educational process, but rather to search for answers. Based on the results of the study, the conclusions provide an overview of specific measures that can be taken to improve digital skills using AI.

Keywords: *artificial intelligence, AI tools, digital competence, learning process, student learning habits.*

Introduction

Among the key preconditions to regard education as an ecosystem – particularly considering the rapid development and proliferation of information and communication technologies – is developing digital skills within both teaching and learning contexts. Digital skills, perceived as the synergy of knowledge, abilities, attitudes, and competencies, become indispensable for orientation within the contemporary educational space. Parallel to this, the embedding of AI and focused AI tools use does indeed play a determinant role in improving the learning outcomes of students. In its turn, the concept of digital competence presents serious challenges within the learning process, especially with regards to students' ability for critical analysis of information, problem-solving, effective collaboration, and adaptation within dynamic life conditions. These competencies belong to a broad area of so-called transversal skills: those that go beyond academic performances and affect students throughout their lives, their employability, social inclusion, and adaptability in general. The school system keeps developing, with increasingly wider inclusions of technology within pedagogical practice and a search for approaches aimed at personalization of learning. In this regard, AI serves as an empowering resource, allowing for the capability of adaptive learning platforms tailored to meet individual students needs.

The present pedagogical situation requires the development of student's digital competence, which in turn provides the obtaining of key life skills and fosters long-term innovation, creating added value. AI has become a highly impactful element in the learning process, opening up new opportunities both for educators and learners. From personalized instruction and administrative support to interactive tools for learning and data analytics that improve educational quality, its impact is multifunctional. Given the importance of AI and digitization issues in education, the objective of this research is to discuss the development of vocational school students' learning habits related to the use of AI tools. To cover this objective, the authors combine different research methods. A systematic review of the scientific literature was conducted by analysing scholarly publications available in open databases (Web of Science, ResearchGate, Scopus, Google Scholar) for theoretical insights. In all, 21 publications from the period of 2009–2025 were reviewed and assessed for their compliance with the selection criteria, which included relevance to the keywords "digital competence", "learning process", "artificial intelligence", "AI tools", "student learning habits", citation count, and open access. The paper also presents the results of the content analysis of the vocational education regulatory framework in the context of AI and a case study, the survey of students in vocational schools.

The Use of Artificial Intelligence Technologies in the Learning Process of Vocational Secondary School Students

Artificial intelligence is a field of computer science focused on creating systems that can perform tasks based on human intelligence and knowledge. AI tasks include problem solving, decision making, obtaining knowledge, planning, language comprehension, and even creativity. AI is supported by algorithms enabling machines to analyse data, identify patterns, and make decisions, often with minimal human intervention. AI is increasingly used in education in several ways, helping students to acquire additional knowledge, develop their skills and abilities, as well as carrying out assessment and evaluation of learning. For example, systems like "Gradescope" use AI algorithms to evaluate student work, identifying grammatical errors or even shortcomings in argumentation. In turn, the program Duolingo uses AI to adapt learning content according to the progress of each person. Another important application of AI in educational institutions is the analysis of student performance and identification of at-risk groups. It allows such systems to predict which student may not understand a particular topic, for example, due to missing a class, which enables educators to intervene at an early stage.

AI integration in education faces challenges as well, for example, when inaccurate data or incorrect information is input into AI systems. Inaccuracies can create different types of risks because issues of data confidentiality demand strict regulation and oversight. However, if AI is applied correctly, it has the potential to transform the learning process into a more personalized and effective one. On the other hand, the so-called digital skills needed today mean much more than just the use of technologies; these are basic competencies that allow people to be fully included in contemporary life. These skills include the ability to work with digital tools, assess information, solve problems, work in a team, and adapt to changes. These competencies form the foundation not only of professional development but also of social involvement and personal growth. The OECD Digital Economy Outlook 2024 stresses the general trend of a lack of AI-related digital skills in Europe, which is reflected in Latvia as well.

Digital skills are just part of digital competence, which as seen in Figure 1 encompasses a number of areas:

- Information and communication technologies, to be able to use computers, internet platforms, and software.
- Data literacy – the ability to understand, analyse, and interpret data; for example, using a tool such as Excel.
- Critical thinking and information verification involve the ability to recognize fraudulent information and consider the reliability of sources.

- Cybersecurity-Data protection knowledge, maintenance of privacy, safe usage of the internet.
- Programming and coding skills in at least one programming language and algorithm development (Carretero et. al., 2022).

Figure 1

Relationship Between Digital Skills and Other Areas of Digital Competence (Created by the Author)
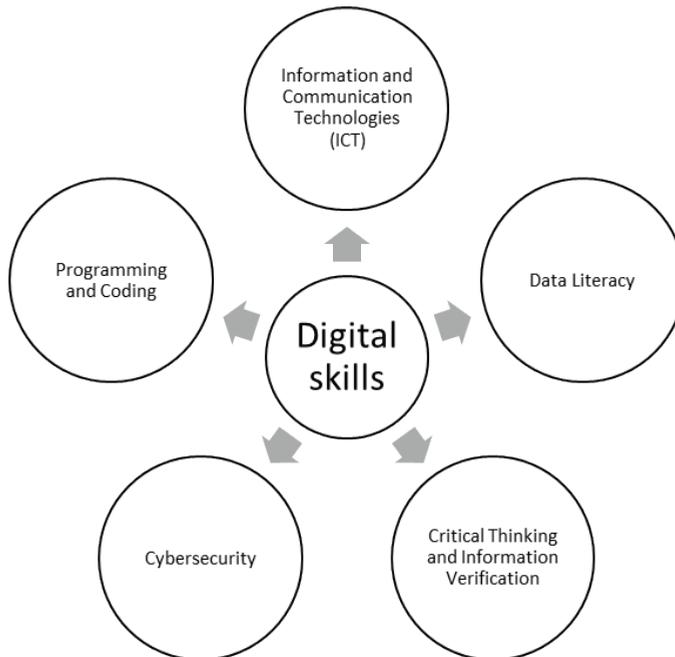
According to the European Commission, digital competence is one of the eight key competences for lifelong learning. The Digital Competence Framework for Citizens (Vuorikari et. al., 2022) outlines the following five competence areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem solving, that include a variety of skills, knowledge and attitudes related to AI.

Artificial intelligence plays an important role in the development of digital skills; understanding how AI works has meanwhile become an essential element of today's education. AI is increasingly becoming a significant resource for digital skills, including digital competence development, which presents new opportunities in both individual learning and school-wide educational processes. For example:

Programming learning with AI, tools like "Copilot" or "Replit" use AI to speed up the process of code autocompletion, suggesting solutions, and quality checking (Smit et al., 2024).

Data Analysis and Visualization: AI helps students to analyse complex datasets and visualize them graphically, information more understandable.

Critical thinking and information verification: AI could help to spot misinformation and could train students to evaluate sources much more effectively.

Cybersecurity training: AI is helping students understand the mechanisms of cyberattacks and develop security skills.

Despite these advantages, developing digital skills with AI also faces problems. Educational systems are not ready to actively integrate AI tools into the learning process. There is a lack not only of technological resources but also of teacher training in using AI tools. Without sufficient professional preparation, AI tools might remain ineffective or even obstruct the learning process (Selwyn, 2019). One of the largest problems is the digital divide, as not all students have equal opportunities for access to internet connectivity, computers, or other technologies. Such a situation can enhance existing social and economic inequalities because students who have more resources receive more significant benefits in developing digital skills. Another big problem is excessive reliance on AI tools; this leads to the decline of critical thinking and self-sufficiency. A young person who gets accustomed to treating AI as an "authoritative source" may lose the ability to analyse information independently, which constitutes a threat to long-term learning capacity. Moreover, many AI tools collect extensive volumes of personal data, including information on age, gender, learning habits, and other sensitive details. There is a risk of data leaks or the use of such data without the user's knowledge (Khreisat et al., 2024). Children's and young people's data constitute especially sensitive information that requires strict regulation and protection. AI systems can also generate inaccurate, biased, or even false information (Bender et al., 2021). Students, especially younger ones, might unknowingly accept this content as true, which inhibits the development of factual knowledge and understanding.

Education systems across the world are facing new challenges caused by rapid technological advances, and the society of today demands the development of digital skills. AI is increasingly being included in educational processes, offering new models of education based on personalization, data analysis, and adaptive learning content. Traditional education models are linear: uniform curriculum, fixed pace of learning, and standardized assessment. Such an approach gives standardization but often does not consider individual needs in the learning process (Selwyn, 2019). With evolving educational needs, existing models are undergoing refinement, while new models are emerging with the use of AI tools.

Three new education models have captured worldwide attention:

- Exemplar of Personalization model: At present, in both the US and the UK, educational models based on personalized learning are widely used. For example, AltSchool in the US uses sensors and algorithms that analyse, in real time, the

behaviour and performance of a student. This data is used to develop lesson plans and activities to individual needs (Williamson, 2021).

- Adaptive learning models: Platforms such as Knewton, Smart Sparrow, and ALEKS have been adopting adaptive algorithms to regulate learning content based on the students' understanding. This framework allows students to advance through content at a speed while getting instant feedback. Knowledge level of a student. This model allows students to go through material at their own pace while receiving immediate feedback (Holmes et al., 2022).
- Hybrid and remote learning model: Numerous countries moved to either hybrid or fully remote learning due to the COVID-19 pandemic. AI apps were developed to track attendance, analyse learning outcomes, and distribute tasks automatically (Zawacki-Richter et al., 2019).

In the last two years, generative AI tools like ChatGPT, Gemini, and Copilot have become widespread. These tools not only analyse data to identify patterns but also generate original content. There is significant scientific debate about the impact of generative AI on learning habits. Research accentuates concerns about the quality of AI-generated content (Mulyani et al., 2025) and about ethical and privacy issues with a focus on plagiarism (Mulyani et al., 2025; Gasaymeh et al., 2025; Fowlin et al., 2025).

These issues, however, are often neglected by students because the content seems to be easily available or accessible. Some studies indicate that students may develop dependency on the use of AI technology to perform their assignments and work (Mulyani et al., 2025; Fowlin et al., 2025). AI also influences teachers negatively regarding some necessary digital competencies and modifications to the teaching process, particularly when the teacher asks for homework and assignment completion.

The Use of Artificial Intelligence in the Latvian Education System

In Latvia, the use of AI in the education system is at an early stage, both positive and negative trends can be distinguished, since successful integration requires not only a new approach in developing digital skills but also state support. AI usage in the education system is limited and is not widespread. Most of the educational institutions use digital learning platforms; however, these platforms do not have wide functionality of AI. In national strategic documents – Science, Technology Development and Innovation Guidelines 2021–2027 (Ministru kabinets, 2020), education digitalization and the development of digital skills are planned, but AI is not indicated as a priority, which testifies to the lack of specific policy. Some schools, on their own initiative, are trying to introduce students to the basics of AI within the framework of programming

clubs, robotics, and STEM programs, which in many cases are driven by the initiatives of teachers themselves.

Latvia is on the path to strengthening digital education: computer science is a compulsory subject, but programming and data analysis skills are only partially developed. AI concepts have not been included in national curriculum standards yet; students themselves make active use of the wide range of AI tools available in the public domain in their learning process and seek ways to make this process easier.

Educational institutions have a lot of problems with the implementation of AI, as it is being gradually integrated into the present system and learning process:

- Diversified student learning needs: These needs vary at each level of education. The students in primary schools need a general introduction to the development of digital skills. Students in vocational schools need to practice using AI tools in their specific field. Students in school need AI tools to be harnessed for further improvement of the learning process (Zawacki-Richter et al., 2019).
- Limited resources and support for personalized learning: Implementing AI-driven learning platforms in Latvia could be challenging considering the high costs and technological demands.
- Lack of student motivation: Some of the students do not have any intention to learn something new (Chen et al., 2020).
- Increased administrative burden on teachers: AI can increase the administrative burden on teachers (Luckin et al., 2016).

Despite these limitations, Latvia is gradually advancing toward a more digitally inclusive education system. However, a clear national strategy is needed to ensure the effective, equitable, and ethical use of AI in both general and vocational education.

Methodology

The empirical study aimed to investigate students' attitudes regarding the use of AI in the learning process, including its prevalence, frequency of use, trust, concerns, and the need to acquire more knowledge about AI. The empirical survey was carried out in February – March 2025 at two Latvian vocational secondary education institutions by applying a quantitative survey method complemented by qualitative data analysis. Correspondingly, following a mixed-methods approach, a sequential transformative design was applied (Creswell, 2009). The quantitative survey was conducted among 111 students of vocational schools as a way to estimate the level of digital skills and the application of AI in the learning process. The survey data provided merely a general view of the prevalence of these skills, whereas document analysis helped to understand how these skills were actually used and what the quality of such use was. Interpreting both sources together allowed gaining a more nuanced understanding of the problem under investigation.

Data Collection

An anonymous questionnaire was developed, comprising 15 closed and open-ended questions, covering several groups of aspects of the study:

- familiarity and frequency of use of AI tools;
- perceptions of AI's positive and negative impacts on learning;
- self-assessment of knowledge and skills related to AI willingness to learn about AI at school.

Data were collected through an online survey using the Google Forms platform, which guaranteed the protection of respondents' anonymity and data security. The sample consisted of 111 students from two Latvian vocational schools (in business-oriented study programs). The sample is diverse in age and field of studies. The participation was volunteer and random, based on the principle of free will and an informed consent declaration. The respondents were vocational secondary school students aged between 16 and 19 years. In total, questionnaires were sent to 198 students, representing 39% of all students studying in the related programs at these institutions. Of the ones invited, 56% completed the questionnaire.

Data Analysis

Descriptive statistical methods were used to analyse the quantitative data, showing how often students use AI and what their attitudes toward AI in learning are. Responses to open-ended questions were analysed qualitatively using thematic content analysis to identify recurring concerns, motivations, and usage patterns.

Despite offering useful insights, the study had several limitations (Creswell, 2009):

- The sample size was relatively small (n = 111);
- The geographic and demographic scope was limited (only two institutions involved);
- A potential response bias exists, as students who actively use AI may have been more willing to participate.

Nonetheless, this study provides an important initial exploration of vocational students' perspectives on AI in education and can serve as a basis for more extensive future research into the pedagogical and ethical effects of AI integration.

Analysis of Results

The data received from the survey, conducted in two Latvian vocational secondary education institutions, were analysed to explore students' attitudes and behaviour regarding the use of artificial intelligence (AI) in the learning process. Participation was voluntary and anonymous, ensuring the reliability and ethical results. Several concerning trends emerged from the data, suggesting students use AI mainly for practical and narrow tasks rather than deeper learning purposes. A total of 111 students took part in the survey, separated by gender and age group (see Table 1). Notably, female

students were more active in completing the survey, which may indicate a greater interest or engagement with the topic among this demographic group.

Table 1
Distribution of Students by Gender and Age, n = 111

Age of student	Male gender (pcs.)	Female gender (pcs.)
16 years old	23	15
17 years old	17	11
18 years old	16	10
19 years old	11	8

The students were asked 15 questions. Summarizing the results of this study, the authors conclude that students use AI to enhance their learning process in Latvia, as well as globally. According to the survey, the most widely used AI tool among students is ChatGPT out of the 23 different AI tools provided by the authors (see Table 2).

Table 2
TOP 5 Most Known AI Tools Among Surveyed Students, n = 111

| MI tool name	Number of respondents(pcs.)	Number of respondents (%)
ChatGPT	105	94.6%
Google Bard	18	16.2%
Grammarly	44	39.6%
Duolingo	44	36.6%
DeepSeek	2	1.8%

Analysing the data, only 11.7% of the respondents have never used AI for generating creative ideas, whereas 44.5% use it frequently, this points toward the widespread use of AI among students. One of the main questions asked by the authors was: "What are your concerns or questions about using AI at school?" Students described how the use of AI could decrease their knowledge and level of education, perhaps with negative effects on their future development and career possibilities. Consequently, it is perceived that students consider the avenues through which AI can be utilized for malicious intent in the learning process. In the long run, malicious use of AI will bring irreversible effects in the educational process and will reduce the level of education not only for the students themselves but for society in general. To the same extent, too frequent and unjustified use of AI tools results in excessive dependence on AI and may reduce the capability for independent analysis and problem-solving. These data show that 55% of the respondents believe that using AI reduces their need to think by

themselves, and only 26.1% viewed AI as a positive aid for implementing creative ideas. Another problem with the use of AI in Latvian educational institutions is incomplete data security, which may result in discriminatory and biased information, and even fabricated and false information.

AI is one of the fastest-developing technologies today, and students should be willing to acquire additional knowledge about AI in schools. However, the survey results denote that only 27.9% of respondents consider acquiring additional knowledge about AI at school to be very important. The reason for this result is that AI is not discussed in Latvian schools; 70 respondents said that in their educational institution, AI is mentioned rarely or not at all. Nonetheless, the students' desire to learn about AI is considerable (see Figure 2).

Figure 2
Students' Desire to Learn More About Artificial Intelligence (n = 111)
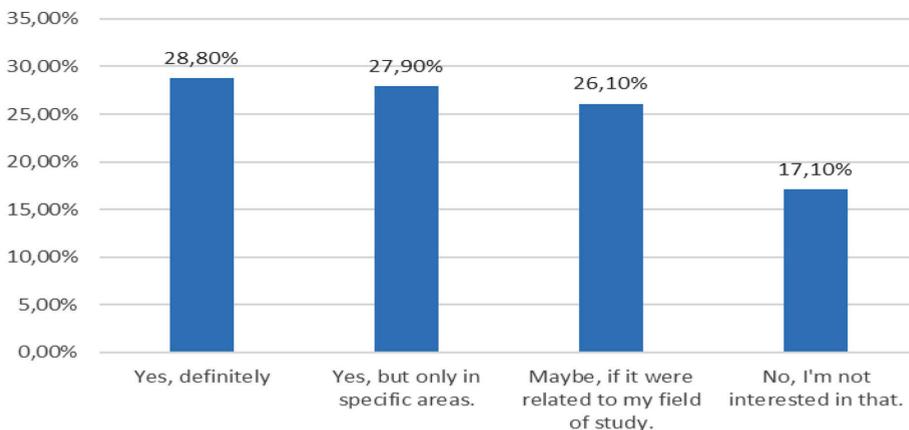
Additional curriculum subjects and trained teachers are required to put AI use into practice in Latvian schools, whose willingness to teach something new outweighs the desire to deny the necessity of technological advancement and improvement of digital skills.

Discussion

The results of this study allow concluding that students actively use AI; however, the Latvian education system is not yet fully prepared for integration of this technology into the learning process. The findings indicate that AI use among students is widespread, however, the education system is not yet fully ready to integrate this technology into teaching. Almost all the responding students are familiar with ChatGPT, the most

popular AI tool, and have used it for generating ideas, preparing presentations, and searching for information (Chen et al., 2020). This corresponds to the results of international studies that confirm young people actively use available digital tools while optimizing their learning, even in cases when such practice is not officially supported within the school environment (Zawacki-Richter et al., 2019).

However, learners are also conscious of the perils of AI use. For instance, survey data indicate the greater part of students think that AI use decreases their own need to think, and only a minor portion view AI as a means for enhancing creativity. This suggests a potential risk where irresponsible use of AI could worsen critical thinking skills along with academic integrity. Bender et al. (2021) and Selwyn (2019) present similar concerns. Other studies highlight similar issues regarding the need for education and guidance, as without those, AI could increase dependence on technology instead of developing problem-solving abilities (Luckin et al., 2016).

In contrast, the data reveal that students show interest in learning more about AI, however, schools rarely discuss or mention this topic. This situation points out failures in educational policy and a lack of structural positioning to include AI literacy within the national education standards (Holmes et al., 2022). If used correctly, AI becomes an excellent tool for personalized learning, giving students greater individual support and matching the learning content to every one of them (Williamson, 2021). This demands the relevant infrastructure and teachers who are ready for this challenge, which is now only in its infancy in Latvia (Livingstone et al., 2021).

Ethical and safety aspects are also of great concern; the possibility was mentioned that AI may provide responses that are incorrect, biased, or even false. This problem is confirmed by other research warning about content which seems credible but actually is wrong (Bender et al., 2021; Khreisat et al., 2024). Therefore, it is not enough to develop a technologically advanced educational environment; students need to strengthen their media literacy and digital competence.

Finally, the study shows that students themselves are motivated to use AI and want to better understand it, yet the education system currently responds only slowly to this trend. For the sustainable and safe implementation of AI in education, the following would be necessary:

- The curriculum should include the basics of AI literacy,
- provide professional development for teachers,
- develop clear rules and methodological guidelines,
- Encourage critical and responsible use of AI (Khreisat et al., 2024; Ouyang et al., 2024).

Conclusion

The use of AI by students is widespread: the data show that almost all students (n = 111) are aware of at least one of the AI tools, most of them being ChatGPT, which the students use for various learning and self-educational purposes.

Students use AI in a very practical and easily accessible way when it comes to their studies for idea generation, presentation preparation, and finding information on unclear topics to build their understanding. This testifies to the student's ability to use technology to enhance their education and hence shows the presence of a digital competence.

At the same time, educational institutions are not yet fully prepared to introduce AI as an integrated component of the learning process. This is explained by the limited digital infrastructure and teachers' insufficient knowledge in the AI domain, which hinder targeted daily use in education.

AI has the potential for personalization of learning processes, which can make education not only more effective but also more tailored to the needs of each student. The technology will enable students to study at an individual pace and receive individual support.

Students are aware of the disadvantages and risks of AI use, such as a decline in the quality of knowledge, problems of academic integrity, and possible negative consequences for future development and careers. Such awareness provides evidence of students' ability to reflectively assess technology use, but the aspect of creativity is perceived ambivalently: Some students believe that AI suppresses their own expressiveness, while others see it as a tool that enhances creativity. This polarization indicates that it is necessary to develop the media literacy and digital competence of students.

The topic of AI in schools is discussed insufficiently, or most often only in the context of prohibitions, which describes a pressing requirement for educational institutions to reflect on this topic in a structured and information-rich way. Students themselves point out that they want to know how to use AI safely, effectively, and responsibly.

Acknowledgement

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Skaitmeninių įgūdžių tobulinimas naudojant dirbtinį intelektą mokymo procese

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Santrauka

Šiame tyrime nagrinėjami Latvijos profesinių mokyklų mokinių mokymosi įpročiai naudojant dirbtinį intelektą (DI). Šio empirinio tyrimo tikslas – ištirti studentų požiūrį į dirbtinio intelekto naudojimą mokymosi procese, taip pat DI paplitimą, naudojimo dažnumą, pasitikėjimą juo, susirūpinimą ir poreikį įgyti daugiau žinių apie dirbtinį intelektą.

Straipsnyje nagrinėjamos problemos, su kuriomis susiduria tiek mokiniai, tiek mokytojai naudodami dirbtinio intelektą mokymosi procese. Taip pat aptariami dabartiniai mokinių įpročiai naudojant dirbtinį intelektą, ieškoma atsakymų į klausimus, kokie yra mokinių norai dirbtinio intelekto naudojimui ateityje ir kas būtų reikalinga, kad būtų pagerintas ir integruotas dirbtinis intelektas Latvijos profesinių mokyklų mokymo procese. Siekdami tyrimo tikslo, autoriai naudojo tyrimo metodų derinį: pateikė sistemingą mokslinės literatūros apžvalgą, peržiūrėjo atviras duomenų bazes, atliko profesinio švietimo reguliavimo sistemos turinio analizę DI kontekste ir atvejo tyrimą, kuris apima profesinėse vidurinėse mokyklose atliktą mokinių apklausą. Atlikus tyrimą daroma išvada, kad mokiniai naudoja DI kaip praktinę ir patogią pagalbą mokantis, ypač generuodami idėjas, rengdami pristatymus ir ieškodami informacijos apie neaiškias temas, kad jas geriau suprastų. Tai rodo mokinių gebėjimą naudoti technologijas savo išsilavinimui gerinti ir įgyti skaitmeninių kompetencijų. Vis dėlto švietimo įstaigos dar nėra visiškai pasirengusios įdiegti DI kaip integruotą mokymo proceso dalį. Tai galima paaiškinti ribota skaitmenine infrastruktūra ir mokytojų nepakankamomis DI žiniomis, kurios trukdo tikslingai taikyti DI kasdieniame ugdyme.

Esminiai žodžiai: *dirbtinis intelektas, DI įrankiai, mokymosi procesas, skaitmeninis raštingumas, mokinių mokymosi įpročiai.*