Modern Trends in Education in the Era of Digitalization: Task and Prospects of Development

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ABSTRACT: The article suggests an overall review of modern technological trends in education. The authors aimed to figure out the objectives, benefits and obstacles of their development.

The article deals with innovations, which have already been and are being implemented in education system with Industry 5.0 shortly ahead. The main aim is to determine social and cultural impact of rapid digitalization in the sphere of education.

Research methods were based on deductive categories. Elements of descriptive and comparative analysis were applied for identification of major patterns and tendencies.

The review given by the authors proves that education is one of the main challenges for authorities, teachers and students in terms of digitalization. The results of the research indicate the importance of new paradigm and reconsidering of educational environment in general. It involves technological, social and communicative aspects. Some conventional standards have become obsolete and we need to acknowledge the fact. Modern society is facing not only technological challenges but also the ones concerning attitude and skills.
We can conclude that effective agreement between social and technological process can be reached if legal framework and standardized approaches are involved.

Keywords: Education, Digitalization, Technology, Artificial Intelligence, Online Learning, Industry 5.0, Soft Skills, Digital Era.

INTRODUCTION

The Covid pandemic had caused huge changes not only in business processes but also in minds of people all over the world. Challenges faced by almost all spheres had made us more flexible thus more sensitive to transformations. It is clear that they are inevitable and urgent, but it remains to be seen whether the world is ready to accept and comprehend all the innovations.

The pandemic had boosted great digital changes, and education is not an exception here. Standing on the verge of the 5th industrial revolution, we need to ponder over human role in the digital era. (Radovanović et al., 2015; Uvarov et al., 2019)

The research conducted by McKinsey & Company in 2017 suggested that technical potential for automation is the lowest for educational services (Manyika et al., 2017). It is true that education system still performs the same function it always has. Based on academic studies it aims at providing students with general knowledge and practice in specific fields of learning. Educational process cannot be totally automated and devoid of human involvement (Barata et al., 2014). However, digital reality we are facing today has proved that both teachers and students should acquire new skills. (El-Sofany & El-Seoud, 2019; Kivarina, 2019)

That is why we consider it important to find out the prospects and consequences of this inevitable digital transformation. The worldview is changing alongside with the role and opportunities of teacher personality, which makes the idea of this article topical. The scientific novelty of the study lies in the attempt to analyze the social and cultural impact of rapid digitalization in the sphere of education and to mark the challenges, which can block its effective development.

METHOD

This is a qualitative type of research, although some quantitative data has been involved. The article is based on observations made by authors in the course of their work, which deals with high school and education process in general. We used secondary sources as a method of data collection. Results of research conducted by various organizations had been analyzed in order to aggregate existing approaches to digitalization in education.

We realize that there is a gap between technological level and people's attitude to digital transformation. Mostly we consider it a massive inclusion of new technologies in work process, e.g. software, hardware, online services, etc. It is not quite true. Moving towards digital era will require new paradigm.

Some businesses and institutions had already turned to evaluation of digital maturity or readiness of their employees. It is a measure of how ready an organization is to transform digitally. It concerns transformations required to reach responsible and effective use of technology to get the desired socio-economic benefits. Therefore, digital era means not just total automation. It will bring sea changes to business philosophy, professional and cultural interaction.

In the context of education, successful transition depends on our ability to acknowledge that some outworn educational standards need to be left behind.

Technologies implemented in education aim at cutting routine procedures, providing teachers and students with various means of teaching and learning thus making education available and convenient. Generally speaking, educational environment might become boundless in terms of professional communication and learning availability.

We have placed trends and corresponding technologies in the right part of the scheme. The left part comprises skills and activities necessary for their successful implementation:
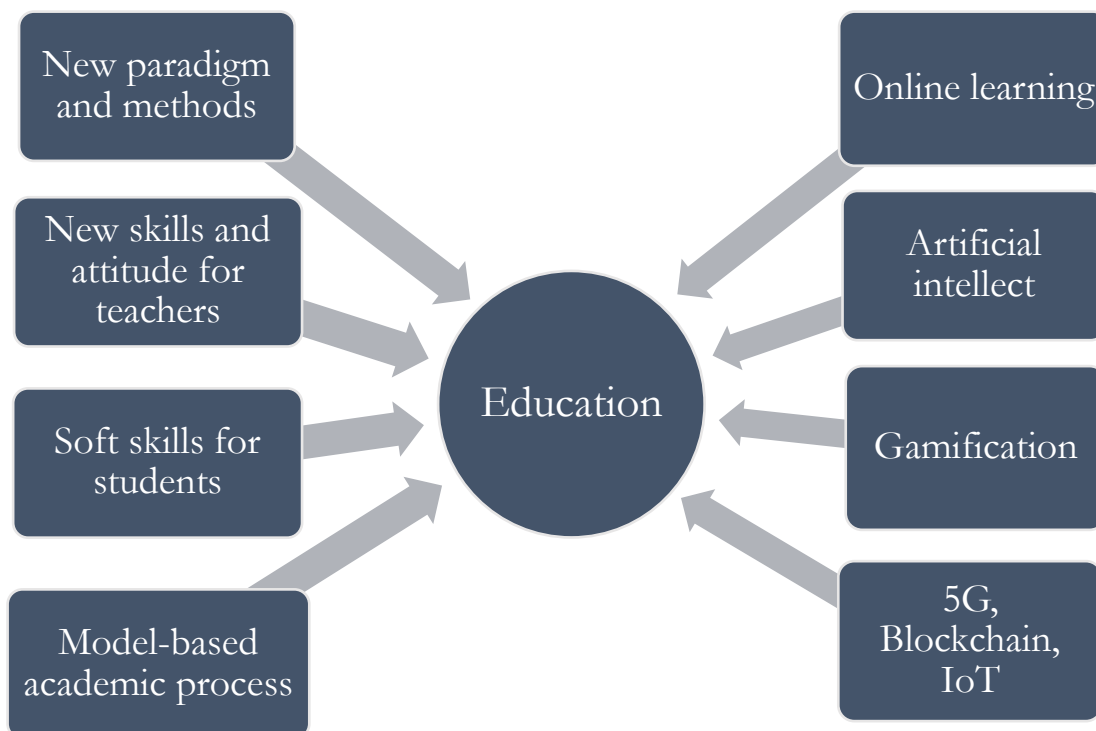
Picture 1. Trends in education

We suggest we go over each technological trend highlighting its advantages, outcomes, prospects and possible obstacles for its implementation.

1. Online learning and education technology. They have turned out to be invaluable services during this pandemic. The transition was rather sharp, and it had exposed some weak points of educational system in terms of online learning. They include both: technological equipment and existing approaches. (Filippova, 2015)

   For example, in Russia not all schools are fully equipped with computers, not to mention high-speed Internet connection. Surveys conducted by Russian Federal State Statistics Service show that in 2019 76,9 % of Russian families had access to the Internet, only 73,6 % out of which had it broadband (Spiridonov & Mityukov, 2020; Strokov, 2020). The problem is common for the majority of countries. According to experts, even technological leaders such as Japan and the United States were not totally ready for the digital boost of 2020. Students in most cases do not have necessary equipment at home.

Consequently, it leads to another issue - drop in attendance and lowering of academic progress.

The problem, as we see it, is that existing paradigm will not let education keep pace with technological progress. Digitalization will require government authorities to reconsider organizational process.

Online education has evident advantages as it enables students from remote places to get access to desired courses and lectures, provided by various institutions and lecturers. Students will have a choice, and lectures will always be up-to-date. Cloud-based technologies provide simultaneous access to educational content. Teachers can use their time effectively, pay attention to self-education and new skills development. Students, too, will have to develop self-discipline and manage their time effectively.

We should also mention that e-learning proposes wide use of visual means. Videos, podcasts are more than welcome by modern students. Moreover, interactive video training is now gaining momentum as a new trend. It helps to reduce passive browsing and enables students to track their academic progress. Videos include embedded questions, navigation menus, keywords, and index phrases to help capture the contents.

To crown it all, online learning allows personalizing of educational programs, adjusting them to the needs of students and giving them knowledge-on-demand. Highly adaptive curriculum is considered another educational trend.

Therefore, education should be based on a good balance between online learning and personal teachers' guidance. Digital era suggests that teachers should work hard to prove that they have some unequalled advantages, if compared to modern technologies.

2. Artificial Intelligence (AI) Learning. Digital era had turned people from information consumers into its producers. Technological objective to provide safe data storage and access had been outran by advanced solutions of data processing. The start of Industry 5.0 is linked with rapid spread of AI tools into many spheres of modern life, including education.

   There are three main trends here: smart content, intelligent tutoring systems, virtual facilitators and learning environments.

   It is argued that intelligent tutoring systems have reached the most progress over the past years. Chat bots can spare teachers' time, replace them in performing routine procedures, such as ordinary tutorials and guiding through educational content. An interesting experiment had been carried out at the Georgia Tech University in Atlanta, US. They involved a robot named Jill Watson as a teaching assistant for a postgraduate course. It successfully answered the questions through an online forum, and students did not reveal

its cyber identity. Evidently a robot will not leave questions unanswered, it does not get tired or too busy to perform tutoring tasks. Consequently, such digital assistance can be of great help to human beings in terms of monotonous activities, algorithms of which are easy to program.

AI tools can be used to create focus groups, define the strengths and weaknesses of each student, help to adjust educational programs since they successfully analyze big arrays of information revealing patterns. AI solutions are also used for diversification of educational content: they can combine existing academic courses and create educational resources for effective training (tests, quizzes, etc.).

In general, the main goals which education can achieve via implementing AI tools and solutions are the following:

- personal assistance for every student with no long waits and delays anytime and anywhere;

- providing students with a good combination of 21st century hard skills and soft skills based on interaction data for learning, personalized curriculum and virtual facilities;

- making learning a life-long development process but not a few-year duty, during which students obtain skills that are hard to apply.

It is understood that AI learning cannot propose individual aid or some kind of psychological assistance especially to elementary school pupils, when needed. Emotional attachment is still beyond AI's competence.

Conventional education standards have been disputed lately. The main reason, as we see it, is that students do not get enough experience. They graduate from schools lacking soft skills, which are in high demand. Otherwise stated, they are not digitally ready. Along with hard skills, modern society needs to acknowledge principles of network identification and etiquette, its intercultural aspects. It may seem that digital era will reduce communication, but in fact, Industry 5.0 will give it a boost, making it unlimited. Education system must explicitly acknowledge and include communication as a soft skill, which allows students not just to read, write and speak fluently, but also to understand, evaluate and improve their communication in accordance with social and cultural environment.

That is partly why Intel had launched Digital Readiness's AI for Youth Program. It aims at giving young people (mostly high school students) technical and social skills required for responsible use of technologies (Şerban et al., 2020).

In Russia, this program started in July 2020. In 2021, we already have 30 pilot projects with over 500 students from 15 regions participating.

AI for Youth Program gives students an opportunity to use AI tools and get the mindset required for digital transformation. Students can even take part in creation of AI solutions in order to understand their impact and benefits. Moreover, participants of the Program will get basic skills at AI ethics, critical thinking and problem solving.

This Program is also unique because it unites young people of different backgrounds; it is flexible and adaptable to students' level of knowledge. Thus, it delivers access to high-level Intel technologies.

To conclude, we can state that AI is now an integral part of our life. Its implementation is a long-term objective and the easiest way to get along with it is to learn and acquire possible benefits. And they can be great if technologies are applied slightly and correctly, in correspondence with the curriculum.

3. Gamification. The main objective of modern education trends is to motivate students to learn upon their own initiative, to make them realize that learning can be flexible and adjustable to their needs. Combining education and entertainment is a reasonable solution though its effectiveness is an open question. Online projects for most demanded skills, for instance, foreign languages learning, suggest educational content with incorporated game-elements, competitions, and interactive graphics. Along with students' engagement, gamification also contributes to soft skills development. Teamwork and competitions can enhance communicative competence and critical thinking.

Gamification is not a comprehensive solution and cannot be applied at all education stages. It is a good supplement to a new paradigm, which is required for successful implementation of trends and technologies. Besides, some experiments show that the effect of gamification strongly depends on personal traits of each student (Barata et al., 2014).

4. 5G, Blockchain, Internet of Things (IoT), Big data.

Indeed, technological trends mentioned above should not be applied in isolation from one another. Holistic development could be reached if all the innovations are combined into a thought-out system allowing each of them fulfil its functions. Model-based structure could be used in order to optimize the amounts of technology needed to perform educational procedures. In other words, the authorities should work on creating and testing different models to implement the most suitable ones at different stages.

The concept of Industry 5.0 is based on inclusive approach and integrating technologies into one another for technical and socio-economic benefits. The 4th Industrial revolution

is connected with IoT, e.g. home and industrial security, activity trackers, smart vehicles, motion detectors, and Industry 5.0 adds more of intellectual human touch to it.

In fact, education is gradually including IoT. Teachers already can share students' results in real time and check their homework using special applications. Students and their parents can track the academic progress using online services, too.

Blockchain technology provides an option of storing students' portfolios in a distributed data bank, so that all concerned parties can get access to it at any period. Blockchain will make educational environment well organized and convenient and it offers massive opportunities for data analysis (Aldowah et al., 2017).

In order to get ready for the 5th Industrial revolution we should successfully overcome the challenges of Industry 4.0. We can state that technical readiness is unequal across the world. As we have mentioned above, many countries are still facing bad Internet connection. On the other hand, industrial leaders are ready to implement the 5G Technology. It is considered very promising in terms of education. 5G brings about a wide range of opportunities such as:

- Improving and fostering of network cooperation;
- Implementing virtual reality into educational process thus elevating practical studies to higher standards.

RESULT AND DISCUSSION

The perspective of Industry 5.0 can be described as personalized and environment friendly technology with human beings in the middle of it. The emphasis is shifting from general automation to successful collaboration between people and intellectual machines (Nahavandi, 2019). It could be a perfect solution in terms of education. Experts claim that Industry 5.0 will not cause unemployment. On the contrary, it is argued that it will provide millions of job opportunities. There is no doubt that advanced skills would be required to obtain these jobs.

Education will have to evolve in order to provide students with background needed to become a successful personality. Employers today seek for skilled professionals in specific fields who can work with both digital and human colleagues on increasingly complex and diverse tasks.

CONCLUSION

Using the picture given above (Picture 1), we have figured out that modern trends in education have common objectives – to make learning available and convenient; to create personalized curriculum based on a good balance between hard and soft skills given to students at all stages.

The research conducted suggests that there are three important issues to deal with to create an up-to-date educational environment.

1) An existing paradigm needs reformation. It includes a new teaching toolbox with digital innovations and corresponding skills for teachers. The last should open up to new approaches in their work to become successful contributors to the Industry 5.0 development. Methods, curriculums and organizational procedures should be reconsidered as well.

2) Technological resources are unequal across the world. This will not allow education transform consistently. There will always be leaders and outsiders in the process. Some innovations (for example, 5G) can hardly be implemented massively. That is why educational authorities must work on models acceptable in their countries thus using all the tools available.

3) Technology is not a panacea for all problem issues in education. It must be implemented in accordance with a clean-cut scheme. Otherwise, it will do no good. That is why Industry 5.0 proposes to rethink the role of human beings and transfer our activities to new intellectual levels.

In order to achieve the goals of the 5th industrial revolution legal framework and standardized approaches are required. They will help to reach an effective agreement between society and technology thus avoiding chaotic digital implementations.

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