

DIGITAL LEARNING AND TRANSFORMATION OF EDUCATION

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Abstract. This article explores the problems faced during the digital transformation of the educational system and solutions to these challenges are also discussed. It argues that digital technology, including AI, could improve the effectiveness and quality of education by personalising education, be it teaching and learning or other education services, by making it more inclusive and possibly equitable, and by improving the cost-efficiency of the sector. By addressing these issues, the educational system can fully leverage the benefits of digital transformation to enhance teaching and learning outcomes.

Key words: digitalization, technology, infrastructure, cybersecurity, artificial intelligence, education, digital technology.

ЦИФРОВОЕ ОБУЧЕНИЕ И ТРАНСФОРМАЦИЯ ОБРАЗОВАНИЯ

Абстрактный. В данной статье исследуются проблемы, с которыми сталкиваются в ходе цифровой трансформации системы образования, а также обсуждаются пути решения этих проблем. В нем утверждается, что цифровые технологии, включая искусственный интеллект, могут повысить эффективность и качество образования за счет персонализации образования, будь то преподавание и обучение или других образовательных услуг, делая его более инклюзивным и, возможно, справедливым, а также повышая экономическую эффективность сектора. Решая эти проблемы, система образования может в полной мере использовать преимущества цифровой трансформации для улучшения результатов преподавания и обучения.

Ключевые слова: цифровизация, технологии, инфраструктура, кибербезопасность, искусственный интеллект, образование, цифровые технологии.

INTRODUCTION.

The relevance and significance of the digital transformation of the educational process is caused by the global processes of the transition to the digital economy and digital society. The digital way of life, like any new technological order, opens up new socio-economic prospects for the society and provides people with new opportunities. It has been generally accepted that the digital transformation of

society is changing the global landscape, the role and opportunities of the student in this world (especially in the world of professions) [1]; new types of activity that expand the boundaries of the modern world appear; new technologies change the instrumental capabilities of the economic subject; the role of motivational and value attitudes and moral-ethical qualities of the individual also increases [2,3].

Digital transformation for educational institutions is a huge step forward in enhancing the learning process and automating plenty of operations: from printing countless essays and coursework to evaluating tests and calculating the GPA. The process of digitalization in education offers a lot of benefits for students, such as faster access to tests and grades through online systems. E-learning systems allow to submit papers, do instant plagiarism checks, and track attendance. All these factors form students' performance levels that you can easily measure via a digital platform. [4]

A number of studies are devoted to the relationship between the economy and education in the modern digital world; they examine the features of the development of practical skills and competencies of students based on case studies in the digital economy. People working in the digital environment should be able to create and process complex information; think systematically and critically; be creative, and able to solve real problems of the digital world [5,6]. In a number of studies, the issue of the development of digital education is closely related to the introduction and implementation of the artificial intelligence technology in the daily life [7]; the advent of native digital generations, people who reside in the digital environment, dramatic changes associated with career guidance, multiple changes in employment and lifelong learning [2,8]. The issue of the ambiguity of human interaction with the digital environment and its negative impact on cognitive abilities, attention, and other aspects of human life is of particular importance [9].

Literature review.

Foreign and domestic researchers note that the digitalization of education has significantly changed the relationship between the teacher and the student. This is due to the fact that today the student has free access to various sources of information, as opposed to the traditional model of education, and therefore teaching methods should be more interactive and attractive based on digital technologies [10,11,12]. Digitalization does not completely eliminate the human factor in education; it defines a new place and qualifications of teachers in a digital society and the education system [5]. The teacher should not be a knowledge transmitter, but a mentor and facilitator, whose task is to help students adapt and apply the knowledge gained.

Both developed and developing countries should deal with the digitalization of education [13]. Kalolo [13] highlights the fact that the digital era around the world has proven its ability to transform most educational processes and systems, including the educational systems of developing countries (including Tanzania). Considering the infrastructure and resource problems in the region, the researcher places the focus on the attempts to bridge the knowledge gaps associated with digital technologies in education and describes problem area and promising approaches to their solution. Learning Management Systems (LMS) allow students to access any online course and resource to receive on-demand assistance beyond the physical reach of their instructors [14]. At the same time, there is a consensus of opinion that the digitalization of economy and education is the future; economic and educational processes are interconnected and objectively conditioned by the overall development of the world and civilization that bring a new vision of and attitude to the education system, new forms, and means of education. Therefore, there is a need to include new digital technologies in these processes.

Methodology.

Based on the analysis of the methodological approaches described in the economic and pedagogical literature, a group of assessment parameters was defined; in our opinion, they are the most consistent with the research problem related to the quality of the digitalization of higher education. The parameters were determined by refining the research concepts and methodologies based on the latest practical research in this area [1,9,15]. The study was based on surveying a statistically significant sample of representatives of a higher educational institution and comparing the assessments of the digitalization process by the teaching staff and students.

Opportunities of a digital transformation

Personalising learning and education

The personalisation of education is one of the major potentials of digitalisation. Personalisation does not imply or assume that education is no longer social and collective; it simply refers to the delivery of education that helps learners individually in their educational journey. While the contexts can be different, the personalisation of education and learning is based on the same principles: capturing and detecting information that is specific to a student or that can be inferred from detections made on “similar” students; using the detected information to make a diagnosis, for example a recommendation; and in some cases, having an intervention based on this diagnosis, usually under the supervision of a human being. This can be used for instructional decisions when giving study and careers advice, for designing

specific educational interventions, etc. What the diagnosis phase requires is usually a large amount of data or observations that allows comparisons to be made between a specific person and others who share some of the same relevant characteristics.

- **Inclusion and equity**

The digitalisation of learning tools and resources can expand access to learning and teaching materials, and thus learning opportunities. Educational platforms proposing open educational resources or massive open online course (MOOC) platforms are good examples. At least in some parts of the world, they allow learners to access learning materials that may be superior to what they can access locally. When provided universally, closed-access resources limited to students enrolled in an education system can also provide students with more learning opportunities. Contrary to textbooks, digital resources can be made accessible at scale on a mere use basis. When provided by the national or central government, all students within the education system can access them and learn under the supervision of their teachers (but also possibly on their own). In the analogic world, this would be equivalent to providing students with all available textbooks and allowing them to choose the ones that work best for them, something that is not feasible under public resource constraints.

- **Enhancing the quality of teaching**

As teaching is key to students' success, and as human educators are key to the wellbeing and holistic education of children in school, digital technology that supports and provides feedback to teachers and other educators offers another opportunity to improve the quality of education. The examples of personalised education presented above provide teachers with suggestions, recommendations and food for thought about specific students, unless the information is trivial. Perhaps this can make teachers realise that specific students needed more attention, or that they would have been expected to perform better (or not as well) as they do, or that they might be at risk of dropping out. This information derived from past data points that are usually not accessible to them, or from a comparison with other students within a system, enables teachers to reflect on their instruction practices and on how to customise them for a given student or class. In some cases, these digital tools not only provide information to teachers, but they also make suggestions on teaching and learning resources, etc. While teachers can ignore them, as is the case for medical doctors who receive information from their "expert systems", this can hopefully provide them with ideas to improve their teaching for a given context.

- **Improving efficiency**

In many business and government sectors, beyond effectiveness, a major rationale for digitalisation lies in efficiency. Many countries have embarked on digital government strategies to this effect, notably to make processes more efficient and easier for their users. The OECD has developed a Recommendation and principles highlighting these different objectives.

There are different ways in which digital technology can increase cost efficiency in education. One example lies in student application (and admission) processes for educational institutions. Applications are sometimes undertaken through digital platforms, especially for the transition towards higher education, where a “matching” (or selection) process is often necessary. In open-admission institutions, when no selection is required beyond rule-based criteria, implementing seamless automated admission processes is even possible. The implementation of the National Education Information System (NEIS) in Korea, an e-government system that allows, among other things, for the digital transfer of students’ academic records from one school to the other (as well as from school to university) was estimated to have saved USD 237 million a year when a cost-benefit analysis was undertaken in 2010.

- **Making education more relevant to modern times**

Regardless of the benefits of personalization and cost-efficiency, a strong argument for the more intensive use of digital tools and resources in education lies in the development of learners’ digital skills. This is one of countries’ main educational objectives, recognizing that education should reflect and prepare students for modern societies. While in the past, most evaluations of digital technology in education focused almost exclusively on their effects on students’ learning outcomes, usually in mathematics or language, both the COVID-19 pandemic and the ongoing digital transformation of our societies have shown that this may not be the only rationale for digital education. Even if the use of digital technology did not improve the effectiveness of education compared to its non-digital equivalent, it might still be important to use digital tools to develop students’ digital competences: to ensure a better mastery of digital technology, to familiarize them with it, and to help them understand broadly how it works. Many countries have made “digital competences”, defined in different ways, a transversal competence (and made “computer science and/or computational thinking” a more important part of their curriculum).

Opportunities usually come with challenges and unknowns, especially when digital technology is new and evolving at a fast pace. Harnessing the promises of a digital transformation requires both awareness and mitigation of those risks, and a

careful cost-benefit analysis. While some of the risks are new and specific to digitalisation, many are not; digital risks need to be compared with the risks of a non-digital education.

Analysis and results.

Digital transformation in K–12 (the foundation of a student's academic career) institutions is a crucial process that can impact the education system as a whole. However, the journey toward digital transformation comes with several challenges that must be addressed. The most significant of these challenges include, lack of technical proficiency, funding and resources, cybersecurity and addressing digital inequities. Many educators may not be proficient in technology and may need training to effectively implement digital tools in their classrooms. Additionally, K–12 institutions often have limited IT resources, which can make it challenging to keep up with the latest technological advancements. Implementing digital transformation in K–12 institutions requires significant investments in technology and infrastructure. Schools may struggle to secure the necessary funding, especially in low-income communities, where budgets are tight. As schools rely more on technology, the risk of cyberattacks increases. Ensuring the security of students' data and protecting the school's network and systems from cyber threats is a significant challenge that must be addressed. The digital divide, where some students have access to technology and others do not, is a challenge that must be addressed. This disparity can negatively impact the learning experience and hinder the effectiveness of digital transformation efforts. [16] Digitalization of the educational system, in a broader sense, in addition to modernization of the teaching process, refers to the improvement of all processes in education, namely: keeping electronic pedagogical records; digitalization of processes (registering for external/ graduation/professional exams and contests, establishing the identities of out-of-school children, etc.); establishing inter-ministerial cooperation using data exchange systems (interoperability); and creating electronic services for citizens (parents, guardians and students) and institutions.

In addition to the development of software solutions, with the help of which we are digitalizing these processes in education, it is necessary to work in parallel on improving the hardware infrastructure, but also on establishing the best possible models of system protection. For better utilization of the entire system, it is necessary to implement various models that affect the quality, reliability and accuracy of the data, but also to strengthen the structure of staff in the ministry and in educational institutions. Providing computer equipment for educational institutions should be an ongoing process. Due to compulsory and elective subjects/

modules in the field of informatics, it is necessary for schools to have computer classrooms. The number of computers and computer classrooms depends on the number of students in the school. Computer classrooms need to be refurbished every five to six years. Also, it should be borne in mind that computers are used in the teaching of other courses/modules.[18]

Conclusion and recommendations.

Faced with the above opportunities and challenges, managers need longterm solutions and strategies to promote digital transformation in education. Firstly, raising awareness about the importance of digital transformation in education, leaders need to raise awareness and popularize the ideas of all teachers, lecturers and staff in the school so that they understand the importance of digital transformation in education as well as build a culture together. active in education. Besides, it is also necessary to foster and improve skills and professionalism for teachers, lecturers, officials, etc. to achieve the goal of implementing digital transformation in education. Secondly, completing database in education, the head should deploy a synchronous education data sharing system and convert paper documents into electronic documents to make management and learning more convenient. Thirdly, building network infrastructure, technology equipment, the improvement of network infrastructure and equipment for teaching and learning will create equal learning opportunities between different regions. Education managers can prioritize the form of outsourcing and mobilizing social resources to participate in the implementation towards successful digital transformation in education. Furthermore, perfecting the legal system in education, building a legal system to ensure the interests of learners and playing a very important role in educational management. Data mining and sharing, teaching methods, online course management, etc. should be clearly regulated.

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