

Digitalization of education as a trend of its modernization and reforming

La digitalización de la educación como tendencia de su modernización y reforma

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ABSTRACT:

The author has presented a comprehensive analysis of the processes of digitalization of education, most actively taking place in the modern world. The formation of a knowledge society and the digital stage of development of modern civilization culture still remains a continuing process, which itself is experiencing serious internal contradictions and problems, especially in our country. One of the contradictions seriously impeding the modernization of education is the discrepancy between the speed of digitalization of educational resources and the speed at which the digitalization of the educational process itself, which is still very low. The reform of education is presented in the article by the example of various forms of curricular and extracurricular activities aimed at the active use of digital educational resources including the review of the citywide electronic journal and diary, which has been used for several years in Moscow secondary schools.

Key words: education, digitalization, modernization, reforming of education, trends.

RESUMEN:

El autor ha presentado un análisis exhaustivo de los procesos de digitalización de la educación, que se llevan a cabo de forma más activa en el mundo moderno. La formación de una sociedad del conocimiento y la etapa digital del desarrollo de la cultura moderna de la civilización todavía sigue siendo un proceso que continúa, que él mismo está experimentando contradicciones y problemas internos serios, especialmente en nuestro país. Una de las contradicciones que obstaculizan seriamente la modernización de la educación es la discrepancia entre la velocidad de la digitalización de los recursos educativos y la rapidez con que la digitalización del propio proceso educativo, que sigue siendo muy baja. La reforma de la educación se presenta en el artículo por el ejemplo de diversas formas de actividades curriculares y extracurriculares destinadas a la utilización activa de los recursos educativos digitales, incluyendo la revisión de la revista y diario electrónico de toda la ciudad, que se ha utilizado desde hace varios años en las escuelas secundarias de Moscú.

Palabras clave: educación, digitalización, modernización, reforma de la educación, tendencias.

1. Introduction

Digitalization of education is a powerful trend in terms of reformation and modernization of global education environment. Digitalization means transformation of all information types (texts, sounds, visuals, video and other data from various sources) into the digital language.

Discussing the phenomenon of digitalization it should be noted that various analysts and forecast experts (mostly British, including Tim Berners-Lee - one of the inventors of the World Wide Web (Stuart, 2014)) consider transition of education process into digital stage as the turning point in the history of education. The United Kingdom is assumed to be the first in the world to introduce compulsory software engineering and IT education in the program for schoolchildren aged 5 - 16 years in 2015.

The stated approach was adopted by the European Union. EU 2020 education development strategy, adopted in 2014, focuses on digital technologies. This document appeared to mirror impressive achievements in IT area with its core objective being integration of state-of-the-art IT-solutions in education institutions' activities across EU.

2. Methodology

This strategy is a part of comprehensive strategical concept of digital education called "Touch the future", developed based on EU government document "DigEduPol". The main aim is to integrate digital technologies in education process, so that they were going hand in hand both with teaching of certain subjects and with school education process in general. In that way the technologies of the 21st century should not only help the students to learn certain facts, but also to improve their competence, develop logical thinking and communication skills. (Overview and Analysis of Policy Models for the Integration and Innovative Use of Digital Technologies in Education, n. d.).

Distance education, based on new digital technologies opportunities, is a separate issue in terms of education digitalization trend. One of the core benefits of integrating digital technologies in education process is that a teacher can control the practical efficiency of teaching process, the quality of educational material mastering, the time spent by a student to solve any certain task, the level of new information understanding etc., whereas traditional control methods ensure "rough" performance assessment (for instance based on final grades).

Digital technologies help teachers to reduce paperwork: exercise books and reports are replaced by laptops or tablets, with all the required academic information available. Home tasks of students, except when special teacher's references are required, can be automatically controlled by software tools.

Students gain apparent benefits as well. State-of-the-art digital technologies make it possible to work at any task in a group, exchange views and ideas with classmates and the teacher, project own life journey and deliver better results within a shorter period of time. Such devices as interactive tablets for presentations, seminars and conferences make it possible to 'catch an eye' of larger audiences, just as 3D modeling technology makes it possible to visualize any idea by graphic representation in 2D plane, helping to meet the challenges in a creative and informal way.

According to scientists, very shortly digital format will eliminate the need for handwriting lectures, when each student will get all the materials and will be able to process them on a real-time basis and work interactively. All the texts will be available online and stored in a digital 'cloud' (Apple iCloud alternative), which will practically eliminate any negative consequences related to absence from school.

3. Results

Intensive digital technologies penetration in education raises a number of practical issues.

Same like with the other innovations, the world of online technologies is associated with certain contradictions and unforeseen circumstances. For instance parents, who want their child to spend less time at the computer, should change their mind, since education process modernization presupposes the opposite.

Lego Group tried to tackle the issue in 2014 and published their research findings in The Guardian. According to Lego analysts "Each education situation and each child is unique; therefore parents should determine how much time their child can spend in front of a computer. Therefore it's vital to interactively find solution regarding correct "digital" behavior of a student and work out "digital activity rules". Although this statement is directly related to video games, it can be applied to any "digital" activity, so much the more, as it was stated above, we face the tendency of 'binding' the games and education, especially in elementary school.

The University of Durham completed the studies of digital technologies impact on education and made several interesting conclusions. According to its experts, digital technologies should only complete, but not supersede traditional teaching methods, with their full potential to be used by slow-learning students or students with special needs. The best results can be achieved if IT are used at certain intervals, approximately three times a week, since frequent use of innovative and primarily digital methods can gradually decrease the students' information processing efficiency. And finally the scientists stress the importance of holding professional development seminars for teachers, who will use digital technologies in their work. (Pearce, Weller, Scanlon and Kinsley 2011, pp. 72-80).

Another issue in this context is comprehensive digitalization of human life, predicted by numerous scientists. Today digital technologies undergo the state of intensive development and will soon reach petroleum branch of industry in terms of turnover. At the same time the community demands turn to rise, forcing us to adapt to the 21st century progress. Nowadays the ability to adapt to new technologies is a success prerequisite, as stated in the 8-th issue of newsletter of global recruiting company Heys. (Digital Dawn, 2015).

"Actually digital revolution affected all aspects of life worldwide", says Ladislav Kuchera, the Chief analyst of the company. That said CEO, CFO, trade and marketing specialists tend to use new digital technologies in their work more frequently. The increasing number of Internet transactions stimulates businessmen to process data online. The teams evaluate the companies and contact the customers in e-form, attaching news and accompanying offers to their messages. Such tasks presuppose deeper knowledge of digital technologies as compared to an average user. According to "Hays recruiting", statistical data employers turn to request HTML and SQL knowledge from senior candidates. Other business technologies have been recently extended by a wide range of new digital solutions.

The aforementioned phenomena seek reaction of general education system on students' mastering of digital sphere and tools at a young age.

L. Kuchera states: "Be ready to face the fact that after a while the majority of work places will require the knowledge of the latest technologies, which are extending and progressing on a going basis. Irrespective of the profession or industry, which is currently covering major scope of human resources, the companies and organizations wish to employ and keep the staff knowing these technologies and ready to advance their skills". (Digital Dawn, 2015).

Another major tendency in education development in terms of globalization is institutional reorganization. Currently we face the stage when the tendencies of digital and online education require institutionalization in new-type educational establishments. Today several institutions pioneer this process, including Khan Academy established by Sal Khan in USA in 2008. The institution established itself as a leader after the project of Nobel peace prize laureate Malala Yousafzai related to promotion of secular education of females from orthodox Islamic countries, based in Lebanon (the Near East).

Currently Khan Academy is a multi-field global education institution with several executives and more than 80 teachers, actively engaged in their activities with wide range of classes: from

online lectures and seminars for students of the academy to extensive archive of special digital records, used as a huge digital library. The key feature of the Academy is a simplified form of participation and presence at classes (personal presence, distant online or extra-mural offline).

This academy concept was established when Sal Khan worked as hedge fund analyst in California, and in between was engaged in online teaching of people from all over the country. At a certain stage he collected enough records and his colleagues from Google advised him to upload these records on YouTube channel. Soon after Khan received feedback from people from all over the country and from abroad, particularly from Singapore, who asked for more uploads. The channel turned to be the starting point for today's Khan Academy.

The Academy is a non-profit-making organization, offering new education approach based on principles, which (according to S. Khan) reflect the forthcoming education development stage to the fullest extent possible:

1. Information should be free.
2. New technologies should be used to the maximum extent.
3. Individual approach to each student.
4. Comfortable and pleasant education process. (Khan principles, n. d.).

The Academy provides direct and immediate access to tutorials and studies according to the following algorithm: "In your own spare time and at your own pace, with a possibility to stop and repeat". S. Khan tried to understand how a video record could replace a class teacher, especially in such humanity subjects as History and Literature, in which he was interested under the influence of Umberto Eco. The education course on French revolution history was a sort of a trial balloon, since there was found a way to go beyond the framework of a "talking head". In the records the emphasis was placed not so much on the fact itself (though it was not disregarded), as on the analysis of the revolution meaning in broad historical context and simple explanation, why revolution changed the world.

Today Khan Academy is a large organization with its base comprising more than 400 million lessons for students in 28 languages. In 2015 the number of languages reached its peak point according to statistical data, with more than 2.5 bln. users connected to the Academy's server. And finally more than 50000 teachers worldwide have cooperated with the Academy since its establishment.

The average monthly number of academy students makes around 2 mln. people, studying Maths, Biology, Art History, Computer science and other subjects. Currently the Academy's YouTube channel has 6500 free video lessons, which are the core of the learning platform with the access granted for free and without registration. More lessons and courses are available after registration on the Academy's website. A game element is actively involved in the academic activity with special signs appearing after completing any of the 20 levels. Anyway according to analysts today Khan Academy is a full embodiment of Sal Khan's principle of education of the future: "Study whatever you want the way you want!"

Presently education digitalization in the Russian Federation is closely related to implementation of Federal state education standards (FSES), developed for all education levels (The creation of the one education information system. Federal target program for the development of education for 2011-2015, n. d.). For example the essence of basic general education under FSES is "to generate and develop major competences in the area of information and communication technologies use; to motivate students to actively use dictionaries and other search systems", including these items in metasubject outcomes of principal educational program mastering in terms of basic general education. One of the tools to reach the stated objectives is "access to school library and Internet information resources, course books and popular literature, media-sources on electronic media, copy machines for replication of tutorials, guidance materials, texts and graphics, audio and video information, creative, research and development content as well as the projects of students". [6]

Another important state document promoting education digitalization concept in Russia is priority project "Modern digital educational environment in the Russian Federation" (Popova 2016) with its core objective to create conditions by 2018 for improving the overall quality and broadening options for continuing education of all citizens by developing Russian digital educational environment and raising the number of online students up to 11 mln. people by the end of 2025.

Currently Russian leading higher educational institutions are deeply involved in their own education digitalization projects. Thus the authors of the ongoing concept of Moscow State University named after Lomonosov (MSU) boarding school for gifted children consider that digital education must go hand-in-hand with traditional education models and techniques. The school offers video lessons of the best teachers (including foreign), online seminars, discussions and conferences. Top MSU and foreign scientists will be engaged in master classes and seminars in terms of distant learning. (Eremin and Kharisova 2016, pp. 118-125)

One of the objects of stage-by-stage reform and subsequent modernization of Russian education, implemented in a pilot format in Moscow's general education schools, is a citywide electronic journal and a pupil's grade book that, for example, allows students to assess the activity by selecting a certain scale that best corresponds to the individual characteristics of each student.

4. Discussion

However it should be noted that the stated education digitalization trend in Russia may soon raise numerous challenges for schools. First it's digital divide between provision of information gadgets to students, who make active use of them, and traditional approaches to studies. Therefore, digitalization has both faithful followers and skeptical opponents. Thus, Y. Shikova considers that new solutions will personalize the education process, adapting the program to a student's individual needs. If a technology contributes to better understanding, memorizing, knowing or using any content, it's worth considering and implementing, even if it presupposes fundamental changes in academic activity. Alexander Sidorkin is however more skeptical about it, stating that Russian education digitalization process embodies major challenges; thus educational resources digitalization (for instance, tutorials) doesn't keep up with informatization of education process. The education lacks initiatives related to intensification of education communicative component using information technologies, as well as basic ideas. This area requires sustained flow of breakthrough ideas and venture projects. (Internet and education, 2015).

The aforementioned innovative tendencies will govern education development in terms of globalization and, as it was stated above, will influence all sides of education and will be followed by major changes in academic activity, i.e. classwork. Classroom activities of the future will not represent a typical picture of a teacher in front of its students, sitting at desks arranged in perfect rows. Introduction of innovation digital technologies will change not only teaching form and tools, but its environment as such.

5. Conclusion

We might state that modern educational system faces creative crisis. Classwork and lessons do not contribute to students' personal initiatives to learn something new, establish objective connection between their knowledge and the real world, use their imagination to look for non-standard answers to standard questions instead of using stereotypic models. Therefore the classroom of the future should not be a place of knowledge transfer, but a place of investing in the mind of students, focusing on creativity and innovation and not on repeating ready-made opinions or mechanical response to test questions.

The stated approach to education will force us to reconsider curricula and integration of conceptual and actual innovations. New curricula should stipulate not only obligatory transfer of

facts, but focus on students' reaching certain objectives, namely creativity, imagination and teamwork irrespective of team members' location.

Finally, it should be noted that today's global education has faced major transformations, caused by further integration of new digital technologies in academic activity and is actively searching for efficient implementation models, which will compromise with traditions and innovations.

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