NEW UKRAINIAN SCHOOL: AI IMPLEMENTATION IN EDUCATION

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Summary

The New Ukrainian School reform aims to modernize education. This article explores the potential of Artificial Intelligence (AI) to enhance this initiative. It discusses ways to integrate artificial intelligence into the Ukrainian education system to modernize learning and teaching processes. It highlights key reforms of the Ukrainian New School and presents initiatives such as personalized learning tools, automated assessment systems to improve student performance and optimize teachers' workload. The article also highlights the role of technology and discusses the issues of gradation of AI use in the classroom. Successful AI implementation requires careful planning, collaboration, and a focus on student needs. The article emphasizes the importance of embracing AI responsibly to create a more equitable and effective education system for all Ukrainian students. The authors present the features of the current state of Ukrainian education and the ways of its development. This approach reflects Ukraine's commitment to creating a progressive, inclusive and technology-oriented educational environment.

Key words: NUS, Artificial Intelligence, student-centered approach, competency-based approach, innovative education.

DOI https://doi.org/10.23856/6714

1. Introduction

Modernizing education through innovation is a cornerstone of preparing learners for success in a rapidly evolving world. The integration of innovative approaches and technologies into educational systems is not merely an option but a necessity to meet the demands of the 21st century. Modern education systems must equip students to tackle global issues such as climate change, digital transformation, and social inequities. Innovative education methods emphasize critical thinking, creativity, and problem-solving that are skills essential for addressing these complex challenges.

The main purpose of the article is to explore the ways with the help of which artificial intelligence could be implemented into the new Ukrainian education system highlighting the educational reform, the roles of modern AI technologies and finally presenting the overall vision of New Ukrainian School.

The New Ukrainian School is a key reform of the Ministry of Education and Science. The main goal is to create a school where it will be pleasant to study and which will give students not only knowledge, as is the case now, but also the ability to apply it in everyday life.

The changes envisaged by the reform of the NUS and set out in the Concept of Reforming Secondary Education concerned the content of education and teaching methods,

the organization of the educational process and school management, ensuring the quality of education and the secondary education management system as a whole.

Today's students are digital natives, growing up in a world of smartphones, social media, and instant access to information. Traditional methods may fail to engage them effectively. Incorporating technology like AI, virtual reality, and gamified learning into education bridges the gap between conventional teaching methods and the expectations of tech-savvy learners.

Innovation in education can break down barriers to learning. Technologies like AI can provide personalized learning experiences for students with diverse needs, including those with disabilities or from underserved communities. By ensuring all students have access to quality education, innovation helps create a more inclusive society. Innovation doesn't just benefit students but also empowers teachers. Tools like AI-powered analytics, digital assessment platforms, and virtual classrooms reduce administrative burdens and enable educators to focus on fostering meaningful connections with students.

The Ministry of Education and Science of Ukraine, together with the Ministry of Digital Transformation of Ukraine, have completed work on developing instructional and methodological recommendations for the implementation and use of artificial intelligence technologies in general secondary education institutions. These recommendations are based on current international practices *(Ministerstvo osvity i nauky Ukrainy, 2024)*. The purpose of the recommendations is to disseminate principles and approaches to the responsible use of AI systems in general secondary education. First of all, this concerns respect for human rights, professional ethical standards, raising teachers' awareness of possible risks and challenges in order to critically, effectively and ethically interact with AI systems and use their potential.

2. The New Ukrainian School: A brief overview of the educational reform

The reform of NUS is designed to last for years, because it is impossible to quickly change the educational tradition that has been nourished in Ukraine for decades. However, changes have already begun, and the Ministry of Education and Science is doing everything to ensure that they are inevitable *(Nova ukrainska shkola, 2024).*

The list of competencies that students will acquire is already set out in the Law on Education. It was created taking into account the Recommendation of the European Parliament and of the Council of Europe on the development of key competencies for lifelong learning (dated 18.12.2006):

– fluency in the state language;
– ability to communicate in the native (if different from the state) and foreign languages;
– mathematical competence;
– competence in the field of natural sciences, engineering and technology;
– innovation;
– environmental competence;
– information and communication competence;
– lifelong learning;
– civic and social competencies related to the ideas of democracy, justice, equality, human rights, well-being and a healthy lifestyle, with an awareness of equal rights and opportunities;
– cultural competence;
– entrepreneurship and financial literacy *(Nova ukrainska shkola,, 2018)*.

The National Doctrine of Education Development defines the organic combination of education and science, the development of distance education as one of the priority areas of state policy for the development of education; the introduction of educational innovations; the creation of an industry of modern means of teaching and education; and also defines the role of education as the driving force for the development of civil society, namely, the focus of state policy on activating the participation of parents in the educational and upbringing activities of educational institutions. Innovative technologies make it possible, on the one hand, to show students “the world as a whole,” overcoming the disciplinary fragmentation of scientific knowledge, and on the other hand, to use the study time saved as a result of this for the full implementation of specialized differentiation in education.

The New Ukrainian School (NUS) framework represents a forward-looking reform aimed at transforming education in Ukraine to align with modern societal needs. One of the most promising avenues for achieving this transformation is through the integration of Artificial Intelligence (AI) into the educational ecosystem. AI has the potential to enhance learning outcomes, empower teachers, and prepare students for a technology-driven future. The purpose of this article is to explore the need for AI implementation within NUS.

The modernization of contemporary education in Ukraine has several directions, with the implementation of a student-centered approach to learning being one of the most crucial. The concept of "student-centered learning" aims to ensure the maximum professional development of students and their successful employment. The focus is put on the learner, emphasizing their needs, interests, and active participation in the learning process. This approach shifts away from traditional teacher-centered instruction when a teacher acts as a facilitator or guide rather than a sole source of knowledge and priority is given to engagement, critical thinking, and personalized education. *(Ishchenko, 2023)*.

The key aspects of student-centered learning are personalized learning, autonomy of studies, teamwork, collaboration and soft skills development. In student-centered learning students are encouraged to take ownership of their learning through discussions, projects, and hands-on activities. They have to work in teams to reach their personal goals, so peer learning and collaborative problem-solving are of greatest importance. It also promotes a classroom environment where students learn from each other and contribute to group success.

Another benefit of such an approach is relative autonomy of studies. Students are provided with choices in what and how they learn, fostering motivation and engagement. But they definitely should not forget about curricula and deadlines of the academic year. So, the idea of autonomy lies in fostering self-directed learning and decision-making when students set goals, make decisions, and take responsibility for their learning process.

Furthermore, this approach leads to critical thinking and problem-solving tasks development. It suggests cultivating thinking skills like analysis, evaluation, and creation when students tackle real-world problems.

To create a maximally comfortable learning environment, higher education students are offered opportunities for academic mobility, allowing them to study at various universities across Europe and the world and engage in experience exchange. An equally important factor is the impact of the variable components of higher education standards, including the updating of course content to reflect the list of general and professional competencies and learning outcomes, which are the key categories of student-centered learning.

Student-centered learning approach is closely connected with competency-based approach that has been thoroughly examined in the works of S. Sharov. This approach involves the use of two fundamental concepts: competence and competency, which are logically and substantively interconnected. *(Sharov, 2018: 195)*.

3. The Role of Technology in Modern Education

In the 21st century, information technology is rapidly penetrating all spheres of human life, and education is no exception. The use of computers, the Internet and other digital tools opens up new learning opportunities, making it more effective, interesting and accessible on the one hand. And on the other hand, they encourage discussions between teachers and parents about how to avoid losing the content of education by paying excessive attention to the form.

Artificial Intelligence (AI) is being applied into the educational process through specific applications that transform both teaching and learning. One prominent example is the use of intelligent tutoring systems, such as Carnegie Learning's MATHia, which offers personalized math instruction to students by assessing their responses in real time. The software not only provides hints and explanations when students struggle but also adjusts the difficulty of problems based on each learner's progress. This targeted approach helps reinforce concepts at an individualized pace, ensuring students gain a deeper understanding of the subject matter.

Another example is the deployment of AI-powered chatbots in educational institutions to assist with administrative support. For instance, Ukraine is closely looking at Georgia State University's experience of introducing "Pounce," a virtual assistant that helps incoming students navigate the enrollment process by answering questions about deadlines, financial aid, and course registration. Pounce significantly reduced the summer melt (students who accept offers of admission but do not enroll) by providing timely responses and nudging students to complete essential tasks, demonstrating how AI can support student retention.

Quite popular among Ukrainian students and young learners is learning platforms such as Duolingo that uses AI where algorithms analyze users' language proficiency levels and adapt the difficulty of lessons to match their learning pace. The platform uses AI to detect common mistakes and provide customized practice sessions, ensuring learners focus on their weak areas. Furthermore, AI's role extends to language assessment, as systems like Pearson's Versant test evaluate spoken language proficiency by analyzing pronunciation, fluency, and grammar with high accuracy.

In addition, AI-driven tools are improving accessibility for students with special needs. Tools like Microsoft's Immersive Reader use natural language processing to convert text into audio, change font sizes, or highlight important sections, helping students with dyslexia or visual impairments. Similarly, platforms such as Voiceitt, which employs AI to recognize non-standard speech patterns, allow individuals with speech disabilities to communicate more effectively.

These examples illustrate how AI is not just enhancing the efficiency of educational processes but also fundamentally changing how learning is delivered, making education more adaptive, accessible, and inclusive.

Ukraine is actively exploring the potential of artificial intelligence (AI) in education. Wide range of AI resources that both educators and students have at their disposal are actively integrated into STEM and STEAM lessons *(Nikitina, Ishchenko, 2023)*.

Although its adoption level remains moderate, government initiatives, international aid, and private projects are driving progress in this area. Ukraine belongs in the category of countries with medium AI adoption, alongside India, Brazil, Chile, and Mexico. Ukraine employs AI to support distance education, especially in the context of ongoing conflict. Emphasis is placed on adaptive platforms that help compensate for the loss of access to traditional educational institutions. Key challenges include insufficient digital infrastructure in some regions and limited funding.

4. The Vision of the New Ukrainian School

The Ministry of Education and Science recommends applying AI to any actions used by teachers and students, other employees in the field of education, in particular:

1) When teaching students subjects (integrated courses), it is recommended to integrate AI into the preparation and delivery of lessons, as well as into extracurricular activities of children. Using large language models, text chatbots, and generative AI systems, teachers can generate calendar plans, lesson plans, knowledge maps, teaching materials, audio materials, interactive presentations and content for them, task texts, mathematical tasks (adapted to specific topics, along with solutions), personalized curricula that meet the individual needs of each student, rubrics for analyzing learning obstacles, difficulties, interests, and needs of students, etc.

2) In partnership interactions with participants in the educational process, namely with parents and students.

3) In organizing a safe and healthy educational environment, namely, supporting inclusiveness and individual needs of students;

4) In managing educational activities, namely monitoring and analyzing student progress, supporting administrative decision-making.

5) For continuous professional development: advanced training, lifelong learning, etc. *(Draft of Recommendations, 2024)*

However, responsible use of artificial intelligence (AI) systems in general secondary education requires adherence to a number of principles that promote fair, ethical, safe and productive use of these technologies.

The project assumes that educational institutions, within the framework of their own autonomy, have the opportunity to choose specific digital educational platforms, online services and tools based on AI systems for use in the educational process.

It is necessary to ensure that they comply with the requirements of current legislation on the protection of personal data of participants in the educational process in the digital and educational environment. It is also necessary to take into account the need to create conditions for ensuring the full participation of persons with special educational needs in the educational process.

Teaching staff independently determine the feasibility of using online services and tools based on AI, select the forms, methods and means of conducting a specific lesson. Such actions of teaching staff do not require additional coordination or approval.

At the level of the educational institution, it is necessary to develop its own policies for the use of AI-based systems or update current regulations in accordance with the requirements of academic integrity, ensuring the protection of personal data, equal access to the Internet and information and communication technologies (ICT).

NUS recommends activities for students based on age restrictions for using services based on artificial intelligence. For students of different ages, various learning activities can be offered that will prepare them for critical, responsible, creative use of artificial intelligence. Primary, middle and high schools use AI as part of the tasks they carry out.

We would especially like to note that the Project offers 4 levels of implementation of AI tools for completing educational tasks. Level 0 tasks prohibit the use of AI. Violation of the requirement is considered a manifestation of academic impiety. While Level 4 tasks widely use AI with human oversight. AI tools can be used at various stages of the work. At the same time, AI should be a "co-pilot" to enhance human creativity, not to replace it completely. The user is responsible for ensuring human oversight and evaluation of AI-generated content.

AI can be used in a wide range of lessons across various subjects, enhancing engagement, providing personalized learning, and supporting teachers with data-driven insights. AI could be perfectly incorporated within STEM disciplines as well as mathematics, chemistry, physics, biology as a single unit that are commonly known in Ukraine as natural subjects. In STEM AI could serve as a bridge that brings together and describes specific aspects that could be taught in various subjects.

Here are some key examples of lessons where AI can be especially beneficial.

Mathematics is often considered a foundational discipline, it provides the tools and frameworks for understanding and modeling phenomena in natural sciences and beyond. AI-powered platforms like Khan Academy and Mathway offer personalized practice problems and step-by-step guidance based on students' performance levels. AI tools can help students understand their mistakes immediately, providing hints or explanations to guide them toward the correct solution. Thus, Ai can be used as an Adaptive Learning and Problem-Solving tool.

Science or commonly known in Ukraine as physics, chemistry and biology subjects. These lessons give a wide field for laboratory testing, simulations and experiments and AI allows students to conduct them virtually e.g. exploring chemical reactions or physics principles, which might be too costly or dangerous in a physical lab. In biology or environmental science, AI tools can analyze real-world datasets, helping students learn to interpret data patterns, a skill valuable for scientific research.

As for geography discipline concerns, AI could suggest augmented reality with the help of which students can interact with AI-driven maps that provide real-time data about geographical features, climate zones, climate change, deforestation, or weather patterns and human impacts on the environment. Interactive maps can be of great interest too.

Could we use AI tools at Humanitarian lessons? Yes, definitely. Languages and literature, history and social studies, art and music and even physical education lessons could include lots of AI tools and platforms. AI-driven language tools like Duolingo and Grammarly, Memrise and Rosetta Stone use adaptive learning algorithms and provide a wide choice of tasks from listening to writing, from lexical chunks training to translation tasks. Additionally, AI chatbots can simulate conversational practice for language learners. What can AI suggest for History lessons? Virtual Reality (VR) Tours of historical sites, certainly. AI-powered VR applications allow students to virtually "visit" historical sites or experience historical simulations, offering an immersive learning experience. It will be a wonderful idea to unite some aspects in STEAM lessons by multiplying the outcomes with the help of AI tools and platforms *(Nikitina, Ishchenko,2022).*

Thus, integrating AI into these lessons makes learning more interactive, personalized, and engaging, encouraging students to become active participants in the learning process.

AI is gradually immersed not only into the teaching process but also into administrative ones. Its application in administrative processes allows to optimize the work of educational institutions, increase the efficiency of management and improve the quality of educational services. Among the benefits of using it, the authorities highlight time management, minimizing the risk of human error in data processing, optimizing processes allows you to achieve better results with lower resource costs.

But the main challenges for Ukrainian managers of all levels are still lack of funding or corruption, unwillingness to change, bureaucracy etc.

The integration of AI in the education sector faces other minor challenges, such as including insufficient infrastructure and inadequate teacher training. Privacy and data protection for students are also significant issues, as AI systems often involve collecting and processing large amounts of data *(Pedró, 2019)*.

Teaching teachers to use artificial intelligence (AI) platforms is fraught with risks and challenges, especially when it comes to teaching foreign languages. Among the most burning challenges are: lack of technical skills and training, dependence on automation, technical failures and limitations, possibility of student alienation.

Despite these challenges, the prospects for AI in Ukrainian education remain optimistic. AI supports adaptive and personalized learning, automates routine tasks, and promotes critical thinking and digital literacy among students and teachers. According to experts, further development of AI in Ukrainian education will depend on continued government support, infrastructure investments, and teacher upskilling efforts *(Derzhstat Ukrainy, 2022)*.

5. Conclusions

AI implementation into Ukrainian education demonstrates a gradual progression from initial efforts in higher education to present-day initiatives in secondary education and nationwide digital literacy programs developed by the Ministry of Education and Science of Ukraine. Today, Ukraine is actively developing the infrastructure necessary to integrate AI into the learning process, aligning with global trends in digital transformation. The key aspects of this long-lasting process have been discussed in the article. Much attention has been given to the role that AI technology shows on the educational environment of New Ukrainian School. The authors have had an attempt to present the vision of transformation of NUS as well as the great role that AI has on re-shaping Ukrainian education to meet the requirements of present-day reality. Meanwhile, it was necessary to point out some challenges in this sphere. Much is still to be done but given the positive results achieved so far, as well as the growth potential, continued AI integration in Ukraine's education system can be expected which will further prepare future generations for the demands of the digital era.

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