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Some Aspects of Ai-Technologies in Education

Algunos Aspectos De Las Tecnologías De La Ia En La Educación

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Abstract

The article is mostly theoretical, bears a review character and is devoted to the description of artificial intelligence (AI) and its role in the life of the modern learning society. The article partly goes into the history of Artificial Intelligence development. The definition of ARTIFICIAL INTELLIGENCE is specified; its functions are stated; its benefits are described. The necessity of providing educational tools and services, designing personal training programs located on cloud services for acquiring new professional functions of teachers are mentioned. The authors pay special attention to the role of ARTIFICIAL INTELLIGENCE technologies in the process of education, devitalizing the spheres of education and correlating each with the benefits of ARTIFICIAL INTELLIGENCE technologies. The terminology of e-learning is enlisted; the difference between the terms is shown. The perspectives of Artificial Intelligence use in the process of education are mentioned.

Keywords: Artificial Intelligence, AI-technologies, E-learning, Personalization, Education, Curriculum.

Resumen

El artículo es principalmente teórico, tiene un carácter de revisión y está dedicado a la descripción de la inteligencia artificial (IA) y su papel en la vida de la sociedad del aprendizaje moderna. El artículo se adentra en

parte en la historia del desarrollo de la IA. Se especifica la definición de IA, se establecen sus funciones, se describen sus beneficios. Se menciona la necesidad de brindar herramientas y servicios educativos, diseñando programas de formación personal ubicados en servicios en la nube para la adquisición de nuevas funciones profesionales de los docentes. Los autores prestan especial atención al papel de las tecnologías de IA en el proceso de educación, detallan las esferas de la educación y correlacionan cada una con los beneficios de las tecnologías de IA. Se incluye la terminología de e-learning, se muestra la diferencia entre los términos. Se mencionan las perspectivas del uso de la IA en el proceso educativo.

Palabras clave: Inteligencia artificial, tecnologías de IA, e-learning, personalización, educación, plan de estudios.

Introduction

The creation of artificial intelligence has worried humanity for many years. People have wanted to invent something which would be able not only to solve the tasks assigned to it but could have self-awareness, reasonably think and even experience emotions, as people do. Many scientific and fiction books were looking for the answers to the following questions: should robots with self-awareness have the same rights as humans do; what to do if a soulless machine is not devoid of emotions if it can feel compassion, affection and even love; can the presence of all these qualities allow humanity to continue the use of these machines only for consumer purposes? If earlier thoughts about these things were considered only fantasy and a distant future, today, we can say with confidence that it is not so distant (Chen et al., 2020).

The term artificial intelligence which is known all over the world nowadays was introduced by the famous American scientist J. McCarthy in 1956. In a wider sense, it was meant as a science or engineering, working on the creation of intelligent machines and intelligent computer programs capable of reacting like a person. They were intended to create such machines that are able to sense the world around them, recognize gestures, facial expressions, conversations of people and make decisions similar to human choice. Artificial Intelligence has given us almost everything: from scanners to robots in real life. People tend to think that Artificial Intelligence represents any machine that to one or another extent copies human behaviour. But this concept includes much more than simple copying. For example, it assumes the ability to think logically in order to make rational decisions and evaluate the possible development of events using algorithms (Colchester et al., 2017; Franzoni et al., 2020).

Today the field of Artificial Intelligence represents a combination of cognitive informatics, linguistics, psychology and mathematics. An attempt by scientists to make every effort and to embody all available knowledge and experience into one thing that could be called a new form of life. In the field of artificially created intelligence, the process of its creation is based on the gradual cultivation of a machine, like a child, from childhood to adulthood. And the process of training the machine, as well as its subsequent use is completely dependent on the person. But despite lots of attempts to describe what Artificial Intelligence tools benefits are, it is necessary to understand what Artificial Intelligence really means. There are a lot of definitions for this concept, and the main ones can be distinguished as follows: the property of intelligent systems to perform complex tasks; science and technology of creating intelligent machines, intelligent computer programs; the property of intelligent systems to perform creative functions that are traditionally considered the prerogative of a person. So, to say, Artificial Intelligence can be defined as the process of endowing automated information systems with intelligent properties, using various Artificial Intelligence methods and approaches (Harouni et al., 2017; Jalal and & Mahmood, 2019; Knox, 2020).

Artificial Intelligence is related to a similar goal of using computers to understand human intelligence but is not necessarily limited to biologically plausible methods. Now Artificial Intelligence has received very wide development in a variety of subject areas, for example, the formation of business intelligence; recognition of visual images; expert systems; text recognition; automatic translation; extraction of information; understanding and analysis of natural language texts; image analysis; intelligent information security systems; speech recognition; robotics; etc. Of course, this list is not final, since, over the past

decade, the use of Artificial Intelligence tools and methods in practice has grown exponentially. Also, it is worth noting that this subject area is interesting to the highest authority. On October 11, 2019, the National Strategy for the Development of Artificial Intelligence for the period up to 2030 was adopted. By December 15, changes were made to the *Digital Economy* program. As a result, a Federal Project *Artificial Intelligence* was formulated within the framework of the *Digital Economy*. Investments in the development of Artificial Intelligence may grow up to 90 billion rubles for six years (Li et al., 2019).

Artificial Intelligence is certainly very productive in the field of education. As it is mentioned in the statistics, about 17 billion dollars were invested in educational technology development, about 3 billion out of which were aimed at Artificial Intelligence educational projects. The latter were aimed at automatic assessment of the quality of knowledge (full and promising replacement for the teacher; Artificial Intelligence is able to create personalized learning plans that can help reduce student errors); repetition and memorizing (educational app that is based on the interval effect; tracking the materials studied by the user and the time when it occurs; quite accurate calculating the date when the user is likely to forget what he learned; smart assistant reminds about it several times; knowledge will forever remain in memory); feedback for teachers (assessment of the level of teachers by students; chatbots based on artificial intelligence, machine learning and processing of human language - can improve the quality of feedback; chat bots are able to collect feedback about teachers through an interactive interface; from a person - to write a review, from a bot - an analyst); virtual assistants (Georgia Institute of Technology - Jill Watson, Teaching Assistant); Campus chat (informs students about the life of the educational institution; learns to find lecture halls, accept applications, find parking, and contact professors (Deakin University, Australia); personalized learning (the educational process is optimized for the character of each student; Artificial Intelligence is able to adapt to the level of learning productivity, and increase learning complexity over time); adaptive learning (allows you to see the progress of everyone and adjust the course for everyone; the program notifies teachers about materials that are difficult to understand); tracking student's honesty (proctoring based on artificial intelligence); data collection and selection of materials (Artificial Intelligence can select content of interest to the user, which will be selected based on his preferences and geolocation) (Kavitha and Lohani, 2019; Nagao, 2019).

One of the most useful tools based on Artificial Intelligence in the field of education is adaptive and personalized learning. This is a dynamic, data-based building of an individual learning path, taking into account the preparedness, abilities, goals, motivation and other characteristics of the student. Such systems work as follows. As a rule, diagnostic testing is carried out first – using genetic algorithms (methods of weak artificial intelligence), the purpose of which is to determine the level of proficiency in skills. Further, adaptive algorithms are applied to dynamically form the learning path after each exercise. And this happens until a minimum skill threshold is set (Holmes et al., 2019; Ribeiro et al., 2019).

Everyone notices that the introduction of Artificial Intelligence technologies in education is a promising direction that can significantly increase the efficiency of educational activities, especially now, when many countries are forced to transfer schools, colleges, universities to distance education. In the future, there are high hopes for Artificial Intelligence in education. Perhaps soon artificial intelligence will be able to analyze the details of the school, teachers, as well as each specific student; it will be able to take into account personality characteristics, general condition, mood, and, if necessary, inform the teacher about the named details. The researchers believe there will also be learning companions in the future to help people learn throughout their lives. They will be available on any device and in offline mode, and if necessary, people can turn to them for help (Vlasova et al., 2019).

As mentioned earlier, the artificial intelligence will transform all aspects of human life. Until now, artificial intelligence has had innovations in various fields. Interesting innovations such as automated parking lots, social networks, smart assistants and… are all examples of artificial intelligence applications. Today, it can be said that artificial intelligence is practically everywhere in the world, and very soon, the world will change education, university and school. At present, in different parts of the world, different procedures have been adopted to integrate artificial intelligence with educational programs in schools and universities, and the field of education has undergone fundamental changes. With education through smartphones and tablets, other students are less likely to turn to books. Meanwhile, there are many Internet companies around the world that offer various training on the Internet. These institutions create new opportunities for people to benefit from a variety of training without having to leave home. Our world today is constantly changing, and new

inventions will influence educational processes. Here are six ways in which artificial intelligence can transform the field of education (Terzopoulos and Satratzemi, 2019).

The automation scoring system will bring more free time for teachers

In modern education, teachers spend a lot of time on administrative tasks such as grading students and grading them. While with the help of technology, this can be done automatically and create more free time for teachers and students to deal with more important issues. Following the developments that have taken place in the field of education, the use of systems and software that can grade and answer the answers and exams, as well as written articles of students, will be implemented in educational institutions. This means that both the time the teacher spends on testing and grading will be eliminated and the issue of unfair grading and grading will be eliminated despite automated grading systems. The school management department will be another area that will take over the process of automation and automation through artificial intelligence by processing and classifying administrative tasks.

Personalized learning will meet the individual needs of students.

It may not be wrong to say that we live in an age of personalized service. From movie offers on sites like Netflix to YouTube ads and…, every new service we receive is customized to fit our needs. Even retail businesses have become much more personalized with the help of artificial intelligence.

With the same clue, Artificial Intelligence also helps teachers to intelligently identify and address students' needs from the beginning, rather than identifying students during a semester. This gives teachers ample opportunity to identify and better understand students' problems and to help them appropriately. Software such as Brightspace Insights is able to anticipate students' needs and behaviours and assist teachers in their teaching. Teachers can also create personalized learning programs for each student by accessing student information in advance. Instead of using a general approach to dealing with all students, the system focuses on and works on each person's strengths. Since machine learning and artificial intelligence are very good at identifying patterns that are out of sight of the human eye, they also help the teacher to develop each student's different talents and… different talents by assigning different exercises and appropriate class lectures.

Artificial intelligence will help identify learning gaps

Teachers usually have to consider a certain speed for teaching different topics to cover the curriculum in a short time. This creates gaps in students' learning and topics, and can sometimes lead to confusion and confusion. Finally, schools and universities can solve such problems with the help of artificial intelligence technologies. Students can use a personal conversation in smart learning programs to express their problems and have immediate access to appropriate solutions and answers. These services can also help the teacher to keep the pace of the training at a reasonable level and to inform him/her of the existing learning gaps.

More smart content will be used

Companies like Cram101 and JustThatFacts101 help students learn more effectively through artificial intelligence. For example, it converts textbook content into intelligible content or guides for students that includes multiple-choice quizzes, summaries of important chapters, highlights of important sections of the book, specific summaries for each chapter, and two that they create on platforms. They are available like Amazon.

This type of smart content has been used in a number of educational institutions and in addition, a number of websites have used it to satisfy their users. "For us, smart content means creating an experience based on previous visitor behaviours," explains EMUCoupon, Content Manager. This includes factors such as location, language, population, and device type."

In the academic context, this issue and concept include learning relationships with digital learning settings and guidelines. Some of these platforms have interactive content, the ability to receive feedback, create exercises and complete evaluations. Teachers can easily take advantage of these platforms by creating customizable curricula and content that are easily accessible to students. As this type of smart content becomes smarter, innovations such as simulation and future evaluations will be integrated with these services.

Online education will continue to grow

Artificial intelligence will make international borders virtually meaningless in the education

process. Today, online education has developed and expanded much more than before. Recent studies show that more than six million American students are currently enrolled in distance education classes. As Artificial Intelligence evolves in the field of education, more and more people prefer to enrol in digital and online classes. Meanwhile, governments in developing countries are investing in artificial intelligence-based online education to enhance high-quality education in rural areas.

Face recognition comes into play

We are not saying that intelligent robots will soon replace teachers or that we will see superhuman intelligent training classes. But artificial intelligence and its capabilities will certainly help teachers to change the previously dysfunctional system and create a system in which students can learn faster, better and more effectively. Artificial intelligence will take on some of the time-consuming tasks of teachers and give them more free time to address more important issues so that they can focus more on students. In general, the education system will definitely change a lot in the coming years, and these changes will be in a positive direction.

Methodology

If we want to have a simple definition of artificial intelligence, it can be defined in the form of simulation of human intelligence processes by machines, especially computer systems. These processes can include "Learning", "Reasoning" and "Self Correction". Learning refers to the process of acquiring (or changing) new (or existing) knowledge, information, rules, values, or preferences to improve interaction with the operating environment. Reasoning refers to the use of rules to arrive at "Approximate" or "Definite" results. Alan Turing, nicknamed the father of "Theoretical Computer Science" and artificial intelligence, defined artificial intelligence as "the science and engineering of building intelligent machines, especially intelligent computer programs." (Gams et al., 2019).

Types of artificial intelligence technologies can be categorized in two different ways. In the first method, artificial intelligence technologies are categorized based on capabilities, how they are used, and the range of problems in which they can solve the problem. In the second method, artificial intelligence technologies are classified into different groups based on their inherent characteristics and capabilities.

The first type of classification

In this classification, Artificial Intelligence technologies are classified into two groups: "Weak Artificial Intelligence" and "General Artificial Intelligence" or "Strong Artificial Intelligence":
1. Weak Artificial Intelligence: It is an artificial intelligence system that is built and trained to perform specific tasks. Many current intelligent computer systems that claim to use artificial intelligence technologies to perform their tasks fall into this category and are used to solve specific problems and very limited scope. These Artificial Intelligence technologies are the opposite of strong or general Artificial Intelligence. Virtual personal assistants such as Apple's Siri include such systems.

2. General Artificial Intelligence: It is an artificial intelligence system that has the capacity to understand or learn any intellectual work (which can be done by humans). In other words, in such systems, human "cognitive capabilities" are generalized to machines. Such systems, when faced with unfamiliar tasks, will be able to find the answer without human intervention. These systems are still being researched, and no examples of such systems have been developed so far.

The second type of classification

In this classification, artificial intelligence technologies are divided into four categories based on their inherent characteristics and capabilities. These categories are:

1. Reactive Machines: This is the simplest form of artificial intelligence technology. These artificial intelligence technologies have no memory; They cannot learn and cannot use past information to perform future tasks. These systems, at each stage, evaluate all possible ways to solve the problem. Then, they choose the best possible strategy.

2. Limited Memory: These artificial intelligence technologies are able to use past information to make decisions about future tasks. Some of the decision-making capabilities of Self-Driving Automobiles are designed in this way. The observations made and the information obtained from previous situations are involved in future decisions (such as changing lanes by car). Observations made are not permanently saved.

3. Theory of Mind: This type of artificial intelligence will be able to understand the feelings, ideas, thoughts and expectations of humans and can have social interactions with humans. Although a lot of research has been done in this field, so far,

these types of artificial intelligence technologies have not become a reality.

4. Self-Awareness Intelligence: An artificial intelligence system that has alertness, extraordinary intelligence, self-awareness and emotion; In other words, be a perfect human being. Such systems do not exist externally, and their implementation is the turning point and the final destination in the field of artificial intelligence.

Figure 1 shows the Artificial intelligence technology knowledge map. The purpose of presenting the knowledge map of artificial intelligence technologies is to create a new space for understanding the depth and complexity of the field of artificial intelligence technologies. In this regard, the knowledge map provides an architecture for modelling and access to knowledge in the field of artificial intelligence technologies and its dynamic applications. The upcoming knowledge map can also be considered as an entrance to access existing knowledge in the field of artificial intelligence. Such an approach allows readers and researchers to search for different sources for additional information and ultimately generate new knowledge in the field. Therefore, this model is called artificial intelligence technology knowledge map. The following figure shows the knowledge map of artificial intelligence technologies.

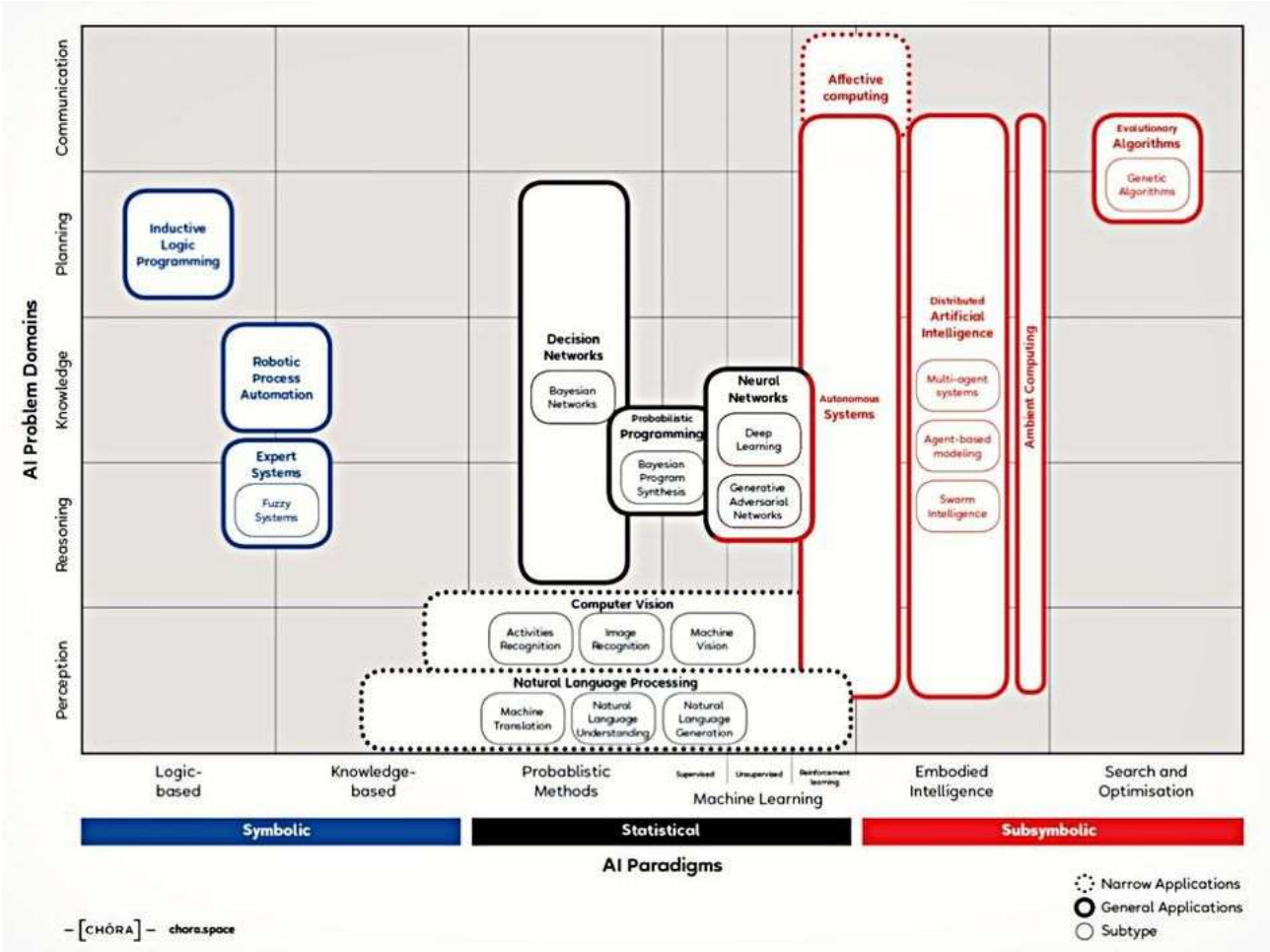

Figure 1. The Artificial intelligence technology knowledge map

Figure 1 shows the macro grouping of artificial intelligence technologies in the horizontal and vertical axes. The horizontal axis represents the "Artificial intelligence Paradigms". Artificial intelligence models are approaches used by researchers and activists in this field to solve problems related to artificial intelligence. The vertical axis represents the "Artificial Intelligence Problem Domain". The range of artificial intelligence problems shows the types of problems that can be solved by artificial intelligence technologies. The range of artificial intelligence issues, in a way, also demonstrates the capabilities of an artificial intelligence algorithm.

The vertical axis in Figure 1 shows the classification of problems that can be achieved by artificial intelligence technologies. The proposed classification of artificial intelligence issues is the standard in this field.
1. Reasoning: Using existing laws, relationships, sets, and theorems in logic to solve complex problems in the field of artificial intelligence technologies such as medical diagnosis and computer-generated natural language

2. Knowledge: Ability to display and understand the environment to create the necessary frameworks to solve the problem
3. Planning: Ability to define goals and perform the necessary activities step by step to achieve them

4. Communication: Ability to know the language (meaning, the natural language of human beings) and communicate through it

5. Perception: Ability to convert raw sensed inputs (such as image, sound, etc.) to useful and problem-solving information.
In the following, the patterns of artificial intelligence or in other words, problem-solving methods in artificial intelligence technologies are examined and defined. First, each of the artificial intelligence patterns is defined. In the following sections, the classification of known artificial intelligence algorithms is described, and each algorithm is defined.

1. Logic-based: These tools are used to demonstrate knowledge in the field of artificial intelligence problems and to solve artificial intelligence problems.

2. Knowledge-based: These tools are based on "ontology" and massive structured knowledge bases (consisting of concepts, definitions, information, and rules).

3. Probabilistic Methods: There are tools that allow the actors involved in the problem environment to solve the problem in scenarios containing "incomplete information".

4. Machine Learning: There are tools that allow computer algorithms to learn data patterns and models.

5. Embodied Intelligence: There are engineering tools that assume that the formation of a body (or at least a small set of capabilities such as motion, perception, interaction, and visualization) is necessary to produce a complete artificial intelligence or an entity with higher intelligence.

6. Search and Optimization: Using such tools, it is possible to implement intelligent search methods in the problem-solving space (with the ability to generate more than one answer per problem).

The ongoing systemic analysis of Artificial Intelligence use in education is mostly theoretical in its way. The methodological basis of this review is based on various general scientific techniques and methods of scientific research (analysis, synthesis, deduction, induction, system-structural, formal-logical approaches). The most relevant data is taken into account; the perspectives for further research are specified.

Main Part

As has already been mentioned, modern education is aimed at obtaining the skills of living in the digital world in order to improve the quality and the conditions of everyday life. This means that the main educational trends should include personalization of learning, adaptive learning, student's involvement in the process of forming the curriculum, open data resources use, active students' interaction, network/cowork and interuniversity educational projects.

According to recent ongoing researches, it turns out that about 80% of education experts believe that personalization plays an important role in engaging students in the process of learning in order to make it more effective (http://unesdoc.unesco.org; http://en.wikipedia.org). So personalized learning that adapts educational content to the unique needs of individual learners has been adopted in a number of educational institutions around the world to achieve better results. And no one can deny that this trend of taking advantage of data analysis and artificial intelligence use has become an important part of the educational process and sequently has got a terminology system to be specified in the article.

First of all, it is necessary to admit the fact that there are modern and popular approaches to the process of studies that might in some way have stimulated computer science to start the research in the field of education. For example, the term adaptive learning is connected with the individual approach to the education itself. In other words, it is based on each individual student's learning process, starting from studying the content and ending with the control point. The study material is chosen, adapted to the level of knowledge of each student and the most appropriate learning style. The next notion, One-to-One Learning, can be defined as the process of study adjusted to suit the needs of

individual learners. Differentiated Learning is associated with the teaching approach adjusted to meet the requirements of individual learners. Competence-Based Learning is based on the students' progress towards learning based on their ability to demonstrate competence, including the application and creation of knowledge along with skills and abilities (Burnjashov, 2017; Hutchins, 2017).

The term *personalized learning* refers to such an educational process in which the pace of learning and the instructional approach are optimized for the needs of each student. This means that learning objectives, instructional approaches, and content can vary in accordance with the students' needs. Mostly these positive features are available due to e-learning which unites the process of organizing education, training programs with the use of electronic means. It involves the use of a computer or other electronic devices (almost always with Internet access) to provide instructional, educational or teaching materials. Its main benefit is the possibility to use technology to enable people to learn anytime and anywhere. Moreover, e-learning allows students and educators to interact using information and communication technology.

We must admit that the discussion of the problems and directions of using electronic educational resources and technologies has been going on in pedagogy for several decades. The history has proved that there was a great way from digital textbooks (on CD and DVD) to the use of training and content management systems (LMS, CMS), then to the creation of immersive learning software that provides educational services to a wide range of geographically distributed users (Hutchins, 2017). It can be stated that the evolution of educational technologies has led now to the emergence of two types of competing teaching aids – standardized management systems for the learning process (LMS such as Blackboard, Sakai, MOODLE, Prometheus, Batisphere, etc.) and variable personal, educational environments, created using cloud services of the Internet. Foreign publications pay special attention to the online learning environment (OLE), virtual learning environment (VLE), personal learning space (PLS), personal learning environment (PLE). In Russian terminology speaking of the same problems, we address to the term LMS which is related to the educational process. Since we have acquired lots of online platforms like Courser, Udacity, EdX, etc., they have all got the name Massive Open Online Course (MOOC) possessing the features of educational space under discussion (Khurana, 2018). But no matter of the character of a platform, educational consortia or university location they are supposed to be implemented into the learning process. One can not deny the fact that since the "teacher-student" story bears the online character, there arises a question of a personal, educational space (PES) which is aimed not only at the process of teaching and learning but on the process of self-education. This space is created by a teacher and includes several necessary modules including classified teaching material, practical representation, testing etc. Harold Jarche describes personal knowledge management as a sequence of processes: "Seeking – Sensing – Sharing" (Jarche, 2020). A technological base has also appeared for the fulfilment of the PMZ mission - services like Scoop. It, Paper.li, List.li, Pearltrees.com, Curata.com, etc., secondary school teachers. According to Beth Kanter, the content curator selects the best content that is relevant and relevant "to share with the community." In her opinion, "content curation is the process of sorting a huge amount of Internet content and presenting information in a meaningful and organized manner around a specific topic" (Kanter, 2020).

Thus, the goal of the content curator is to duplicate, organize and structure the content in a personal depository, while the author's interpretation and commentary on information are scattered in specific areas of social activity. The authors of such services perform important didactic functions which are analytical and research, as well as compensatory, reducing the unproductive time and effort of other network users to search for relevant information. Thus, the described teacher's activity in the curation of content within the framework of personal knowledge management allows the daily updating of one's personal, educational sphere (Perceived Differentiation and Personalization Teaching Approaches in Inclusive).

In this context, an important role is played by the definition of the structure of education, which should be contextualized and adapted taking into account the requirements of teachers who have individual approaches to learning and students (Paskova, 2018). E-learning is a web-based delivery of personalized, dynamic learning content that fosters communities of knowledge that connect learners and practitioners with experts. E-learning supports the various stages of the traditional educational system, and in some cases, it is the only possible learning method to acquire knowledge, like for example, for students with disabilities and special needs.

E-learning needs to be more than just a collection of technology solutions. In addition to effective multimedia delivery, they should aim to improve the quality of learning and intellectual interaction at the cognitive, behavioural and physiological levels. One of the obstacles to the successful implementation of e-learning is the lack of personalization of learning. The learner-centred aspect of e-learning is often overestimated. All the student has to do is simply follow the paths that are set through the entire course of study, from pre-assessment to post-assessment. Another problem is that most courses are offered during the academic semester, without regard to preferred learning pace and experience (Vajnshtejn, & Esin, 2017; Khurana, 2018; Perceived Differentiation and Personalization Teaching Approaches in Inclusive).

Effective personalized learning systems must be based on the following: teaching goes along with institutional standards and also fosters the social and emotional skills students need to be successful; students are encouraged to customize their learning experience according to their interests; learning follows the pace of each individual student, which means that students can move forward when they are ready or slower until they fully understand the material; teachers have access to real-time student assessment data and feedback so they can adapt materials and intervene to help students when needed; access to understandable, transferable learning objectives and assessments, so students understand expectations in advance.

Personalization in e-learning is the use of technology and student information to tailor the interactions between the teacher and individual learners so that learners achieve better learning outcomes. Researches related to personalization in e-learning focus on two main aspects: first, the management of teaching materials and other information; secondly, the educational process with an emphasis on people engaged in educational activities (Samarakou et al., 2018). Personalized learning technology systems help learners to set their own learning goals, manage their learning, manage content and process, and communicate with others in the learning process, thereby achieving learning goals. These systems can consist of one or more subsystems, which, in turn, can be built on a desktop application or on web services (Baylari and Montazer, 2009).

Personalization in e-learning focuses on surroundings (how the content is displayed in front of the student - font size, colours, backgrounds, themes, etc.), content (audio, video, text, graphic, etc.), the interactions that occur between the teacher, the student and the learning content (gamification, blended learning, tests, tutorials, adaptive learning, etc.), the sequence of presentation of the material, the way students are assessed, feedback mechanisms and much more.

So, Artificial Intelligence being the modelling of human intelligence processes by computer systems includes learning (obtaining information and rules for using information), reasoning (using rules to reach approximate or specific conclusions), and self-correction. Specific Artificial Intelligence applications include expert systems, speech recognition, and machine vision. One area where artificial intelligence can lead to big changes in education, in particular, e-learning. The use of Artificial Intelligence in e-learning has the potential to create a realistic environment with which students can interact. The student will essentially interact with intelligent agents, which, in turn, perceive changes in the simulated environment (Cavus, 2007).

Let's consider the main possibilities of using artificial intelligence technologies in personalizing e-learning. Artificial intelligence can automate basic education activities, such as certification. Educational software can be tailored to the needs of students. One of the key factors in the influence of artificial intelligence on education is the increase in the level of individual learning. This is already happening in part thanks to a growing number of adaptive tutorials, games and software. These systems respond to the needs of the student, focus more on certain topics, repeat things that students have not mastered, and tend to help students work at their own pace. Artificial Intelligence technology is able to indicate where courses need to be improved and provide useful feedback to students and teachers. Coursera, a major online course provider, is implementing this technology. For example, when a large number of students give the wrong answer to the same task, the system warns the teacher about this and gives the students a special message that contains hints for the correct answer. This helps to fill in the explanatory gaps that may arise as you study the course and ensures that all students build the same conceptual framework. Instead of waiting for an answer from the teacher, students receive immediate feedback that helps them understand the concept and remember how to do it right next time. Educational programs based on artificial intelligence. These programs can teach students the basics, but they are not yet able to help students learn to think and create. Changing the role of the teacher. Teachers will always play a role in education. Artificial intelligence systems can be programmed to provide

expertise, serving as a place where students can ask questions and find information. However, in most cases, Artificial Intelligence shifts the role of the teacher to that of the facilitator. Artificial Intelligence can make learning by trial and error less intimidating. Trial and error is a critical part of learning, but for many learners, the possibility of failure or not knowing the answer is critical. Artificial intelligence can offer students a way to experiment and learn in a relatively judgment-free environment.

Personalization in an e-learning system can be achieved through two levels of personalization. Level 1 allows you to personalize the learning content and course structure in accordance with a given personalization strategy, while level 2 defines the personalization strategy. The teacher must select and apply a personalization strategy that matches the characteristics of the learner and the specifics of the courses (Castro et al., 2007).

While major changes may come in a few decades in the future, the reality is that artificial intelligence can radically change just about anything we take for granted in education.

Discussion and Results

Artificial Intelligence is our present and future. It can make our life better, and in the future, perhaps, become the salvation for humanity. However, too much depends on the person himself. How we manage technology, how we "educate" smart androids, will largely determine what our future will be. The use of Artificial Intelligence technologies allows you to personalize e-learning. Using Artificial Intelligence systems, software and support, students can learn from anywhere in the world, at any time, with such programs replacing certain types of classroom teaching. AI-based education programs are already helping students acquire basic skills, but as the number of these programs grows and as developers learn more, they are likely to offer students a much broader range of services. Artificial Intelligence in education can automate certification, freeing up the teacher. Artificial Intelligence can assess students and adapt to their needs, helping them work at their own pace. Artificial Intelligence could change the place and way of teaching students, perhaps even replacing some teachers (Alaoui Harouni et al., 2017).

Artificial Intelligence applications in e-learning can help educational institutions map out the learning path for each student based on their individual success, as opposed to the current model of delivering the same content to everyone at the same time. Experts see these technologies as an ideal way to facilitate personalized e-learning without the need for increased teacher requirements (Bhattacharya and Nath, 2016).

The purpose of e-learning is to improve the knowledge and skills of human resources by using an up-to-date and cost-effective program. Even if an institution's staff has enough time to attend traditional classes, live class-based training will still be costly for the organization. In addition, employees must update their information as technology advances.

1. Permanent education for everyone and everywhere: In this type of education, learners' access to the content of the course does not depend on time and place. Access to e-learning through computer networks is permanent, and there are no restrictions on its use for staff, students and the rest of the community. The only basic requirement for using computer-based training and online training is to have a computer. Also, in e-learning, people are able to learn what they need at any time of the day or night and throughout the week.

2. Cost savings: In e-learning, travel costs and expenses related to professors and consultants are reduced, and time is wasted. Training courses can be divided into shorter sessions and instead offered on longer days and weeks. In e-learning, institutions do not lose employees and employee productivity increases. They can both work and learn.

3. Cooperation and interaction: E-learning solutions, like traditional education, lead to interaction between the student and the teacher to better understand the concepts, with the difference that in the discussion between the learner with each other or with the teacher, other class members can continue teaching regardless of the discussion. Interaction in e-learning environments is possible in environments such as chat rooms, forums, bulletin boards, etc.

4. Fearless learning: Students enrolling in an online course enter a risk-free and stress-free environment in which they can try new things and make mistakes without exposing themselves to the judgment of others. This feature is especially valuable when students are learning skills such as decision making and leadership.

5. Ability to select different levels: In e-learning, students can select the required levels and courses

in the shortest possible time according to the instructions provided. At any stage of e-learning, if the student feels that he/she has not chosen the required level correctly, he/she can enter other levels of training courses bypassing the necessary steps. In fact, in e-learning, the lesson for a slow user is not delayed. E-learning spaces are characterized by individual-centred learning, i.e. each learner moves in the course based on their knowledge and ability and adjusts the learning speed based on their ability, knowledge and time. One person completes a course in one week and another in one month.

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