DIGITAL TRANSFORMATION OF HIGHER EDUCATION SYSTEM

George BUCĂŢA*, Florin POPESCU**, Cosmin TILEAGĂ***

***"Nicolae Bălcescu" Land Forces Academy, Sibiu, Romania
**"Carol I" National Defense University, Bucharest, Romania
***"Lucian Blaga" University of Sibiu, Romania
george.bucata@yahoo.ro, popescueve@gmail.com,
cosmin.tileaga@ulbsibiu.ro**

Abstract: *Digital transformation of higher education undergoes cultural, mental, and technological change as an overall process. The present paper represents a correlation of the current literature that brings to light the key pillars aspects of the digital transformation of higher education. The objective of this research study was to outline a model of digital transformation strategy applicable to the Romanian academic environment. The original contribution of this study lies in establishing the key pillars elements and necessary stages for the implementation of digital transformation strategy for higher education which should be focused on students and effects.*

Keywords: focused on students, technologies, processes, digital campus, digital library platform, digital interactions

1. Digitization, digitalization or digital transformation of higher education

Digitization, digitalization, digital transformation or transformation through digitization? Different institutions or organisations use one, two, or all of these terms when describing their efforts to take their organisation to the next level of performance. At the level of the Romanian Army, for example, the goal is "digital transformation" [1].

Technology has grown increasingly crucial for every section of society and has taken on a transformational role, and this influence has been seen most prominently in the education sector, which has been challenged in the previous almost two years. The changes that have just been felt, but have been visible for some time, have resulted in the necessity to digitize the education sector and connect students' digital abilities with the demands of the future job market. Under these conditions, teachers must adapt to new generations with different learning styles and demands than previous generations.

Digitization is not an end in itself, but a way to promote change. Only when we understand the digitization process as a means to beneficially transform the organisation will we be able to understand the power of digital technologies to support the members of the organisation. Transformation through the digitization of an organisation implies a cultural and mental change, the de-bureaucratization of activities and putting the user at the centre of the systems while optimising the use of information resources.

In this context, the question arises as to why we can no longer work in the traditional way, where operations are carried out

manually by entering various data in registers, printing reports or declarations on paper, obtaining approvals by signing with a pen, and physically transporting the document in the approval/authorization chain? Aside from the time and effort required to travel and the fragmentation of many workers' schedules, there's the information explosion we have been experiencing lately that we can not manage effectively. Information is ubiquitous, in formal and informal spaces, in closed or private secret networks, and in public social networks. We no longer read paper newspapers, but we continue to collect binders to protect ourselves from the law or to quantify the time we spend in the office. Add to this the over-bureaucratization of the work of organisations, which can cripple their core function. Excessive bureaucratization has effects that go beyond the bureaucratic processes and can desolate the relational system of the organisation as a whole.

According to Statista Finland was the European country with the highest score on the Digital Economy and Society Index (DESI) in 2020 (Figure 1), placing first in the human capital component due to its inhabitants' superior digital capabilities. Denmark was ranked third overall, but first in terms of connectivity. Bulgaria, Greece, Romania, and Italy had the lowest scores in terms of digitization of their economies and societies. A timely reaction to your difficulties is critical in times of distress. COVID-19 has revived the states' reaction capabilities and defined a mobilization of resources relevant to the various scenarios in concern. Romania effectively attempted, in March and April 2020, to develop equitable solutions for children's access to education and to assure their return to school, depending on the course of the epidemic. A range of activities and initiatives from the central government, as well as those from the private sector and non-governmental groups, have resulted in a complicated initial reaction, which tackles early school departure and

promotes learning as a coordinated process in the first phase [2].

Higher education institutions have shown a very high level of adaptability to digital teaching models during the Covid-19 pandemic, but they need many additional resources and special training to support this model economically and pedagogically, a new analysis on the model draws attention. issue, published by the European Commission. In addition, higher education institutions need additional changes, from technical issues to certification issues, in order to support the growing needs of digital education. Prior to the COVID-19 epidemic, higher education was one of the least digitized and most labor-intensive industries. However, prior to the pandemic, the higher education sector began to face growing pressure to reorient itself toward more digitally-driven and outcome-focused economic models, as private finance poured into digital and online learning.
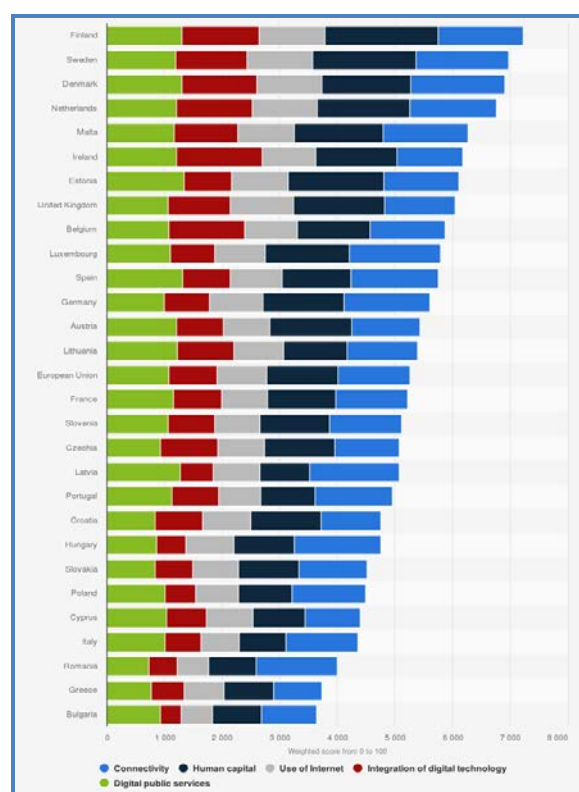

Figure 1: EU: digitalization level 2020, by country
Source: Statista.com, January 2022

Today, the field of online courses and degrees, particularly post-graduate education for adult learners, is a multibillion-dollar industry, with 'Massively Open Online Courses' playing a significant role (MOOCs). Prior to the onset of the pandemic, many colleges, like commercial organizations, had begun to implement mixed and totally online formats by gradually adapting to the burgeoning post-graduate sector [3]. Because of the lockdown, teachers were forced to adapt swiftly to online tactics, even if they had little or no expertise. At the start of the epidemic, instructors might be separated into two groups: those who depended on traditional techniques and had never utilized digital tools previously, and those (usually younger) faculty who were already familiar with internet technologies. A research conducted by the Organization for Economic Cooperation and Development (OECD) in Europe indicated that on average, around 40% of educators throughout the EU felt well equipped to use digital technology in teaching, with considerable differences between EU Member States [4] Among educators who had to use online technologies for the first time, there was a wave of gaps in terms of the technological skills needed to use computers. In addition, this time there was a lack of communication skills in a new environment, namely the online environment. There were also problems in the proper use of the various teaching-learning tools and in quickly solving specific problems that arose during the learning sessions.

2. Research method

It is well known that the choice of a research paradigm has a great impact on the design of the research and the interpretation of the results obtained. According to Estelle M. Phillips and Derek S. Pugh (1994), there are several methods of scientific research, of which interdisciplinary research in the field of digital transformation was chosen in this paper [5].

Thus, the research method used within this paper represents a correlation of the current literature which has as main objectives to responds to following:

✓ What is already known in the field of digital transformation research in higher education?

✓ What are the relevant concepts and theories in the field of digital transformation?

✓ Are there controversies that need to be considered when developing strategies for the digital transformation of higher education?

✓ Are there conflicting findings in the research area proposed in this paper?

✓ Are there questions about the digital transformation of higher education that have not yet been answered?

3. Action plans and regulations of higher education digital transformation

At the European Union (EU) level, the Digital Education Action Plan (2021-2027) is adopted as a renewed policy-level initiative to support the process of adapting the entire education and training system in EU Member States to the challenges of the digital age in a sustainable and efficient manner. This Digital Education Action Plan sets out a long-term strategic vision for the new digital education to be high quality, inclusive and accessible across Europe. The European Union aims to address these new challenges and opportunities arising from the COVID-19 pandemic, which has seen an unprecedented use of technology for educational and training purposes, and therefore seeks greater collaboration at Member State level in this area of digital education. At the same time, this plan highlights the importance of collaboration between different sectors to bring education into the digital age. New opportunities are identified, including improving the quality and quantity of teaching in all aspects of

digital technologies and, of course, providing the necessary support for the digitization of teaching methods, pedagogy and the provision of all the infrastructure needed for inclusive and sustainable distance education. To achieve these proposed goals, the Action Plan identifies two areas of focus.

The first area concerns providing the support needed to develop a high-performing digital education ecosystem. This includes: the necessary digital infrastructure, connectivity, and equipment; effective digital capacity planning and development, including up-to-date organisational capacity. There is also a need to ensure digital training for teachers and the recruitment of staff with high-quality education and training backgrounds, as well as user-friendly tools and secure platforms that comply with e-privacy rules and ethical standards.

The second area concerns improving digital skills and competencies for digital transformation. In this context, the following are considered necessary: basic digital skills and competencies from an early age; digital literacy, including countering disinformation; knowledge-based education and understanding of data-intensive technologies such as artificial intelligence (AI); advanced digital skills that produce more digital specialists; and ensuring that girls and young women are equally represented in digital studies and careers.

At the national level, digitization efforts in Romania were accelerated with the launch of the National Digital Agenda Strategy for Romania 2020 in 2015, which sets the framework for Romania's integration into the European Digital Single Market in the field of information and communication technology by defining guiding principles and criteria for improving public services. It is important to highlight the inclusive nature of this vision, which clearly states that "in order to achieve an organised

implementation of the Digital Agenda for Romania 2020 in all areas of action, it is important that the guiding principles and criteria for public services serve as a basis for the development of projects for the Digital Agenda in Romania, regardless of their area of action" [6].

The European Commission [7] conducted a Europe-wide stakeholder consultation prior to the publication of the Digital Literacy Action Plan 2021-2027. The COVID -19 incident was seen by 95% of stakeholders as a "turning point" for the way technology is used in education and training. In addition, respondents cited teachers' digital skills and competencies as the most important issue for digital education. In Europe, the European Commission has launched actions from 2021 aimed at developing a high-performing digital education ecosystem at EU level by improving and expanding digital infrastructure, connectivity and equipment. For example, funding will be made available at the EU level to expand broadband and high-speed internet access in most EU member states through programmes such as the Recovery and Resilience Facility. During the COVID -19 outbreak, 95% of European institutions used at least one level of distance learning. Since then, faculty have relied on digital technologies, such as videoconferencing, sharing course materials via digital and online learning systems, interacting with students via chat rooms, and setting up forums to facilitate specific debates or working groups. Another area of focus is the provision of digital media for recording explanations and making them available to students, as well as the development of new methods for assessing and tutoring distance learners. In addition, the use of these new digital tools should be simultaneous or asynchronous, sometimes combined.

It follows, of course, that there is a prerequisite for educators to be able to handle the new digital and online learning

formats that are planned for the long term. This relates to the need to incorporate digital education into professional development, including the training of prospective teachers. Educators, in particular, need to understand how to adapt digital technology to specific subjects, goals, and activities. As a result, their professional development opportunities must shift from gaining skills to mastering specific tools or technical competencies.

Furthermore, educators are constantly faced with the challenges posed by the emergence of new digital technologies such as artificial intelligence and virtual and augmented reality. All of this helps them to play a more active role in designing learning units and also in implementing these tools to ensure more effective, desirable and inclusive use in the future. The European Action Plan for Digital Education therefore aims to provide a concrete framework with practical principles for the successful and equitable implementation of distance, online and hybrid education [8].

Now, more than ever, Artificial intelligence (AI) is present in our lives, reshaping the world we live in and manifesting itself in various forms: chat bots that use AI to understand customers' problems faster and to provide more efficient answers; referral engines, which make automatic recommendations for TV shows, depending on the viewing habits of users; smart assistants that analyze essential information from large text datasets to improve programming [9].

Promoting digital transformation of teaching and learning in higher education necessitates the creation and implementation of novel digital learning tools and formats. It does not, however, ensure long-term success. The establishment of a digital learning culture necessitates the growth of new kinds of engagement, which is critical for long-term sustainability. As a result, students, educators, and administrators must collaborate to investigate new difficulties and encourage digitalization-related changes. A participatory culture can be defined as a comprehensive transition from training to learning, with distributed leadership, active participants, shared decision making, and transparent evaluation of outcomes. Building a digital learning culture must begin with the appropriate selection and successful integration of digital technologies in the classroom. Because digital technologies give a plethora of new alternatives and resources for learning experiences, they force educators to modify their teaching practices and techniques. Digital technology, in particular, allows students to create their own genuine learning by self-exploring difficulties and developing their own self-perceptions [10].

As a result, instructors may serve as facilitators, assisting students in developing skill sets that include creative and adaptable learning experiences through the right use of accessible digital resources. In this environment, students have the ability to direct the learning process, which frequently results in non-linear learning in which students reflect not just on outcomes but also on the learning process itself.

Romania's digital transformation, like that of the rest of Europe, is being expedited by the fast development of new technologies such as artificial intelligence, robots, cloud computing, and blockchain technologies1. This is why it is critical for everyone to invest in their digital abilities throughout their life. Openness to tangible experiences and initiatives, innovative learning methods and materials, and open educational resources may all help education. Online collaboration allows students and teachers to achieve more autonomy. Students from socioeconomically disadvantaged circumstances can benefit from access to and usage of digital technology, which can assist bridge the learning gap between them and students from disadvantaged

backgrounds. Through the individualized approach of the teachers' effort in each of them, personalized teaching strategies boost the motivation of the students.

Research and innovation enhance living and working circumstances in the European Union (EU), which is why it is at the core of policies aimed at stimulating employment, development, and investment by the European Commission. Furthermore, research and innovation offer us with the information and solutions we need not just for immediate crises like the Ebola outbreak or the refugee crisis, but also for long-term societal concerns like transportation, climate change, and energy. In everyday life, they improve healthcare, transportation, and security, and they serve as a springboard for many new goods and services.

The EU is a prominent actor in the global scientific and technology scene, and it is unquestionably the leader in several sectors, including renewable energy and environmental protection. The European Union is the world's greatest "knowledge factory," accounting for over one-third of global scientific and technical production. So there are many strengths: openness, diversity and quality in companies and institutions. Investments in science and technology make the world a better place.. However, because the EU is facing more strong foreign competition in technological research and production, it must guarantee that breakthrough ideas swiftly become new and profitable goods and technologies. Each EU Member State has its own research funding policies and programs, yet there are many significant challenges that may be handled most effectively through collaboration.

The way research evolves is currently experiencing significant changes, as is the way innovation is produced at the company and societal levels. Science and innovation are becoming more open, collaborative, and transnational as a result of the rise of digital technology. As a result, the Commission has established three strategic goals for tackling the difficulties of this fast changing environment: open innovation, open science, and global openness [11].

Open innovation entails including a larger number of actors in the innovation process, developing a favorable regulatory environment for innovation, and making it easier for entrepreneurs to invest and raise funds, including through the creation of a new risk-capitalized fund. Open innovation will facilitate the transformation of research results into products and services, as well as the commercialization of technologies developed by European researchers in Europe. *The Rapid Path to Innovation* pilot will fund near-market innovation activities, while the *Excellence Mark* will help to unlock further funding opportunities for proposals that have been rejected by the Orizont 2020 initiative. European scientists are hugely engaged, and yet science is advancing at a rapid pace. It is becoming much more accessible and collaborative. Open science is a new approach to scientific processes that is centered on collaboration and new methods of spreading information via the use of digital technology and new collaboration tools. For example, in order to considerably increase open science in the EU, the Commission published a strategy in April 2016 to build world-class data and cloud infrastructures. As a result, scientists, corporations, and government agencies will be able to reap the benefits of dealing with massive amounts of data [12].

The Commission intends to create a new European cloud for open science by consolidating and interconnecting existing research infrastructure, which will provide 1.7 million researchers and 70 million professionals in science and technology in Europe with a virtual storage environment, as well as the exchange and reuse of their data across disciplines and countries. This cloud will be built on Europe's data

infrastructure, which will offer the broadband networks, high-capacity storage devices, and processing power required to access and analyze enormous data sets stored in the cloud. Education and training are the best investments Europe can make for its future. They play an important role in promoting growth, innovation, and job development. European education and training systems must provide citizens with the knowledge, skills, and competences required to innovate and prosper in the future. They also play an important role in the building of a European identity based on shared cultures and values. Education should enable young people to express themselves, engage, contribute and influence the future of a democratic, solidarity-based and inclusive Europe. Digital technologies improve learning in a variety of ways and generate learning possibilities that should be accessible to everybody [13].

In the context of education, "open(ness)" has become a hallmark for a growing number of learning materials and related platforms and practices from a variety of institutions and individuals. "Openness" in education is currently being discussed primarily in the context of the technological developments that have allowed it to develop in its current form.

In this regard, D'Antoni and Savage (2009) state in a somewhat florid language, that:

"Openness is the breath of life for education and research. Resources created by educators and researchers should be open for anyone to use and reuse. Ultimately this argument resonates with the Universal Declaration of Human Rights, which states: 'Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages' (United Nations, 1948, Art. 26, para. 1)" [14].

Over the centuries, there has been a close correlation between socio-technological improvements and improved teaching and learning opportunities, not only in institutional settings but also in self-organized forms.

Universities have been a part of many cultures for centuries, with religious institutions possibly outlasting them in terms of longevity. With well-known exceptions such as distant learning in rural areas and organizations such as Open Universities, the conventional university business model relies upon face-to-face learning and teaching via planned programmes of study with specified hours guided by profound scholarship and research. COVID-19 compelled colleges to shift to a nearly 100% online course delivery strategy in a matter of months. However, while the pandemic has prompted them to modify their business model, the dynamics driving the march toward greater digitization – as vividly demonstrated at COVID-19 – are not new. These pressures were there before to the commencement of COVID-19, but they did nothing to alter the existing economic paradigm. Undergraduate and most postgraduate education was still given face-to-face in the classroom. Indeed, as the middle class expanded in many nations, so did the number of students seeking an international higher education experience. As a result, many institutions found themselves with more students and financial resources than ever before [15].

The pandemic highlighted many of the benefits of shifting to a more digitally delivered educational environment, while also highlighting its numerous obstacles. The changes brought about by the sector's fast digitalization will not be reversed, so what is developing today will come to define the new 'normal.' Higher education is not the only industry to face such a significant threat to its old business model as a result of fast digitalization, thus it is worthwhile to consider the lessons learned from some of those other industries (Figure 2).
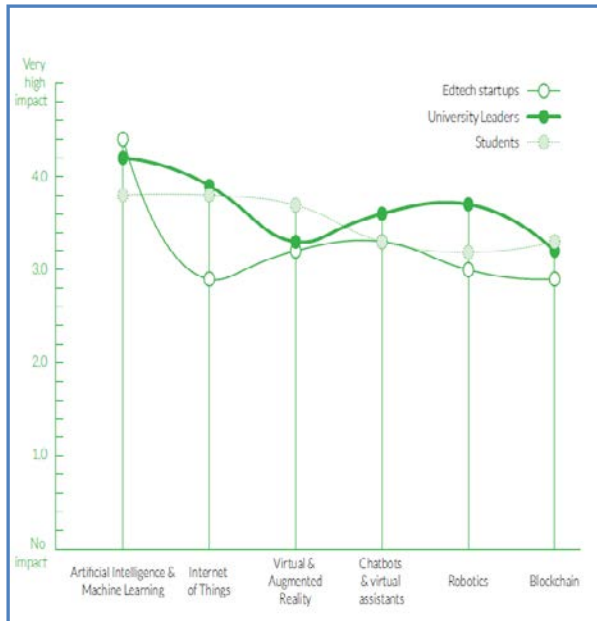
Figure 2: Expected impact on Higher Education from emerging technologies Source: Medium.com, August 2017

4. Key pillars elements and necessary stages of digital transformation strategy applicable to the Romanian academic environment

It is no longer a novelty that the digital age is changing at a dizzying pace, and the university environment needs digitization strategies that include as essential elements people, technologies and processes. The digital transformation of the university environment must take into account both internal and external changes. Thus, the digital transformation strategies of the university environment should be emerging to the organizational and technological changes. As such, we need a digitization strategy tailored to our needs to provide space for discussion and decision-making on changes of direction and alternative ways to achieve our goals. Digital transformation strategies will have to be conducive to discussions that take into account the emergence of changes of direction with alternative ways, corroborated with the achievement of educational objectives.

The objectives should be structured on 3 levels, as follows: people, technologies and processes. Possible directions for the development of the digital transformation of higher education:

a. Creating digital foundations:

✓ Creation of digital architectures, in which the stakeholders are clearly defined.

✓ Easy access to digital architectures, through dedicated portals;

✓ Data systems management;

✓ Providing training in the digital field.

b. Organizational digitization

➤ The tools and services that higher education needs to be successful:

   ✓ Establishing a communication strategy in the digital environment;

   ✓ Ensuring the transparency and traceability of university leadership decisions;

   ✓ A digital approach to university relationship management

   ✓ Creating a distinct structure whose primary responsibility is to digitize the university, a process of continuous change

➤ Development of support systems, such as: Human Resources, Finance, Student Record System, etc ...

➤ Smart workflow

c. The digital university

➤ Realization of a Digital Campus

   ✓ Digital Library Platform

   ✓ Custom schedules

   ✓ Electronic management of attendance assessment and monitoring.

➤ State-of-the-art academic teaching and research services;

➤ Learning analysis

➤ Involving artificial intelligence in university interaction.

The primary stages of digital transformation:

a. First of all the students:

➢ Unique digital university identity, meaning connecting to university digital architectures and getting everything you need.

➢ Creating remote solutions so that teachers and students can interact at any time, from anywhere.

➢ Involving students in updating digital architectures, thus obtaining consistent feedback.

b. Transforming research activities into digital

➢ Creating a university open cloud where metadata can be created for future researchers;

➢ Connecting to digital dissemination architectures, such as Publons, Scopus, Orcid, etc ...

➢ Adherence to EOSC - European Open Science Cloud, an environment for hosting and processing research data to support EU science.

5. Conclusions

It is clear that digitization processes are affecting the future of higher education. The term "digitization" has already left its mark and will continue to have a significant and dynamic impact on the higher education landscape in the future. Consequently, higher education institutions have a real interest in managing the digital transition. The transition will also bring structural and cultural changes, as well as new opportunities and choices for higher education institutions as organizations. Although the potential benefits of such applications for all areas of activity are considered extremely high, digital opportunities in core areas of higher education are not being used as widely as might be expected. The discrepancy between usage and potential points to an urgent need for action. A major difficulty, then, is assessing the potential of digital

solutions so that the higher education institution can respond to digital developments in a timely manner.

Higher education institutions addressing digital transformation issues must take current and future processes and structures into account. As a result, they can use 'digitalization' as a tool for organizational and structural growth, as well as for improving their image. As a result, 'digitization' becomes a 'vehicle' for reinventing the higher education institution as an organization and its processes. The true added values of "digitization" are therefore reflected in the structures and (digitally) generated "end-to-end processes" of an institution.

Higher education institutions as organizations need to be very flexible in order to respond more quickly to digital advances and changes. However, they are often characterized by lengthy decision-making processes that are particularly obstructive in the context of fast-moving digitization activities. Existing governance structures and college-specific cultures are common reasons that make organizations sluggish and resistant to change. Against this backdrop, a strategic framework, lean and agile structures, and a defined process (from concept to decision, approval, and execution) can help universities adapt more flexibly to digital transformation processes.

Actions to be taken for the transformation through digitization of higher education should be directed in the spirit of the following principles:

Focused on students: Students' and learners' information, study, research-documentation needs must be met through easy digital services and user-friendly and logical interfaces, through tutorials, but also through self-service. Mobile, easy and secure connection to the portal managing physical resources and software applications will be pursued, as well as remote access to an environment for simulation, testing and validation of

hypotheses and study and work processes. *Confidence in technologies:* The process of digital transformation must be supported by encouraging and developing a strong digital culture at individual and institutional level. This process aims at two fundamental aspects: presenting relevant information about the services offered and automating the interface processes by roles and functions so that beneficiaries can quickly receive the answers to the questions they are looking for online.

Transparency and traceability: The educational and scientific research process must become visible in relation to other academic and research entities and ensure transparency of the development of the academic and researcher at all career stages. Traceability involves tracking progress and feedback of learning outcomes, as well as public exploitation of the scientific research portfolio at individual and institutional level.

*Cyber security***:** The digitization activity requires strict compliance with national and international norms and standards in cyberspace by ensuring single identity management, using cyberspace-specific technical tools in conjunction with the protection of classified information and personal data.

References List

[1] https://sgg.gov.ro/1/wp-content/uploads/2021/08/STRATEGIA-MILITARA-A-ROMANIEI-1.pdf.

[2] Gaebel M., Kupriyanova V., Morais R. and Colucci E. E-Learning in European HEIs. Results of a mapping survey conducted in October – December 2013. Available at: https://eua.eu/resources/publications/368:e-learning-in-european-higher-education-institutions.html .

[3] Pucciarelli F., Kaplan A.M. Competition in Higher Education, in Bang Nguyen, T C Melewar and Jane Hemsley-Brown (editors) Strategic Brand Management in Higher Education, 2019, Routledge, New York.

[4] OECD (2019), TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/1d0bc92a-en.

[5] Estelle M. Phillips and Derek S. Pugh. How to Get a PhD: a handbook for students and their supervisors, England: Open University Press, 2nd ed., rev. and updated, 1994, ISBN: 0335192149 (pbk.)

[6] https://epale.ec.europa.eu/sites/default/files/strategia-nationala-agenda-digitala-pentru-romania-20202c-20-feb.2015.pdf.

[7] European Council. Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021–2030). Official Journal of the European Union, 2021/C 66/01.

[8] Gonzalez, T., Rubia, M., Hincz, K., Comas-Lopez, M., Subirats, L., Fort, S., & Sacha, G. (2020). Influence of COVID-19, Cornell University.

[9] Popescu F.l. & Ichimescu C. Romanian Journal of Information Technology and Automatic Control, Vol. 31, No. 2, 7-20, 2021. https://rria.ici.ro/wp-content/uploads/2021/06/art._Popescu_Ichimescu.pdf.

[10] MacIntyre P. D., Gregersen T. & Mercer S. Language teachers' coping strategies during the Covid-19 conversion to online teaching: Correlations with stress, wellbeing and negative emotions. System, 2020, 94, 10235.

[11] Lynch M., Sage T., Hitchcock L.I. et al. A heutagogical approach for the assessment of Internet Communication Technology (ICT) assignments in higher education. Int J Educ Technol High Educ 2021 18: 55. Doi: https://doi.org/10.1186/s41239-021-00290-x.

[12]   Mucharraz Y., Venuti F. Online Learning Can Still Be Social, 10 Keys to Building a Supportive Digital Community of Learners, Harvard Business Publishing Education, 2020. Available from: https://hbsp.harvard.edu/inspiring-minds/online-learning-can-still-be-social.

[13]   European University Association (2020): European higher education in the Covid-19 crisis.   Available   from: https://eua.eu/downloads/publications/briefing_european%20higher%20education%20in%20the%20covid-19%20crisis.pdf.

[14]   D'Antoni S., & Savage C. (2009). Open educational resources: conversations in cyberspace. Paris: United Nations Educational, Scientific and Cultural Organization.

[15]   Narayan V., Herrington J. and Cochrane C. Design principles for heutagogical learning: Implementing student-determined learning with mobile and social media tools. Australian Journal of Educational Technology 2019 35(3): 86–101. Doi: https://doi.org/10.14742/ajet.3941.