https://doi.org/10.53656/ped2022-3s.06

DIGITAL UNIVERSITIES: FEATURES AND KEY CHARACTERISTICS

Dr. Marina Skiba, Assoc. Prof.
Financial Academy (Republic of Kazakhstan)
Prof. Maktagali Bektemessov, DSc.
Abai Kazakh National Pedagogical University (Republic of Kazakhstan)
Dr. Alma Turganbayeva, Assist. Prof.
Al-Farabi Kazakh National University (Republic of Kazakhstan)

Abstract. The article discusses the phenomenon of "Digital University". The goal is to identify the essence of this concept, its content, as well as the criteria for transformation into a digital university. The article outlines the problems of transformation and its ways. Digitalization, like any phenomenon, is multifaceted and can have both positive and negative effects on the educational process and the quality of education. The study conducted by the authors made it possible to describe in detail the key characteristics of a digital university, which has the features of a research organization, an educational organization, an IT company, information banks / knowledge repositories and marketing organizations.

Keywords: digital university; transformation in education; change management; changes in education

Introduction

Post-industrial development has changed not only the economic landscape, making a significant shift from real production to the service sector, many of which have become possible due to the advent of digitalization. Like any phenomenon, digitalization has both favorable and unfavorable manifestations of its properties, therefore, when managing an organization in a digital environment, special attention should be paid to the new specifics of managing educational organizations in the existing reality. The exponential growth of information flows, when each person is the source of information, has drawn the attention of researchers to the search for technologies for systematizing, processing, and storing information and the problems of ensuring its reliability, completeness, and quality (Benavides et al. 2020; Arnold, Vogel & Ulber 2021).

Higher education systems of all countries are facing a global challenge between the ever-changing needs of the digital economy and the lagging behind of the university operating model. That is why, responding to changes in the economy and society, universities are implementing digital transformation (Kang & Norton 2006; Gros, Garcia & Escofet 2012; Habib, Jamal, Khalil, & Khan 2021). The transition to a digital society and digital economy has revealed new requirements for the higher education system in general and for individual universities. One of the responses to the processes of globalization is the creation of virtual and distributed universities, "universities without walls", in which education is possible at any time, in any place. An alternative way of acquiring knowledge is offered by digital educational platforms, competing with universities and at the same time creating educational alliances.

Within the digital society, the roles of students and teachers, as well as the relationship between them, have changed (Henderson, Selwyn & Aston 2017). External key stakeholders such as the state, society and business have also changed the requirements for universities, suggesting more transparency, openness, flexibility, and rapid response to changing technologies (Becker & Eube 2018; Sitnicki 2018). It is worth noting that in the "pre-Covid" era, speaking about digitalization, the main emphasis was on creating a digital educational environment. (Siemens, Gašević & Dawson 2015; Margaryan, Littlejohn & Vojt 2011; Rampelt, Orr & Knoth 2019). In the "post-COVID" period the topics of digital culture, digital ethics, digital competencies and changes in the functions and roles of teachers and students, digital technologies as a tool for educational marketing have become relevant (Mercader & Gairín 2020; Händel 2020; García-Peñalvo 2021; Bozkurt & Sharma 2020; Simonette, Magalhães & Spina 2021; Kaputa, Loučanová & Tejerina-Gaite 2022; Jandrić et al. 2021; Tsochev 2021; Stanković, Golubović-Ilić & Herodek 2020).

The COVID-19 pandemic has exacerbated the need to move from the classic classroom model of learning to blended and digital models. The change in the social format of communication implies a new format of remote interaction, caused by isolation and distancing.

Consequently, there is an urgent need for universities to develop and implement digital transformation strategies (García-Peñalvo 2021). The crash test that universities passed, forced to ensure the quality of education in the digital world, showed the need to specify the concept of "digital university".

Related concepts are discussed in scientific research: digital transformation of education, university of the digital age, university 4.0, university 20.35 digitalization of the educational process, information and educational environment, digital form of university activity, digital environment, digital marketing of educational activities, digital footprint of the educational process, digital infrastructure of the university. The main approaches are to use digital technologies in the educational process or to

create digital educational environments. At the same time, there are works related to the expansion of areas and processes for the use of digital technologies in the activities of universities. All the above stimulates the renewal of the understanding of the digital university as a complex model of activity using digital technologies, and, consequently, the relevance of identifying and describing the properties, features and key characteristics of universities. In separate works, researchers have attempted to define digital services in education.

Methodology

The research methodology consists of a structural and functional analysis of open data and university management practices in the framework of the transition to a digital economy.

Results

Universities are traditionally understood as specific organizations that are involved in the field of information management. In fact, in our understanding, the university implements both the function of transmitting the culture of society to its members, as well as changing the cultural code, and implementing feedback – integrating changed and new elements of culture to develop and enrich it. The creation, storage, dissemination of information are the main functions of the university in relation to its role in society, which is often reflected in the mission of universities. All main functions are derivatives, for example: training of specialists is a component of the dissemination of knowledge, research – their creation, publication of articles and development of the library – storage. The Covid-19 pandemic has shown that it was digitalization that served as the basis for the sustainable existence and operation of universities, contributed to the employment in the educational process of the most active part of the population – youth, and, therefore, contributed to maintaining the stability of society.

The educational process carried out by universities in the digital world has the following characteristics that reflect the positive impact of digitalization:

1. Availability of information:

– Information available.

– Sources of knowledge are unlimited.

– Information posted in various places.

– Information is equally available to all participants in the educational process.

– Algorithms of actions and decision rules are known and available for repetition in other universities.

2. Availability of quality education:

– Scalability of the best universities and the best professors.

– Easier to find data for international benchmarking.

– Best practices are spreading fast.

– The educational process and the "rules of the game" have become transparent.
– The boundaries are erased, the distance for interaction is not essential.
– Culture of quality – becomes scalable.
– You can find "your" professor and "your" explanation.
– Checking written works for plagiarism.
– Anti-plagiarism and storage of responses in databases have led to an increase in the objectivity of assessments.
– Education is available anywhere at any time.

3. Reliable storage of information:

– Creation of databases both in the universities themselves and outside them.
– Network distribution and cloud storage.
– Keeping a historical digital footprint.
– Availability of digital copies.
– Ability to instantly check the accuracy of information upon request.

4. Transparency of management and decision-making:

– Technologies for making decisions based on data analysis have become available.
– University strategies are available to the public.
– Transparency of decisions made.
– Transparency of financial flows.
– It became possible to make decisions based on the analysis of big data.

5. Transparency of information about students as confirmation of the learning process and the achievement of its result:

– Portfolio of work is available to interested parties.
– The educational trajectory is completely tracked; its falsification is impossible.

6. Continuity of innovation:

– Knowledge obsolescence – the half-life of knowledge is less than the period of study at a university.
– Innovations occur rapidly, radically changing the scope of production.

At the same time, there are also adverse manifestations, which are as follows:

– There is a lot of information and it is poorly structured.
– The truth of the information needs to be verified.
– Individuals have no room for error.
– Information storage vulnerability.
– Difficulty in storing information.
– Information available to competitors.
– Strategic advantages in making unique decisions based on publicly available technologies are disappearing.
– Reducing the need for teachers.
– Competition at the global level.
– University strategies are available to competitors.

– Local acts – unique processes have become widely available, which increases competition.

– Universities do not have time to introduce new technologies into the educational process that appear in the real sphere of the economy.

Universities are now in a highly competitive environment, and competition occurs not only between universities themselves, but also between universities and educational platforms, corporate universities.

Analyzing many works that are devoted to university management, and highlighting the works of J. Salmi and the generalized recommendations for building a quality assurance system at a university given in the ESG, as well as our own experience, we can identify the following criteria for a university that represents quality education through integration into the educational process digital technologies.

Strategy and management:

– Strategic management.

– Clear mission.

– Real autonomy.

– Internal education quality assurance system.

– Public private partnership.

– Involvement of stakeholders in management and collegiate bodies.

– Overcoming university conservatism.

– New markets.

– Making decisions based on new digital technologies.

Educational programs - development and evaluation:

– Validation and verification.

– Involvement of various categories of stakeholders in the development of educational programs.

– Orientation of learning outcomes to the needs of the labor market and the National Qualifications Framework.

– New EPs at the intersection of scientific fields.

– Joint EPs, including remote ones.

– Balance of soft and hard learning outcomes.

– Recognition of the results of previous formal and non-formal education.

– Joint and double degree programs.

Students:

– Attracting the best students.

– Formal and non-formal education.

– Individualization of education: choice of content and pace.

– New markets, new consumers, new services.

– Inclusiveness in a broad sense – considering the needs of different categories of students.

– Asynchrony of the educational process.

– Ability to return to digital sources and video lectures.
– Alternatives in the choice of teachers and subjects.
Teaching staff:
– Attracting the best faculty and research.
– Support in the teaching process.
– Determination of the model of the teacher, considering digital realities.
– Promoting capacity building.
– Online mobility.
Resources:
– Adequate funding.
– Attractive location.
– Modern laboratories and technologies.
– Digital Library – access to electronic full-text libraries.
– Transformation of libraries into research support centers.
– Support for students.
Information Management:
– Use of IT and social networks, information channels.
– Availability of information databases.
– Collection of information in real time.
– Feedback.
Public information:
– Targeted brand development.
– Creation of channels in information networks to inform the public.
– Creation of various thematic dialogue platforms based on the university.
– Publications based on the media plan.
– Promoting the Sustainable Development Goals.
Educational process:
– Orientation to the planned learning outcome.
– Learning through research.
– Uniqueness of educational trajectories.
– Satisfaction and development of personal educational needs.
– Mobility and internships, real and virtual.
– Communication with the professional community.
– Involvement of practitioners in the educational process.
– Interaction with real sectors of the economy.
The science:
– Identification of popular areas of research.
– Research commissioned by the real sectors of the economy.
– Commercialization of research.
– Priority of authorship (digital footprint).
– Anti-plagiarism.

– Publication only in leading scientific journals.
– Fame and advancement in the digital scientific environment
– Creation of international and interdisciplinary research groups.

Based on the analysis of their own experience and a number of studies, the authors identify the following characteristics of a digital university:

1) Research organization:
– development of new approaches to work with data;
– creating models for representing knowledge and skills, as well as studying their productivity;
– visibility of university researchers in digital databases and scientific platforms;
– digital scientometrics;
– software tools that provide modeling of processes for research and laboratory work;

2) Educational organization:
– transmission of new values and attitudes;
– development and implementation of programs for the digital economy;
– accumulation of various educational content;
– repository of educational information - video lectures and recordings of classes, instructions, texts of lectures, recommendations for laboratory, etc.;
– promoting the creation of a unique personal educational space;
– the possibility of building unique educational trajectories;
– assistance in the development of unique educational trajectories and their passage;
– online courses (MOOC) and their integration into existing educational programs;
– online consulting on the design of an individual educational trajectory;
– virtual and real support for students;
– digital marketing – interaction with potential applicants,
– virtual mobility;
– digital footprint – digital portfolios of students and teachers;

3) IT company:
– creation of new educational platforms and tools;
– study of new educational products;
– development of standards for the study of ecosystems of educational platforms;
– scaling educational solutions;
– the presence in the virtual world (social networks, the Internet, an external site, and an internal portal) of a digital trace that reflects all the nuances of educational activities;
– educational platform integrated with LMS;
– digital services that support learning processes (anti-plagiarism, electronic library, etc.);

– digital services providing communication via videotelephony – cloud platforms Zoom, Google Meet and many others;
– cloud storages and platforms;
– electronic document management.
4) Organization as an information bank/database:
– Collection, storage, and systematization of information;
– Efficiency of information updating;
– Systematization and structuring of information;
– Ease of information search;
– Ability to meet individual and complex requests;
– Scaling and replication of copies and access to information;
– Possibility of integration with other data storages;
– Digital library available anytime, anywhere.
5) Marketing organization that promotes educational services and research in the digital environment:
– New strategy for university development in digital reality
– Articulation and commitment to values
– Identification of potential categories of consumers and stakeholders and interaction with various groups
– Strategies of stakeholders – individuals affiliated with the university, should be agreed "win-win" and the contribution of each
– Social networks – affiliation with the university – a new attitude towards accounts and personal freedom
– Maximum attraction of the best in the global space
– Creation of strategic partnerships and interest groups
– Increasing the "expert" level of individuals
– Author's position and novelty – minimization of plagiarism and self-repetitions.

Thus, it should be noted that digitalization has had a significant impact on the specifics of university management, brought increased competition and ensured greater availability of information and dissemination of best practices. University management in the digital world considers not only the change in the specifics of management within the university, including the management of digital resources and the digital educational environment, but also the change in the format of university promotion and the development of its brand. The issues of developing the potential of teachers and students, as well as internationalization in the digital world, also require special consideration.

Conclusion

Summarizing and analyzing the results of the study, we can come to the following conclusions.

1. The understanding of the term "digital university" is not yet well-established. It is constantly evolving.

2. Digitalization, like any other phenomenon, is multifaceted and can have both positive and negative effects on the educational process and the quality of education.

3. Digitalization has changed the nature of work in the post-industrial economy. In the framework of the activities of universities, special attention should be paid to

4. A digital university has the characteristics of a research organization, an educational organization, an IT company, information/knowledge banks, and marketing organizations.

REFERENCES

ALEKSANDRA, A. V., STANKOVIĆ, S., GOLUBOVIĆ-ILIĆ, I. & HERODEK, K., 2020. The differences in students'attitudes about online teaching during COVID-19 pandemic. *Pedagogika-Pedagogy*, **92**(7s), 205 – 210.

ARNOLD, M. G., VOGEL, A. & Ulber, M., 2021. Digitalizing Higher Education in Light of Sustainability and Rebound Effects Surveys in Times of the COVID-19 Pandemic. *Sustainability,* **13**(22), 12912.

BECKER, B. A. & EUBE, C., 2018. Open innovation concept: Integrating universities and business in digital age. *Journal of Open Innovation: Technology, Market, and Complexity*, **4**(1), 12.191.

BENAVIDES, L. M. C., TAMAYO ARIAS, J. A., ARANGO SERNA, M. D., BRANCH BEDOYA, J. W. & BURGOS, D., 2020. Digital transformation in higher education institutions: A systematic literature review. *Sensors*, **20**(11), 3291.

BOZKURT, A. & SHARMA, R. C., 2020. Education in normal, new normal, and next normal: Observations from the past, insights from the present and projections for the future. *Asian Journal of Distance Education*, **15**(2), i-x.

GARCÍA-PEÑALVO, F. J., 2021. Avoiding the dark side of digital transformation in teaching. An institutional reference framework for eLearning in higher education. *Sustainability*, **13**(4), 2023.

GARCÍA-PEÑALVO, F. J., 2021. Digital Transformation in the Universities: Implications of the COVID-19 Pandemic. *Education in the Knowledge Society*, **22**.

GROS, B., GARCIA, I. & ESCOFET, A., 2012. Beyond the net generation debate: A comparison of digital learners in face-to-face and virtual universities. *International Review of Research in Open and Distributed Learning*, **13**(4), 190 – 210.

HABIB, M. N., JAMAL, W., KHALIL, U. & KHAN, Z., 2021. Transforming universities in interactive digital platform: case of city university of science and information technology. *Education and Information Technologies*, **26**(1), 517 – 541.

HÄNDEL, M., STEPHAN, M., GLÄSER-ZIKUDA, M., KOPP, B., BEDENLIER, S. & ZIEGLER, A., 2020. Digital readiness and its effects on higher education students' socio-emotional perceptions in the context of the COVID-19 pandemic. *Journal of Research on Technology in Education*, 1 – 13.

HENDERSON, M., SELWYN, N., & ASTON, R., 2017. What works and why? Student perceptions of 'useful'digital technology in university teaching and learning. *Studies in Higher Education*, **42**(8), 1567 – 1579.

JANDRIĆ, P., BOZKURT, A., MCKEE, M., & HAYES, S., 2021. Teaching in the Age of Covid-19-A Longitudinal Study. *Postdigital Science and Education*, **3**(3), 743 – 770.

KANG, S., & NORTON, H. E., 2006. Colleges and universities' use of the World Wide Web: A public relations tool for the digital age. *Public relations review*, **32**(4), 426 – 428.

KAPUTA, V., LOUČANOVÁ, E. & TEJERINA-GAITE, F., A., 2022. Digital Transformation in Higher Education Institutions as a Driver of Social Oriented Innovations. *Social Innovation in Higher Education*, 61.

MARGARYAN, A., LITTLEJOHN, A., & VOJT, G., 2011. Are digital natives a myth or reality? University students' use of digital technologies. *Computers & education*, **56**(2), 429 – 440.

MERCADER, C. & GAIRÍN, J., 2020. University teachers' perception of barriers to the use of digital technologies: the importance of the academic discipline. *International Journal of Educational Technology in Higher Education*, **17**(1), 1 – 14.

RAMPELT F., ORR D., KNOTH, A., 2019. *Bologna Digital 2020*. White Paper on Digitalization in the European Higher Education Area.

SIEMENS, G., GASEVIC, D. & DAWSON, S., 2015. Preparing for the digital university: A review of the history and current state of distance, blended, and online learning.

SIMONETTE, M., MAGALHÃES, M. & SPINA, E., 2021. *Digital Transformation of Academic Management: All the Tigers Come at Night.* In: Radical Solutions for Digital Transformation in Latin American Universities (pp. 77 – 92). Singapore: Springer.

SITNICKI, M., 2018. Development of a model of digital research universities. *Baltic Journal of Economic Studies*, **4**(1), 311 – 318.

STRIELKOWSKI, W., 2020. *COVID-19 pandemic and the digital revolution in academia and higher education.*

TSOCHEV, G., 2021. Some Problems in Engineering Education with Computer Science Profile During COVID-19. *Mathematics and Computer science*, **64**(3), 255 – 263.

✉ **Dr. Marina Skiba, Assoc. Prof.**
ORCID ID: 0000-0002-4155-9957
Financial Academy
Nur-Sultan, Republic of Kazakhstan
E-mail: marina.skiba@fin-academy.edu.kz

✉ **Prof. Maktagali Bektemessov, DSc.**
ORCID ID: 0000-0001-8634-8531
Abai Kazakh National Pedagogical University
Almaty, Republic of Kazakhstan
E-mail: m.bektemessov@abaiuniversity.edu.kz

✉ **Dr. Alma Turganbayeva, Assist. Prof.**
ORCID ID: 0000-0001-9723-4679
Computer Science department
Al-Farabi Kazakh National University
Almaty, Republic of Kazakhstan
E-mail: turganbayeva.alma1@kaznu.kz