DIGITAL INNOVATIONS THROUGH THE PRISM OF PERCEPTION BY BELARUSIAN STUDENTS

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In the sphere of higher education the imposed digitalisation of learning processes under conditions of the pandemic has made distance forms of education a reality for most students and therefore helped them increase their level of knowledge of information and communication technologies and competences. Digital innovations have become the key features of an image of a contemporary society that most students constructed in their consciousness. However, virtual reality differs from the real everyday life that is not necessarily technologically advanced. This contradiction can be an important reason for several risks and illusions emerging in the students' perception of digital transformation and overpriced expectations from the processes of digitalisation at work, study and everyday life. Depending on the type of students' assessments of the role of digital innovations in a society, five theoretical patterns of students' attitudes towards digital innovation have been selected. The results from this research indicate the importance of the university learning environment to discuss with the students the real benefits and potential threats of digital innovations.

Keywords: digital transformation; perception of digital innovations; students; potential threats; higher education.
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Introduction

The innovative development of society is currently based on the processes of digital transformation, which acts as a long-term strategic goal in many modern countries. A similar goal has been developed in Belarus. The state program «Digital development of Belarus» for 2021–2025 was prepared on the basis of the priority areas of the socio-economic development of the republic. The program is focused on the introduction of information and communication technologies and advanced production technologies in the sectors of the national economy and the spheres of society. In addition to identifying the most promising areas for the development of the country, where the introduction of digital innovations is primarily expected, the program analyses the problems of human resources, the country’s resources, as well as digitalisation-related issues of national security and counteracting computer risks.

Innovations in this program are understood as new or improved products, services, technologies, mechanisms for solving urgent problems of economic development or used in everyday life, which must be put into practice and bring an economic, social or other effect. With regard to digital innovations, they are distinguished by the use of digital processes, resources based on big data technologies, artificial intelligence, industrial internet and many similar technologies and tools used in the digital economy. Social innovations include those changes in labour and daily activities that, based on digital tools, facilitate the work and life of people and improve their quality of life. Social innovation is an important characteristic of the entire process of transformation of society.

Among the variety of digital innovations, not all of them are in the focus of attention of most people, and even more so of certain groups of the population. Different social groups perceive digital transformation processes differently. One can imagine this diversity on a scale where at one end there will be the most advanced groups in the use of digital technologies, and at the other – the most distant from them. The most open groups to digital innovations are those that are directly related to the transformation processes (programmers, computer specialists, etc.). Representatives of these groups are distinguished by two important characteristics – education (higher, as a rule, technical) and age (young and middle). Since their work is constantly connected with digital technologies, they have adequate knowledge in the field of information and computer technologies (ICT) and can competently judge digital innovation processes in the economy and society. The groups at the other extreme are much less or not at all connected with digital innovations; they are carriers of opposite characteristics (older age, insufficiently high level of education, being retired). At best, such groups are users of some digital innovations in everyday life (such as ordering coupons on the Internet, online shopping), since these groups are no longer connected to the labour market. Students as a social and age group are between them. On the one hand, students have scientific knowledge and purposefully acquire skills in the use of digital technologies, as they encounter them in their studies, on the other hand, they may not have professional digital knowledge about how ICT function, and may not think about what consequences may be related to digitalisation. In this article, this group will be the object of study.

The purpose of the article is to consider the features of the perception of digital innovation processes by modern student youth in Belarus.

Research objectives include:

• overview of the literature related to the research problem, with selection of those topics that seem to be most attractive for the students;
• description of different factors influencing the youth consciousness and youth perception of actual and potential risks connected to the processes of digitalisation and digital innovations;
• construction of the ideal (theoretical) types of the students’ perception of digital innovations, including their level of understanding digital risks.

Theoretical basis and methods of research

Theoretical basis of our research includes two major kinds of theories – digital transformation and modern generation of youth (generation of millennials). Both theories have many versions constructed by several authors as they refer to the global processes that took place all over the world. Theory of modern cultural evolution developed by R. Inglehart also contributes to our research: this theory describes the value changes in the global world during the latest decades as cultural shift from the traditional value orientations toward the post-traditional values such as individual autonomy, democracy, leisure time and self-realisation.

Theories of digital transformation describe digitalisation of the economy, labour market, everyday life and society at large. They include many spheres where digitalisation made great changes, and these processes are still under way. The topic of digital transformation is popular among the sociologists, economists, specialists in other spheres of science in the world [3–5]. It is developed in Belarus and Russia as well [6; 7], where changes in business economy, labour market and social structure. It is stressed that on the one hand, digital economy brings a significant contribution to economic development, on the other hand, this process is quite contradictory. It is accompanied by many myths focusing on technological advantages or threats [8]. Digitalisation does not always lead to production efficiency and an increase in living standards. The practical influence of digitalisation is ambiguous: the digitalised workplaces require new knowledge and skills from the competences from the employees, so that the employed persons have to constantly learn new digital technologies and improve their professional qualification. Indeed, not every current employee is able to carry out constant learning due to previous basic education, age and personal interest. Young workers can easily adjust themselves to the new requests; however, they agree to do that only when their salary increases according to their received digital knowledge. With further digitalisation of labour, as it is predicted in the theory of the Fourth industrial revolution, it is expected that robots will replace a lot of professions and displace from the workplace those workers whose work will be digitalised and who will not be able to adapt to the digital world. These perspectives are not broadly discussed in the media, so that many people do not care about such future and expect only digital benefits at work. It is even more common for the students to think about the future interesting job and digitalised workplaces and do not anticipate the problems with the employment [9].

There are three main directions of research in the sphere of technological transformation represented in the literature: digitalised economy (or digital business), ICT as a driver of societal development, and social-economic consequences of the digitalised transformation and digitalisation in general [10]. The first direction is the most popular in the literature. It is broadly represented abroad, as it reflects the processes of business development, tools to support digital competitiveness on the global market, productivity improvements, recommendations on cost reductions, and innovations that simultaneously influence the digital transformation in several aspects. That is why issues of digital transformation are better known by the young people as well. Most literature on this topic describes digital transformation in positive. The second direction of research is less known by Belarusian youth, although it also represents important topics on how technologies are influencing digital transformation and societal changes. As for the third direction, it is especially important to learn how innovations obtain legitimacy in a society and how organisations are influenced by socio-cultural aspects of implementation of digital innovations. Students mainly pay attention to the positive digital innovations in different spheres of life (e-banking, e-shopping, e-medical services, digital games and leisure time), although these spheres represent only a part of digital transformation possibilities. Surely, the students perfectly know only the sphere of higher education because they are involved in the digital learning and became familiar with distance education – the major sphere of digital implementation for them.

Modern theories of youth often describe the contemporary generation as «digital natives» to distinguish it from the previous generations [11]. This generation was born in the end of the 20th century and socialised when Internet has become broadly available. The main features of millennials include individualism, prevalence of personal interests over the societal interests, everyday use of IT technologies, and rational (or instrumental) life attitudes. Nowadays students in our region also belong to this generation [12; 13]. Thus, V. Radaev admitted that Russian millennials broadly use digital tools in their activities, although they can be less knowledgeable in some practical issues than their parents or grandparents because they join the labour market later. This generation feels globalised through the online communication and media contacts. Their strong involvement in the Internet helped them to quickly adapt and change according to the new technology. In Belarus, like elsewhere, this generation of youth demonstrates a significant shift in societal development reflected in their high assessment of ICT, technological innovations and perspectives related to technological progress. The concept of millennials fits our research, because modern Belarusian students belong to this generation and cannot even imagine their life without Internet and its numerous technological tools.

Our empirical research was based on online survey with Belarusian students aiming to define and analyse students’ perception of the shift to distance education (DE) within the period of the pandemic. The national survey was conducted in spring 2022 and included 2666 students from different types of the universities of Belarus that used DE. Also, local surveys of the university teachers were held at Belarusian State University as well as interviews with the students. These methods helped to collect information on the detailed assessment of the learning situation in the pandemic. The data allowed us to analyse the changes in the students’ perception of the digital innovations in higher education.
Factors affecting the students’ perception of innovative processes

There are many different factors that may influence the youth consciousness and somehow determine the students’ perception of innovative processes. Roughly these factors can be divided in two groups: objective and subjective. Objective factors include the economic development in the world and the country, the level of digitalisation in the everyday life and workplace, availability of Internet and ICT. The pandemic of COVID-19 also belongs to the objective factors as its emergence was not possible to anticipate in advance and (or) prevent. In general the objective factors stimulated the students’ need to master new technologies and adapt to a new reality as a new normal [14]. In the sphere of higher education it was a shift to DE that strongly determined the usage of ICT in the learning process.

As for subjective factors, they are mainly connected to the special features of the modern youth as a generation of millennials. DE facilitated the students’ interest to ICT, desire to fully use digital innovations at the university aiming to transfer this knowledge to the future workplace and gain privileges to demonstrate before the future employer. Those students who found a part-time remote employment during the pandemic were even more interested in learning ICT to successfully combine work and study. As such students were constantly involved in the Internet activities; they could read social media on the digital progress all over the world and overestimate the role of digital innovations at home, while until recently in Belarus digital development has been faster in everyday life services than in the industry and education [15]. According to some global estimation, digitalisation of the economy can reach 25 % by 2025; however, it demands enormous investments. Under the current objective conditions Belarus cannot afford them in full, so that not all businesses, organisations and other institutions are able to use the advanced technologies. The younger generation might not know details of economic development. However, many students plan to be employed in the IT sphere regardless of their profession by education: they are ready to study ICT additionally to meet the requirements of the employment in this sphere. Mass media regularly inform the people that ICT professionals have the highest salary in Belarus that is several times higher than average, students want to get a job in IT sector by all means.

However, IT sector is relatively small and cannot include all those who would like to be employed there. Information about how large the share of those industries where there is no digitalisation (or it is minimal) remains behind the scenes of students’ perception. Most students assume that they will definitely find a well-paid digitalised job that provides them an opportunity to satisfy the consumption interests and career ambitions. As the students’ cognitive features of the learning social reality differs from the previous (pre-digital) generations, their perception of digital innovations also has specificity. They overestimate all positive opportunities technological innovations can bring to the social and economic life. Briefly, their attitude towards digital innovations can be formulated as that: «Technological innovations first, other innovations will follow».

One can understand the special modern features of the youth consciousness: millennials desire to use digital innovations for their own needs; they wish that their dreams to come into reality soon after getting a diploma on higher education. Their future plans are optimistic and even bright; digital technologies are viewed in these plans as useful tools to reach the life goals. From the view of this generation technological innovations and material benefits are more valuable than other changes in a society.

This kind of perception of technological innovations combines rational and naive attitudes. On the one hand, students believe that ICT can make their own life more interesting, make work easier, and allow to save time (in our research, almost 90 % of students gave this answer). Thus, 94 % of respondents agreed that digital technologies provide more opportunities for career growth, education and personal development. Assessing the role of ICT in society as a whole, 66 % admitted that digital technologies make life brighter and richer, and make it possible to spend time interestingly. It is unlikely that such answers can be changed unless these young people personally experience the problems at the workplace in the future. That is why they do not feel risks of unemployment due to a high level of robotisation or threats of being not hired because of a high competition on the labour market that are typical for technologically advanced Western societies deeply researched and analysed in several books. Thus, French researchers explained threats of spillover digitalised work for physical and psychological health and for balance between the work and family domains. They discovered several challenges associated with recent or emerging ways of working related to the digitalisation of work [18]. As research confirmed, even a smartphone can make harm for mental and physical health of addicted persons. Thus it was discovered that excessive use of smartphones can bring depression, anxiety, stress, negative emotions, and other disorders. What is also important to add, «smartphone addiction to social media is linked to interpersonal issues and contributes to non-assertive behaviour and exposure to cyberbullying» [17, p. 120].

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Unfortunately, students do not read foreign books, instead, they use foreign social media and telegram channels, where information can be carefully selected to impress the young readers and construct the impressions that can be far from the social reality. In the process of translation the meanings of digital innovations to the young audience emotional tools and visuals are actively involved, which easily penetrate the minds of young people. As a result, they may pay more attention to certain positive effects of technological innovations and be completely oblivious to others that may negatively affect environment and health.

For example, during our research we found out that teachers assess DE less positive than the students. First, this assessment relates to the influence of DE on health. Teachers often worried about extremely high workload and the necessity to spend more time for the preparation of visual materials, learning new digital methods of education, while students only mentioned that their home works took more time than earlier. Young people did not experience psychological stresses; they paid more attention to low internet speed and technical problems with Moodle platform. Second, most teachers considered that DE decreased the quality of education due to the remote contacts. As for the students, almost quarter of them said that the quality of education increased and only 10% agreed that it decreased [18].

Third, teachers are aware of the possibilities of mind manipulation with the help of ICT; therefore, they highly assess their interpersonal communication with students and insist on regular face-to-face contacts in the classroom. It is important to stress that students did not mention this possibility; they only admitted that can be addicted on the internet.

Theoretical models of the students’ perception of digital innovations

It is interesting to single out some theoretical models of students’ perception of innovative processes, which will differ based on how students evaluate these innovations, how actively students themselves want to participate in innovative processes, and how much they consider digital innovations necessary in their lives.

The first model can be called optimistic. Its bearers pin their hopes on the development of scientific and technical progress as a driving force of social transformations, they believe in innovations, including ICT, in all spheres of life. On the contrary, they do not perceive digital risks or at least do not care about them, because they highly evaluate technological transformations and innovations.

The second model is pessimistic. Its bearers are those who do not believe in technological progress and digital innovations. They critically assess both technological and social-economic development in the country, although recognise that technological innovations brought a higher quality of life in the advanced economic countries. As for the sphere of higher education, they do not support DE and think that ICT cannot contribute to the quality of education.

The third theoretical model is neutral. It is assumed that its bearers have no clear opinions on the role of technological transformation in general and digital innovation in higher education in particular. During the empirical surveys they may answer «do not know» to most of questions.

The fourth model is hybrid. Its representatives recognise both the pros and cons of digitalisation and take it all for granted, without much thought, what are the roots of the digital challenges and whether they can be minimised. Its bearers prefer to stay aside from the changes, since the situation as a whole is uncertain both in the world and in Belarus. Such young people focus on their personal interests without consciously relating them to the development of society and other people. They are atomised and have little interest in the global processes of scientific and technological revolution.

The fifth model includes those people who are optimistic and active, i.e. whose goal during the education is to gain the knowledge and competences for the future digitalised work. They dream about digital creativity and like technological innovations. Such young people anticipate digital risks and threats and are ready to resist through an active life position. They plan to have job with high salary that provides opportunities for self-realisation. Using the terminology of A. Giddens, such people are actors that can transform the social environment through their actions and reproduce conditions that are necessary for their activities [19] in their life with a possibility to influence other people and social and technological environment. Perhaps, in the real life such young people are in minority, however, this model is the most perspective.

Empirical studies are needed to determine the real proportion of young people with these theoretical models. If they are empirically verified, then it will be possible to analyse how to influence the perception of digital innovations in the student environment in a way that optimistic and active attitudes to digital innovations predominate.

Based on a theoretical analysis and preliminary empirical data it is hardly possible to predict the predominance of active and optimistic groups of students in real life. Active youth do not make up the majority of this social group. There will always be young people who are far from digital innovations, feel indifferent to them and cannot evaluate their impact on a society. Such people simply use digital technologies in their lives, based on everyday needs.

As for the pessimists, critically thinking students are quite a normal element within this social group. If this group is provided with comprehensive information
about digitalisation, then they will be able to carefully evaluate digital processes, understand their inevitability in modern society, and direct their interests to finding means to minimise the negative consequences of digitalisation (at least within the boundaries available to them at present).

In any case, expanding the knowledge about digital transformations, training the ability of young people to independently analyse digital changes and adequately perceive innovations and their socio-economic consequences is an informational and an educational task of higher education. This task cannot be solved within the framework of individual subjects (whether it is sociology or economy or informatics), but should be perceived as an integral element of the entire learning process at a university.

**Conclusion**

- Young people primarily associate digital innovations with the digitalisation of everyday life processes. They perceive such innovations as an integral part of their life and actively use them.

- After the introduction of DE, students have gone from distrust to recognition of digital educational innovations as adequate means and forms of education. Young people see shortcomings in the current state of DE and would like to eliminate them. Threats to learning from DE are associated with the potential full transition to this form (however, it is not anticipated). Most students support a hybrid form that combines traditional and distance forms, and does not consider as a threat to the quality of education.

- The theoretical models of students’ perception of digital innovations include a wide range of options: from the complete acceptance of innovations to their uncritical rejection. It is quite possible that in real life a neutral attitude will prevail. Empirical research is needed to clarify this issue.

- For the students, belonging to the generation of millennials, digital innovation is natural in their lives. However, due to the fact that they have little personal experience, they focus their attention only on particular digital transformations and do not pay attention to potential digital risks and threats related to digitalisation. A bias in the students’ perception of information about digital transformation can be determined by the predominance of some sources of information and lack of sources on other important issues.

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