IRSHAD Uzbek Journal of Law and Digital Policy | Volume: 3, Issue: 1
2025

# Reforming Traditional Modern Education in the Context of the Projected Symbiotic Economy

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## Abstract

This article analyzes the problems and various restrictive methods of traditional models of the educational system. It considers the potential of digital education and technologies in cyberspace to reform this system and prepare students for the digital era. This article discusses various approaches to innovative aspects, including augmented reality, digital reality, virtual reality, artificial intelligence, and creative platforms based on machine learning. In addition, various educational technologies are given, including legal LegalTech and STEM technologies that can be used in both social sciences and humanities. In addition, an analysis is made of how education is being reformed in different countries, and recommendations are given on how cyber education can improve the teaching activities of the teaching staff. A summary is made of how traditional and innovative methods can work in synergy to solve joint problems in the future.

**Keywords:** Cyber Education, Education Reform, Artificial Intelligence, Digital Skills, Innovations

**APA Citation:**

Gulyamov, S. (2025). Reforming Traditional Modern Education in the Context of the Projected Symbiotic Economy. *Uzbek Journal of Law and Digital Policy, 3*(1), 57–73. https://doi.org/10.59022/ujldp.295

## I. Introduction

To begin with, it is worth noting that modern education has a number of limitations that will have to be overcome in the near future. Despite the fact that digitalization and globalization are growing all over the world, there are still problems that have been crossing the current modern generation since the 20th century (Prensky, 2001). This includes the fact that the lack of knowledge, technological infrastructure and other problems do not allow the development and implementation of information tools in higher and secondary education.

This article provides a comprehensive analysis of the problems and limitations existing in the traditional education model, and also proposes innovative approaches that, based on artificial intelligence, innovative modern platforms and other methods and processes, can develop the education system using methods such as EdTech, LegalTech and much more (Bates, 2015). In the end, recommendations are given on how to conduct synergy between traditional and digital education in order to solve problems together in the future.

The relevance of integrating modern technologies in education is greater than ever. The World Economic Forum report, which was called "On the Future of Jobs", noted that in 2025-2030, the most important skills will be creativity and development of critical thinking. The paradigm of working with artificial intelligence is changing both the labor market and the education market, and therefore it is necessary to adjust and adapt to the conditions of the fourth industrial revolution (Schwab, 2016).

Education in a digital environment is aimed at transforming the current system by developing skills that will allow the use of all modern technologies, including infrastructural interaction with elements and programs of augmented, digital, virtual reality, work with big data and information analysis, mobile platforms and other technological tools that will be integrated in the near future in all developed and developing countries.

Digital education, which is transforming education today, allows us to develop these skills. For example, artificial intelligence helps us understand how to approach each individual student in a personalized manner; EdTech technology makes it possible to use various innovative tools that are already being actively used in the study of social and humanitarian disciplines in the European Union, Japan, South Korea and other countries. Recent statistical reports show that the context for the dissemination of these technologies is greater than ever.

The main goals and objectives of this article include the analysis of the problems and limitations of traditional models, the assessment of new opportunities in the context of studying modern technologies, the illustration of the capabilities of modern applications, as well as the study of world experience and its adaptation in the context of implementation in developing countries. In addition, the purpose of the study is to consider the issue of developing teachers' competencies in the context of

interaction with information tools and the preparation of recommendations for the implementation and introduction of a new approach in the context of traditional education.

## II. Methodology

The methodology of this study was literature review and analysis. We analyzed the latest scientific advances and studies by examining scientometric databases using keywords from journal scientific articles. The literature we reviewed showed that pioneering institutions around the world have illustrated that the application of artificial intelligence and other technological tools within educational institutions can improve student performance and demonstrate the benefits of educational technology today. In addition, we analyzed various regulations around the world and realized that developing and developed countries in Europe, North America, and other regions are gradually adapting policies to transition to digital education.

In addition, we studied the main trends, analyzed statistics and came to the conclusion that the synthesis of various concepts of these technologies allows us to form a unified approach to hybrid education, where there is a place for the implementation of both time-tested technologies, based on traditional views, and models of the modern world that allow us to reform the education system at both higher and secondary levels, including the implementation and introduction of work with artificial intelligence, virtual and augmented reality and other tools.

The methodology also included an extensive analysis of academic databases, including EBSCO, ERIC, JSTOR, and Elsevier, to collect the latest books, reports, and journal articles on EdTech and education reform. These databases allowed us to understand the main trends and key areas of work of key researchers and best practitioners from all over the world. Taking the empirical views and observations of these leaders of the innovation industry, we tried to form a new vector that, taking into account all their recommendations, can build an innovative view on reforming the traditional education system.

## III. Results

Moving on to the results section, first of all, it can be emphasized that at the first stage we analyzed the problems and limitations of what shortcomings exist in the traditional education model. Despite the fact that the 21st century dictates new conditions and tries to show in every way that a digital transformation of educational tools is necessary, there are still methods that do not correspond to the technological age (Selwyn, 2016). For example, there is a lack of student engagement due to mechanical and routine tasks, the way of thinking that some teachers try to instill does not fit the paradigm of using digital devices, meanwhile, the technological infrastructure of many educational institutions also does not correspond to the modernized approach adopted in developed countries (Beetham & Sharpe, 2013). All

this suggests that it is necessary to take a comprehensive approach to solving these problems and issues.

Let us consider the main interrelated problems. Firstly, it is the lack of a personalized approach. When working with students and pupils, it becomes clear that each person is unique, and an individual approach is necessary for each of us, so instructors and teachers must develop such programs that can meet the needs of each student, and so that each enrolled student can gain knowledge and his academic performance is at a good level (Huang et al., 2019). The next problem is that student motivation remains low. It is very important to emphasize that self-discipline and self-education are extremely important conditions for the effective development of a student. Therefore, it is extremely important to interest him and provide him with such information that will be relevant and aimed at practical benefits (Ryan & Deci, 2000).

As scientist Bral analyzed in his work, it is necessary to add active learning activities, stimulate and encourage students for implementation and independent searches and research of technological aspects and methodological points (Bral & Cunningham, 2016). In addition, in his work, he notes that it is necessary to develop critical thinking in students, which will be aimed at applying in practice, not trusting only one source and triangulating data when working on them.

The third problem is the standardized approach. Unlike the personalized approach, it seeks to teach the topics that are set in the plan in a documented manner. However, such a fast period of time as today suggests that it is necessary to adjust and adapt to reality day by day. For example, no one expected that such advanced models of generative artificial intelligence and large language models would be released that would be able to talk to a person at the same level and even be able to pass the Turing test (Bral & Cunningham, 2016).

The next problem is very outdated teaching methods. For example, as shown by the work of scientist Schleicher, which he wrote in 2015, passive learning and outdated tools do not allow to adapt to the realities of the time, which suggests that the field of educational technologies in such conditions will stop developing, and people accustomed to clip thinking and digital devices will simply stop paying attention to these aspects of their lives (Schleicher, 2015). The last problem that was studied in this study is that the context of the real world and the educational program do not match.

This suggests that the facts and material that are presented in the programs can be divorced from real time, and the practical application of the knowledge gained in practice does not seem possible to students. Therefore, students who receive abstract knowledge and do not understand how to apply it in the future will not be able to show real interest. Therefore, it is extremely important to approach the trends and potential of technologies that can eliminate all of the above shortcomings. This will be discussed in the following sections of this article.

Having analyzed the shortcomings and main challenges faced by the educational system around the world, we came to the conclusion that it is necessary, first of all, to develop new skills and competencies in the digital age. The fourth industrial revolution already indicates that the automation of routine work, the increase in demand for non-routine skills and mechanisms, as well as the shifted economic paradigm towards digital development, indicate that it is necessary to develop creative and critical skills of human thinking that can ensure high-quality training of specialists and the provision of jobs in the long term. Therefore, educational systems must correspond to this paradigm shift (Turing, 1950). The global initiatives that we analyzed as part of the literature review showed that there are urgent priorities for development.

The first priority we looked at is the development of digital literacy and digital device skills. This includes computational thinking in order to logically distribute problems and build correct algorithms. As the work of modern researcher Poe showed in 2012, it is necessary to take a comprehensive approach to reforming traditional education and reduce the gap in skills and competencies between generations.

The next priority area, which we have identified as extremely important, is adaptive thinking. The rapid development of digital technologies in the 21st century suggests that it is necessary to develop metacognitive skills that could be suitable for most areas (Poe, 2012). Factual knowledge that can be applied programmatically should be replaced by such competencies that can, with the help of self-reflective and other approaches, adapt a person to the digital era, because almost every area is already connected to technology in one way or another. The third priority is to develop interdisciplinary and synthesizing abilities. It is no longer enough to be just a lawyer, a doctor or a teacher (Fadel et al., 2015). One must also be a professional in the use of digital devices, and digital education with skills and a hybrid approach will help to expand the boundaries of traditional boundaries, increasing user capabilities.

The fourth priority is the development of social and emotional abilities. Emotional intelligence is extremely important in the modern period, since competence and skills in working with people are very important in order to establish communication, build a dialogue, and with the development of empathy, compassion, responsibility and understanding of what the atmosphere is in the company, it will be much easier for a person to advance in his career and understand why it is possible to build empathic and ethical relationships and a system of trust in an organization (Deakin Crick et al., 2015).

In addition, analytical capabilities are also very important, so you can constantly study new material, develop as a person and do not forget to pay attention to creativity. All this will help develop skills and competencies at the academic, technical, cognitive and socio-emotional level, which will allow you to become flexible and become a specialist who can approach digitalization issues without fear (Kereluik et al., 2013).

Now let's look at innovative tools and their potential in education. The tools of the fourth industrial revolution have great potential to transform education and the entire system. By integrating these tools, the education process can become exciting and interesting. First, it's worth talking about artificial intelligence, which is the basis of everything that is done in the digital space. This includes adaptive learning, intelligent learning systems, automated assessment, personalized approach, predictive analytics and much more. Platforms like Civitas Learning use AI to advise teachers, advise on building plans for students and are generally suitable for most educational institutions (Goleman, 1995).

In addition to artificial intelligence technology, there are virtual and augmented reality technologies. For example, virtual tours and museums allow using such technologies to visit all famous institutions, historical sites and areas where works of art are collected, and admire these creations remotely (Robinson & Aronica, 2015). Next is augmented reality and multimedia tools, books, games, which, with the help of special plugins, allow you to set up a system and analytics of big data. The enthusiasm of students in order to identify new approaches within the education system helps to build a cyclical system of work with the curriculum in order to improve the skills and results of completing the course. Algorithmic learning and analysis of discussion forums allow using such technologies to develop creative skills and competencies of students (Russell & Norvig, 2020). With the help of pragmatic analytics technologies, students can not only improve their learning, but also better understand where to direct their skills after completing the training, that is, where to find themselves in the professional field.

The next branch of technology is mobile platforms and devices that can accommodate simultaneous use by a large number of people. These include social learning through crowdsourcing, microlearning through large amounts of content, informal education, massive open courses, and more. Platforms such as Coursera and EdX partner with leading universities to offer open access courses and offer other tools that may be useful to both faculty and students (Dunleavy & Dede, 2014).

And the following technologies are related to the cyber-physical layer and interaction system. They allow the creation of Internet of Things classes, smart campuses. For example, Amazon Web Services promotes IoT innovation in university labs [26], Laval University has a fully integrated smart campus, and Singapore's SUTD Maker Lab combines the physical and digital worlds in engineering into a single space. Logistical support can ensure inclusive technology for all students, including opportunities for people with disabilities and other vulnerable groups (Siemens, 2005).

In addition to technologies aimed at general educational purposes, there are also technologies that can transform and expand the potential of existing projects in higher and secondary education. For example, with the help of educational application technology, it is possible to design various courses, interactive teaching staff includes

the use of natural language processing, provides individual user support and helps to understand how students can better cope with certain tasks. For example, research by Cognitive Tutor has shown that the use of AI tutors and other AI tools in the educational process increases the average student's academic performance by about 20-40% (Fig. 1).

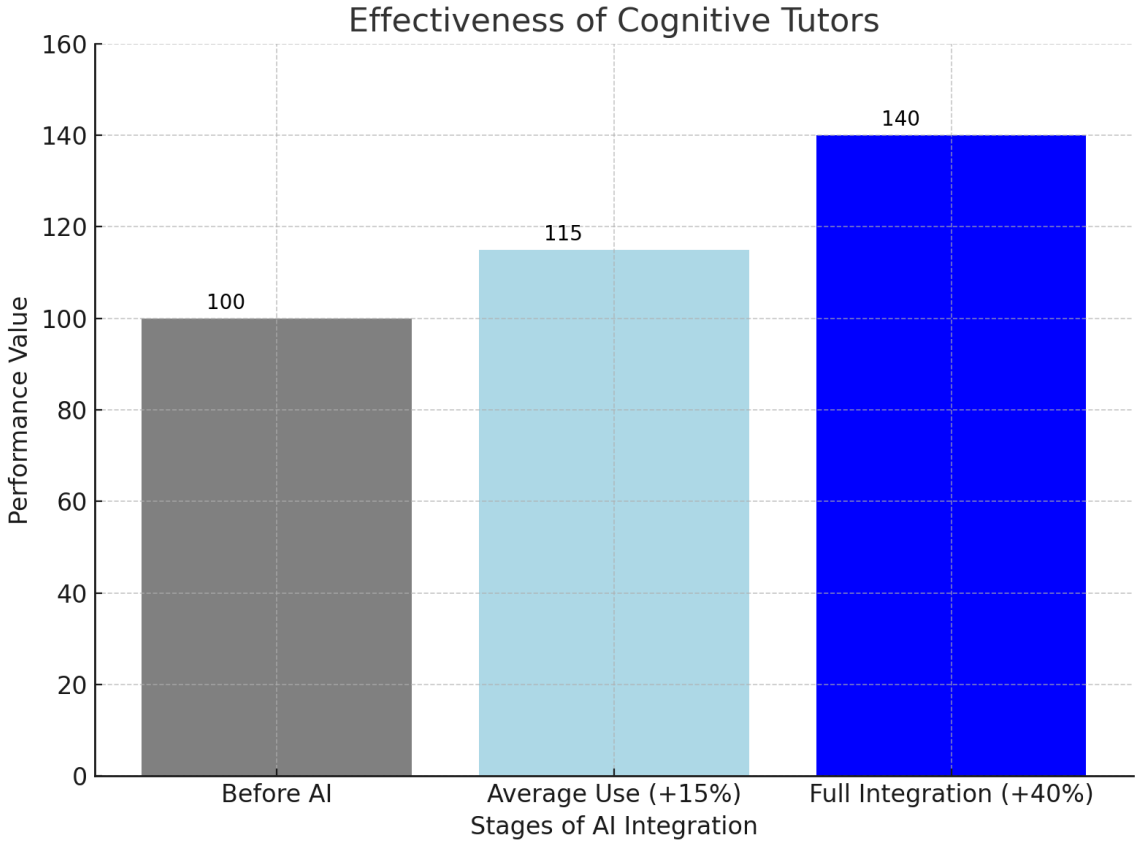

**Figure 1**

Beyond the obvious direct benefits to students, there are also tools that can be extremely useful to educators. For example, generative tools and large language models can help organize and summarize work plans, analyze recommendations for improving existing courses, and help solve routine problems in professional activities (Koedinger & Corbett, 2006). Adaptive learning platforms use data analysis to customize instruction.

AI also plays an important role in personalizing the approach. Thus, Knewton adaptive courses help to better approach each student in a personalized manner and provide recommendations on where to go next. Carnegie Learning found that the most effective implementations are the use of AI tutoring for both personalized and group education (Brown et al., 2020). At the same time, these technologies should not become the only ones and replace the teacher, they should only automate routine tasks, improve the productivity and academic performance of students in the educational process, and help motivate students and develop self-discipline and a desire to learn in them.

Continuing with the topic of how technology and systems can tackle mundane tasks, MetaMetrics, for example, has developed an AI reading tutor, Lexile, that adjusts text difficulty and questions in real time based on readers' demonstrated comprehension (Pane et al., 2015). Working with over 30,000 students, Lexile students increased their reading comprehension by an average of 1.7 years after using the tutor for just 28–35 hours. Another tool, developed by Georgia State University, is an AI-powered tool that can analyze a course's curriculum and content and, based on the results, modify aspects of a module to best suit future courses, taking into account new technology developments and the challenges that both students and teachers may face in previous courses.

And the next tool that can develop and help students' activities in their educational activities are intelligent writing tutors. These include tools for automatic writing assessment, checking for grammatical errors in the text, and training in writing essays, compositions, and dictations. The innovative Project Essay Grade offers all these benefits in the context of writing development through special practice based on management characteristics and special exercises that can reduce the gap in grammar and punctuation among students (Mostow et al., 2013). Research from schools using another innovative tool, WriteToLearn, has shown that intelligent assistants can develop motivation among students and help them improve their academic performance (Shermis & Burstein, 2013).

This is not limited to the social sciences and humanities. For example, in mathematics, there is a tool called ST Math that uses engaging puzzle games that visually represent mathematical concepts using levels and supports. The puzzles adaptively respond to the student's persistence, solving problems at an optimal level of

difficulty. Schools using the program report an increase in mathematics knowledge of 15–50% (Figure 2).

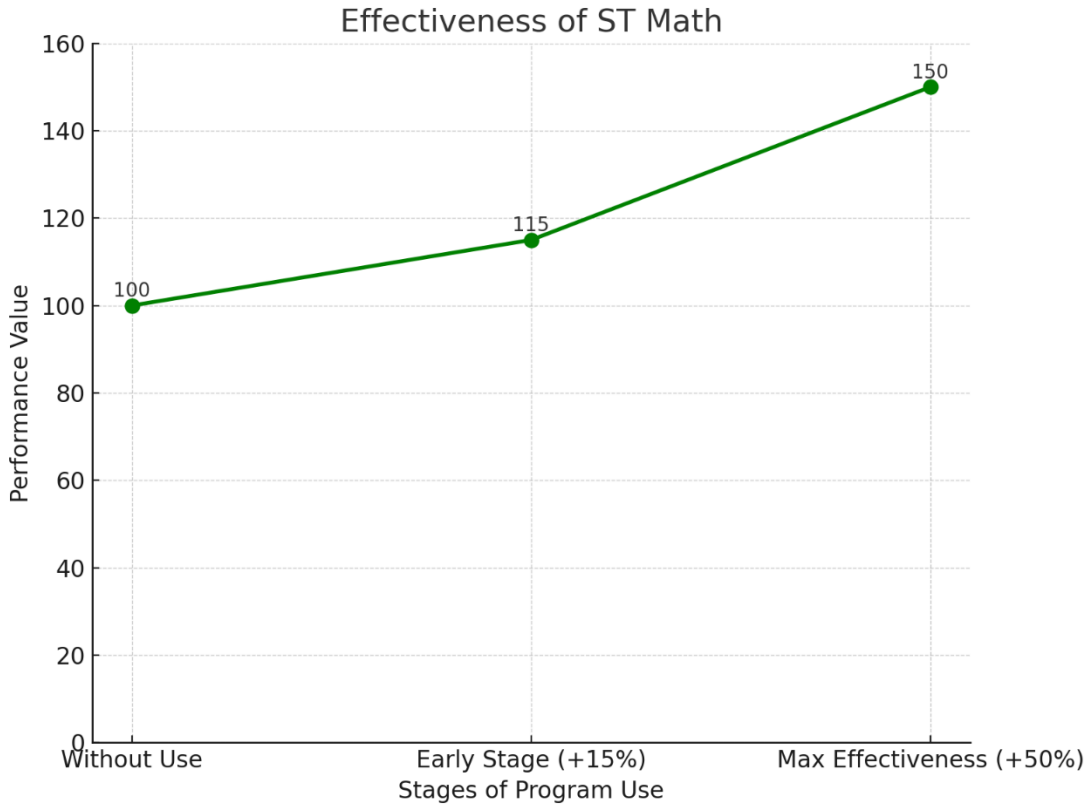


**Figure 2**

In addition, other tools can be used that are related to, for example, graphic modeling, 3D tools, gamification, and adaptive guidance. For example, Labster has proven that the use of virtual and multimedia labs in the study of courses in higher education programs around the world improves learning outcomes by more than 15% compared to standard labs (Pearson, 2022). Available virtual labs provide unlimited practice, gamify the process, and focus learning through adaptation. PhET also offers engaging, playful, interactive science and math models (Overdeck, 2018). In a study of over 25,000 students, 77% believed that PhET models reinforced concepts better than textbooks alone. The company has also shown that using virtual labs can help develop motivation and creativity among students.

When it comes to language learning, apps like Duolingo can help you learn vocabulary, grammar, and syntax in a short time. They also offer interactive translation systems for different languages and help you learn reading and speaking skills in a wide range of languages around the world. Microsoft Translator allows you to translate more than 70 languages in real time using speech, text, or images. The intelligent tutor StudyPad offers adaptive reading and listening lessons using natural language processing and speech recognition to provide feedback (Grønlund, 2020).

I would also like to consider adaptive technologies. For example, there are

technologies such as immersive analytics that can understand where to move better within the entire life cycle of an educational institution and offer various opportunities for administration, grading and course development, taking into account the entire creative and imaginative potential of students and teaching staff. However, today there are various threats, such as hacking risks, technical failures and other issues related to anthropogenic factors that can become an obstacle to the integration of this technology. However, it is necessary to build special policies and combat risks and threats in order to better prepare for the digital era.

Not only theoretical but also practical research is constantly being conducted on the implementation and implementation of these methods, which were described above. For example, a study by the Massachusetts Institute of Technology showed that students using a physics curriculum with augmented reality perform more than 70% better on tests than a control group without AR. Another Stanford study found that medical students who were exposed to virtual reality technology made fewer mistakes than those who were not trained (Duolingo, 2022). This suggests that simulation is better at preparing people for a skill such as medical surgery. This has been documented not only at Stanford, but also at other universities in America and Europe.

In addition, almost all studies in the field of motivation indicate that innovative tools help to increase this indicator very significantly. For example, a study by the New Media Consortium showed that more than 85% of students surveyed believe that AR and VR increase engagement in the educational material (Cai et al., 2014). Teachers also noted increased enthusiasm and participation.

However, it is worth considering that you need to constantly come up with different ways, since one study showed that the same tools in virtual and augmented reality may, on the contrary, not contribute to the development of interest in the long term or even reduce it. These results are presented in the table below (Table 1).

**Table 1**

**Effects of Frequency of Use of Immersive Technologies**

| STATE | EFFECTS |
|---|---|
| **ACTIVE USE** | High involvement, sustained interest, significant increase in knowledge |
| **MODERATE USE** | Average engagement and interest, minor increase in knowledge |
| **RARELY USED** | Short-term increase in interest, rapid decline in engagement, minimal impact on learning |

Despite all the advantages described above, there are a number of problems that the global scientific community may face. For example, it is very difficult to

accurately assess what results a project will bring and the risks that may be associated at the stage of its implementation. Another aspect is that not everyone will have enough resources to implement innovative tools, there will be gaps in research, and the design will not always be aimed at simplicity and accessibility of using a particular tool. Therefore, the justification of innovations in pedagogy and factual data remains imperative.

Let us consider the best practices that countries are applying in the education system to implement the tools of the digital age. For example, Finland is enriching the educational ecosystem and focusing on personalization (Seymour et al., 2002). They have developed a digital content base, focused on implementing a curriculum that integrates digital literacy and computational thinking at all levels and courses. This strategy, according to the country's leadership, allows for an emphasis on the design and adaptation of content, which will be regulated and guided by principles and national frameworks.

Singapore has placed a strong emphasis on computational thinking, developing a maker culture through FabLabs that offer experiential learning in digital design. This is increasing EdTech fluency. It is also developing national portals, creating a multi-layered structure of homegrown content that develops pedagogy, an interactive learning environment, and a platform for students to become more engaged in learning (Alexander et al., 2017).

The United States of America is also not lagging behind. For example, the EQUIP pilot partnership between technology providers and higher education institutions to develop adaptive solutions allows for increased integration capabilities of higher education infrastructure. The #GoOpen campaign to support state and district implementation of open licensed educational resources offered a number of modern technological tools for integration into education (Merchant et al., 2014). The ConnectED Library Challenge to create open repositories of interactive educational content within the framework of a public-private partnership made it possible to provide access to large databases of scientific data to a huge number of students.

China has placed emphasis on building smart schools and districts, developing its own standards and strategies for regulating education systems, and making major investments in research and development based on artificial intelligence, adaptive learning, and other modern technologies. In Canada, grassroots design labs such as the EdCan Network are used to test digital learning tools and then implement them in practice.

Having analyzed international experience, identified the vectors of countries' direction, and analyzed the shortcomings and recommendations of experienced researchers in this environment, we have developed our own step-by-step strategy for integrating innovations across disciplines. First, it is necessary to set clear goals in order to design a higher education institution's strategy for implementing EdTech technologies within the educational process. Second, it is necessary to develop

communities and groups so that participants can offer various ideas, exchange changes and experiences. At this stage, it is possible to involve experts, conduct various experiments and pilot projects. Then comes the creation of peer training for teachers and the creation of incentives for students to develop a love of learning. The following recommendations include the creation of public goals around educational development, the integration of interactive tools into tactical processes, the conduct of continuous assessment and analysis, including audit, and further recommendations.

All this can help pave the way for the introduction of digital systems into the educational process. This can help both in the sciences, including laboratories, adaptive tutors and mentoring tools, team projects; and in the humanities, which can also develop with the help of additional artifacts, multimedia tools, intelligent support for writing activities, social networks; special tools can be implemented, geographic simulations, virtual reality, augmented reality assistive technologies, clinical data systems, distance learning and much more. This can be mixed reality, rapid prototyping technologies, the Internet of Things, special equipment and much more. In the context of law, artificial intelligence can offer various recommendations for improving laws, augmented and virtual reality applications can sharpen and stimulate court appearances and credentials, automation programs can help process legal documents.

This shows how an optimal strategy for reforming educational institutions can be formed. In addition, it is important to set the right priorities. The first priority, we believe, should be updating pedagogy and assessment methods through the integration of learning. The second priority should be to ensure that teachers themselves propose and are an example, being leaders of innovation, constantly taking new courses for professional development and having a good command of new skills and tools. The next priority is to ensure personalized learning, and the last priority is to plan educational technologies taking into account recommendations and trends based on empirical experience.

In addition, it is important to take into account the costs, which may include both risks and financial costs, which can be partially covered by special regional and federal programs that can provide subsidies for educational technologies in schools, universities and other institutions with increased needs, forming a fair distribution of resources. For example, you can take the program of innovative grants, as in the USA, where the development of educational resources and exclusive technologies is taking place (Gulyamov & Rodionov, 2024). Non-profit projects are also a good example, where, for example, in Europe and America, special platforms are already included, where you can invest in any projects on a volunteer or government basis.

Financial difficulties, problems with technical equipment, low access to the Internet, budgetary restrictions and unpreparedness of some teachers in some cases should be expected. However, one must be prepared for the emergence of these problems and it is important to understand that a large number of modern technologies

can introduce both benefits and negative aspects, for example, some tools, such as social networks, can cause digital addiction, which, of course, must be fought (Gulyamov et al., 2024). However, proper time monitoring, constant self-improvement, discipline will help to form a steady increase in motivation and passion for the educational process.

## IV. Discussion

This study reveals a critical issue that many educational institutions face when deciding which tools to integrate into their educational process. For institutional leaders, the study can help them formulate the right digital education strategies based on the empirical experiences and cross-national comparisons presented in this analysis. For educators, the examples provided in this topic can be used in practical and theoretical lessons in their disciplines. For students, it is an example of how to approach education with self-determination, discipline, and self-improvement in mind. It can be useful for developers, as examples based on products and services that eliminate financial and technical barriers and friction can be applied by them, which can then lead to strategic and other improvements.

The article shows that learning opportunities through innovation are engaging, effective, and empowering for both regular and disabled users. With the creative opportunities offered by modern technologies, the development of critical thinking and creative skills is paramount. The future may shape various updates in modular programs, conducting more extensive field studies and much more. It can be concluded that it is necessary to develop increasingly personalized and objective systems that can be suitable for each student so that the comprehensive educational process is directed only in a positive direction and does not allow discrimination that can occur in the context of technology training.

## Conclusion

The results of this study show that although the traditional education system is important, it is also worth emphasizing that a personalized student environment with the introduction of technological tools further expands the learning potential, forms a system of motivation, self-determination and self-discipline. Technologies that can positively affect the improvement of teaching and delivery processes are also promising innovations where efforts should be directed and joint pilot initiatives should be implemented. It is essential to approach this with regard to cooperation, staff development, technical training, development of new tools and adherence to the principles of ethics and fairness. The principles of openness are also extremely important, and it is important to consider that data security is an important aspect that cannot be avoided, so it is imperative to integrate antivirus programs and firewall systems.

The implementation of the educational process we have described may require

commitment from all stakeholders, but it can play a huge role in developing adaptive and creative thinking in order to thrive in the context of the development of the economy and the educational system. Intersecting paths can help to realize and unleash the potential of each person, making learning and the educational process an exciting complex. In fact, it can be said that the transformation proposed in this article is focused on the ability of the individual to truly develop and express himself. Through the efforts of smart provision and competent policy, which can become the basis of digital education, a new corporate world will be formed, where traditional and innovative education go hand in hand and serve for the benefit of all humanity.

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