EDUCATION PROCESS DIGITALIZATION AND ITS IMPACT ON HUMAN CAPITAL OF AN ENTERPRISE

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ABSTRACT

This study aimed to combine different teaching technologies, learning formats and technical innovations into a single educational system, with the aim of identifying the characteristics of each digital educational environment, as well as determining the role that the teacher plays in each of these environments. Correct distribution of functionality between teachers and digital learning support is critical. Improving the quality of digital education through better data analysis and forecasting, developing and launching advanced educational products using artificial intelligence, improving predictive tools for understanding the connection of digital transformation in various departments and ensuring their interaction. Digitalization management is possible with unified databases, learning efficiency criteria, in other words, an integrated approach that would determine the goals, structures and content of the educational process. The education system with the use of new technological tools and unlimited information resources must learn how to effectively implement them in the educational process.

Keywords: Learning models; Digital tools; Learning support; Technological tools Lorem ipsum; Lorem

INTRODUCTION

Educational field in the country is facing certain issues. To start with, it is rather obvious that traditional school cannot be “factory” specialized on providing its graduates with adaptivity and stress-resistant skills, which they will find useful when facing various situations throughout their lives. That explains why the great majority of students does not find the educational process satisfactory.

The learning model is outdated. Years ago, the teacher was the only holder of the knowledge, whereas the textbook was the source where one could get it. Just learn the chapter, answer correctly to your teacher and a positive grade is yours. That’s it! That was everything that schools had to cover from their side. Nowadays, there is a wide variety of information sources. Unfortunately, many of them are fake ones. The way the information is represented is

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also diversified, which brings us to conclusion that a regular textbook is not even compatible to this whole variety.

In Ukraine, children are brought out and told to give standard answers to general questions on external independent testing (IAT) in this case - "exit testing". The following actions, and future as a whole, depends on each student individually. Though, the problem is, universities with practical education appear to be very stressful for freshmen, since there is no place where they can get a proper practical base they need for such educational needs.

Education is a major factor for development of society, as well as the whole country. Every parent, would no doubts prefer to hire a professional tutor for all day long, rather than deal with regular school. Though, this may work only for little groups of people and stays impossible for the majorities. A perfect 21st century education model is a combination of skills and knowledge with using platform technologies.

Students should be eager to study and learn more. It is necessary to combine new technologies with teaching content so that the student could master the material, as well as practice in some useful things, like prepare projects using gaming techniques - virtual, mixed and augmented reality, animation.

The information technology development makes it useful and common to use digital tools in various fields of life. Digitalization also affects the educational process. New technologies, especially mobile technologies, become more widely used in teaching. The generation of school and university students is much more likely to use digital tools to solve their everyday issues.

There is a number of information systems which are directly or indirectly used in the educational process. Most often, such systems are used to facilitate the learning process, to visualize the explained material, to simplify testing or examinations. Here are some examples of such systems: platforms for hosting distance MOOCs (massive online open courses), systems for organizing the educational process, digital modular systems for managing the educational process in the form of commercial products or developed in certain educational institutions.

The number of such systems grows, as well as their popularity, which is why there is a need to structure and provide a proper description to them, so their further design and development become possible. In addition, the teacher position in such systems remains unclear, as well as the mechanisms of cooperation between the two main parties of educational structures - teacher and student. The purpose of this work was to establish the characteristics of each digital educational environment, as well as to determine the teacher position in every mentioned environment.

LITERATURE REVIEW

World economy is facing transformations caused by a large-scale and rapid emergence, development and implementation of new technologies and information systems. Significant social changes are taking place. Many researchers start analyzing the impact of digitalization on the life of society. Such, in the book review "Robots are coming" (Ford, 2015) by an engineer and entrepreneur from Silicon Valley, we can see some pessimistic and optimistic outcomes for the further development of the in connection to the active introduction of information technologies. During the last few years, one may have paid attention to a big number of analytical articles or articles-predictions dedicated to potential future, taking into account the changes in economic and social environment, caused by increasing automation. That all definitely confirms the change in society's attitude to automation and its prospects.

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Kaivo-oja et al. (2015) conducted a large research and foresight on key trends in automation and robotization development. He identifies three main directions of further information technologies development: infocommunication technologies, digitalization and the robots' widespread development and use. The researcher claims, that we are about to face a major increase in the number of information flows in future, so that society will turn into a "modern ubiquitous knowledge society". In this society, the interaction of people with each other is set to minimal, whereas the machine interaction way more developed.

In their work, Higgins et al. (2012), have presented studies on assessing the impact of digital learning in schools (ages 5-18), where they found a positive impact of digitalization of the learning process, which was reflected in the assimilation of acquired knowledge (exams). The researchers also mention that the higher level of digitalization of the learning process in schools, leads to higher motivation and the material and technical bases improvements, as well investment attraction, especially of we talk about higher than average performing students.

Harris (2009) showed the relationship between high levels of information and communication technology use and school performance (mathematics, foreign languages, design, English) in England. Some works (Meer et al., 2015; Smith et al., 2015) identified a connection between high levels of ICT use and improved quality of schooling. Based on these studies, we found that the rate of improvement in English tests at the end of primary education was faster through the digitalization of the learning process and the use of information and communication technologies. Jewitt et al. (2011) conducted research on secondary schools in England that have begun to implement digital learning and teaching, and concluded that: using digital resources provided more time for active classroom learning; more opportunities for active learning outside the classroom (blogs, forums, games adapted for learning); have provided students with the opportunity to choose educational resources; provided a safer space for formative assessment and feedback. A more recent PISA study (OECD, 2015). Found a positive relationship between computer use and improved educational outcomes.

At the same time, new technologies use brings about positive outcomes to the flexibility, adaptivity and other soft skills improvement of the individuum (Zhenghao et al., 2015). As a consequence, we get graduates with better developed skills corresponding to modern needs, which increases the general efficiency of the organization they became part of. First of all, such new experienced workers become a 'breath of fresh air' to the company, introduce and share their up to date knowledge and flexibility to others, as well as increase general level of compatibility of the company (Kovtun et al., 2020).

THE MODEL OF COMPETENCES, BASED ON 21ST CENTURY SKILLS

A brand new competency model was developed in 2016, based on the skills of the 21st century. It takes into account the strategic directions of one of the banks - Sberbank. The model estimates and shows new expectations of employees, determines the directions of employees' development to meet new challenges. The model has six competencies in it:

- Customer centricity - deep understanding of customer needs and building trustful, long-term relationships; proactive formation of market trends and customer needs.
- Problem solving and systemic thinking - the ability to solve problems, think systematically and critically, have cognitive flexibility.
- Result management and responsibility - the ability to achieve results based on design thinking; create a prototype and improve it to a competitive product or service.
- Innovation and digital skills - the ability to take deliberate risks, participate in the development of trends and technologies, be curious, encourage a variety of thinking models, and strive for constant improvement.

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- Team spirit development and collaboration - the ability to interact with colleagues and build teams, break the ice and have chats, maintain mentoring and cross-team interaction, be committed to the principles of Agile.
- Self-management - the ability to reflect, empathy, communication skills, energy management, the ability to resolve issues.

The introduction of a new competency model was one of Sberbank's priorities starting from 2017 and has affected not only training and development, but also the selection, assessment and other elements of the HR cycle. Training and development processes for specialists and managers are synchronized. The Corporate University of Sberbank and the Virtual School operate for managers. Sberbank specialists have the opportunity to undergo training and develop both: in training centers and remotely in the automated system of Sberbank and at workplaces. Most of the training programs for managers and specialists are associated with the getting specialized professional knowledge and skills, as well as developing corporate competencies - the ones, aimed at problem solving and result management, team development and self-management, customer-centricity and innovation (Andriushchenko et al., 2020).

New formats of face-to-face learning in the digital world predominantly develop competencies related to creativity, team building, the development of communication and collaboration, and in most of the cases, they are a form of learning by doing and / or collaborative learning.

In fact, the significant boost of new formats of remote education formats as well as flipped learning brought about various new formats of full-time education. As well, the intensity of the development is the effect of releasing the energy and time of teachers in the new structure of educational services. New formats of face-to-face trainings include meetup, educational travel, transformation laboratory, and hackathon.

MASSIVE OPEN ONLINE COURSE

The growing opportunities of the Internet and mobile communications through broadband technologies has increased the potential for distance learning. From 2010 to 2016 online education has experienced a peak in demand with the advent of massive open online courses (MOOCs).

MOOCs are developing in several parallel directions. At the same time, there are constantly available open courses, the study of which is not tied to a specific timeline, and chronologically structured courses, which at the same time may have limited access depending on the prerequisites required for their development. There are also services that allow working with the ready-made content of online courses, ensuring its translation into a responsive way. Better (previously called Erudify) is working on this model, using already developed materials for corporate online training in order to impart interactivity to them. The organization of academic MOOC providers is also becoming more complex with the progressive increase in content units. Special resources (Smart Sparrow) appear that allow real-time coordination of elements provided on different platforms in the curriculum and create integrated units of educational content on their basis.

Even the largest providers continue changing their services for reaching a broader audience and ensuring long-term financial sustainability. Udacity, the first MOOC provider, pioneered the transition from undergraduate courses to corporate courses and continuing education programs, while EdX focused on their original mission of expanding access to knowledge.

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According to EdX analytical materials, the majority of students are people with an education degree (69% with a bachelor's degree). On average, 17% of participants complete more than half of the course content and only 8% receive a certificate. Most of the students took part in computer science courses (36%), natural sciences, technology, engineering and mathematics (STEM - science, technology, engineering and mathematics) courses (26%) and humanities courses (21%). Computer science and STEM courses are predominantly popular among young and least educated cohorts, while humanities courses are in demand by a diverse population (EdX, 2017).

The main motivation for Coursera students to follow through is to improve their current job or find a new one (52%) and achieve their academic goal (28%). 26% found a new job, while only 3% received a pay raise or promotion after successfully completing a MOOC. Only 12% of those who set themselves academic goals completed their studies, while 64% received significant knowledge for their field of study (ATD, 2016).

All this speaks of the need to improve general human capital of the company, but not only individual, as group knowledge every year has more influence on the company's efficiency (Abdullah & Sofian, 2012). Such new education approaches bring both: hard-skills as knowledge and new skills needed for work, as well as soft-skills, such as adaptivity and flexibility. The second may be as much important as the first one, as researches show soft skills are becoming more demanded during professional growth (Andriushchenko et al., 2019).

MOOCs are also used by international organizations such as the World Bank and the International Monetary Fund. The World Bank has partnered with Coursera to build a line of specialized courses on education, health and climate change for partners and technical experts in developing countries. The International Monetary Fund is partnering with EdX to train government officials in developing countries on public debt management and balanced financial policy. Employer participation in MOOCs involves not only training existing staff, but also digital recruiting (Deutsche Bank, Ikea) to attract the next generation of talent (OECD, 2016).

An important step in terms of increasing user engagement is the creation of adaptive eLearning courses. Currently, they are offered mainly by large academic and commercial vendors and allow for point modeling of the student's experience in real time, depending on the results of monitoring his educational achievements. In this case, portions of video content are accompanied by tests that control the development of the material, and the subsequent content of the course is transformed depending on the identified gaps in knowledge (Scherer et al., 2018). At the same time, the successful solution of basic-level problems leads to an increase in the level of complexity of the proposed tests. This course structure allows you to more effectively solve the problem of personalizing training, since students can manage their time. Course content is available upon request and is not tied to specific chronological frames.

An important element of the adaptive e-course is adaptive testing - a technology for testing students, where each next question is selected automatically, based on the given answers to previous questions and a predetermined level of difficulty. The main difference between adaptive testing and classical tests is dynamic (in real time), rather than static determination of the list of questions that will be asked to the test taker. The trajectory along which the trainee passes the tests is individual. The choice of the next question is determined by the personal characteristics of each individual listener, and not by general rules. Initial personalization of training is provided by providing the user with the ability to customize the interface: choosing an avatar, font, integration with profiles on social networks. Subsequent profiling assumes input and periodic user backtesting in order to determine the most optimal training path. Finally, deep personalization of training involves the integration of user survey data into the modification of educational content using courses with flexible levels of customization of

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interactive functionality (Alvarez et al., 2009; Bates, 2015, Bates et al., 2017). Developed adaptive learning systems using personalization tools contain a large number of variable tools to support users in the process of content mastering.

VR/AR-SIMULATIONS

Virtual simulations of production processes have started to be actively used in those industries where ensuring that workers are ready to work in high-risk conditions is a necessity, so customers lives are not put at risk. An important advantage of VR/AR environments is their ability to bypass the limitations of attention and concentration of the user on certain content that are present in other forms of delivery of user-generated content.

At the moment, there are no generalized statistics on the effectiveness of using VR/AR simulations on a global scale. The general trend is to combine the practice of emulating real production processes with allowing users to create their own experimental contexts and situations.

The National Hockey League uses this tool to analyze game tactics and improve the individual skills of players. Since 2016, General Motors has been using Google Glass to recreate real-world manufacturing contexts for new recruits and line staff development courses. In this case, the VR effect is integrated with elements of augmented reality, available to learners through an interactive feedback system on their learning activities.

Over the past years, Deutsche Bahn AG has successfully used VR technology in its recruitment process. Potential employees are tested directly in the working environment in which they actually have to work, which significantly improves the accuracy of the starting estimates of the company's human capital. In practice, the tool used is an introductory 3D video developed by the talent acquisition department created within the corporation's team. AGL Energy Limited, a mining company in Australia, has launched a safety training program since 2017, built entirely on VR simulations of critical incidents, including those that have actually happened in production units in the past. The monitoring of corporate activity in the field of VR / AR simulations is carried out, among others, by the global consulting company Wipro, which is currently developing the corresponding corporate ranking. The other examples of using such formats are described in Table 1.

TABLE 1
EXAMPLES AND FORMATS OF USING VIRTUAL REALITY FOR EDUCATION PURPOSES

Playing with machine	Virtual simulators (trainers) - a student, immersed in virtual reality, performs actions on a set of scenarios included in the program either initially or in the process of machine learning.
	KLM Airlines Hangar Simulator: What to do when a plane being repaired in a hangar starts smoking?
Playing with reality	Facilitated virtual simulations - the student performs actions in a virtual space under the guidance and/or monitoring of the facilitator and / or other participants in material reality
Playing with others	Virtual collaboration (virtual collaboration) - a student in a virtual space performs actions with other participants in the training, who are also in the virtual space.
	Holoportation is a new technology from Microsoft Research for virtual interaction of participants

Source: Own survey

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Augmented reality (AR) technologies can be used in conjunction with VR technologies for greater convenience or involvement of students. The use of augmented reality in teaching is based on several key areas, in particular:

Use of QR codes: inserting QR codes with links to multimedia materials allows you to make printed educational materials dynamic;

Explanation of the surrounding world: when pointing at a real object (for example, a starry sky), the device gives additional text and graphic information about the object (for example, about constellations) (Jiang et al., 2019);

Design and prototyping: creation of virtual objects embedded in a real environment;

Watching movies and virtual objects embedded in reality;

Provision of interactive instructions: when you point your smartphone at the instructions for using the equipment, dynamic video information appears on the screen; information output (dictionaries, reference books, reports, dashboards, articles, graphics) and the arrangement of information in an order convenient for studying; online consulting: a remote operator sees through the eyes of an employee wearing AR glasses and gives advice (for example, on working with equipment); collaborative spaces for joint remote solution of common problems.

INTARACTIVE DISTANCE LESSON (LIFE VIRTUAL)

Such a new format of teaching in a digital environment as distance learning is becoming more and more widespread. Training with the use of distance educational technologies, implemented mainly with the use of information and telecommunication networks with indirect (at a distance) interaction between students and teachers.

There are various formats of distance learning, among which, first of all, there are chat and web classes, teleconferences, webinars and web conferences, distance learning in the format of "live virtuality".

Due to its novelty, of particular interest for consideration are distance learning in the format of "live virtual class" (LVC) - distance learning in real time with the participation of a teacher. Unlike traditional webinars and video conferencing, this format uses interactive learning technologies, which allows you to use tools such as high-quality VoIP, highly functional packages for presentations, a full set of interactive tools (whiteboard, chat, video, application sharing, etc.). These webinars are similar to regular classroom training sessions, except that participants attend the sessions remotely.

During classes, students can be located in different cities, countries or regions. Participants interact by connecting to the Internet - they can hear each other, see the teacher on the screen and ask him questions. In the learning process, the teacher can interact both with the entire group and with each student, and each student fully interacts with the teacher and with the entire group (Nworie et al., 2012; Conole, 2014).

Virtual classrooms provide various interactive means of interaction: video broadcast to transmit images of participants or information; virtual board/flipchart, whiteboard allows you individually or jointly to leave notes, visualize speeches, thoughts, ideas. Drawing tools can be implemented, for example, as follows: each participant has his own color, the teacher and/or other participants have the opportunity to make edits; raised hand and emotions of the participants - the event participant can at any time attract the attention of the teacher (and in some cases - of another participant) by “raising his hand” (by pressing the appropriate button) or by choosing an emotion that he feels is appropriate to what is going on (Zawacki-Richter & Naidu, 2016, Zawacki-Richter & Latchem, 2018). The teacher sees all raised hands and emotion icons; multi-party voice conferencing, which allows transmitting the speech of both

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the presenter and the participants; “call to the board” - the teacher has the opportunity to ask a question to a specific participant and receive an answer from him (in voice or text format); work in small groups - the possibility of dividing participants into small groups and separating them from other participants in the collaboration in these groups; polls, testing - carrying out various forms of knowledge assessment, asking participants' opinions, individually or in focus groups, collecting statistical information; tools for viewing and commenting on presentations of various formats; chat - any of the event participants has the opportunity to ask questions, speak up and send other information for public viewing in a text chat (Liezina et al., 2020). A participant or teacher can write in the chat both messages that will be visible to everyone, and private messages to certain users; analytics tools - analytics of participation in classes and activity of participants: participation in chats, in collaboration, evaluation of results, etc.

With the help of new technological tools and almost unlimited informational resources, the education system with the use of new technological tools and unlimited information resources must learn how to effectively implement them in the educational process (Andriushchenko et al., 2020). The practice of online courses and blended learning creates a field of unlimited educational opportunities, which focuses on the quality of education for each person, regardless of where they live, skills, but in accordance with their interests and capabilities.

CONCLUSION

Digitalization management is possible with the help of unified databases, learning efficiency criteria, in other words, an integrated approach that would determine the goals, structures and content of the educational process. Digitalization management in the educational environment is carried out using digital marketing aimed at organizing interaction with educational support personnel, scientific and pedagogical workers, alumni, students, applicants using a range of digital communication channels; monitoring changes to form a positive image of the university; stimulating the creation of new digital communities and innovations; development of personalized marketing materials for target audiences.

To solve the current problems in the field of education, the system of training personnel of high digital competence must undergo decisive changes, namely:

- Combining various teaching technologies, teaching formats and technical innovations into a single educational system. In here, the balance between regular face-to-face learning expansion and mobile technologies, augmented reality and other digital educational tools is very important. Distributing the functions and activities between teachers and digital tools is being crucial.
- Improving the quality of digital education through the better data analysis and forecasting, developing and launching advanced educational products using artificial intelligence, improving predictive tools for understanding the connection between digital transformations in various departments and ensuring their interaction.
- Solving the names issued may bring us not just to a new level of education and highly developed skills of new generation, but a more efficient production in the nearest future digital education gets a student well-acknowledged of modern tools.

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