Revista Jurídica unicuritiba

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

ESTRATÉGIAS PARA O DESENVOLVIMENTO E REGULAÇÃO DO ENSINO SUPERIOR NA ERA DIGITAL

STRATEGIES FOR THE DEVELOPMENT AND REGULATION OF HIGHER EDUCATION IN THE DIGITAL ERA

ELVIR AKHMETSHIN
Department of Economics and Management of Elabuga Institute, Kazan Federal University, Russia. Khorezm University of Economics, Uzbekistan Orcid id: https://orcid.org/0000-0002-2576-503X E-mail: elvir@mail.ru

ILYOS ABDULLAYEV
Urgench State University, Uzbekistan. Orcid id: https://orcid.org/0000-0002-9601-7434
E-mail: abdullayev.i.s@mail.ru

ELENA SVERDLIKOVA
Lomonosov Moscow State University, Russia. Orcid id: https://orcid.org/0000-0003-3518-4455 E-mail: e.a.sverdlikova@list.ru

NADEZHDA BANKOVA
Moscow Aviation Institute, Russia. Orcid id: https://orcid.org/0009-0001-3858-9389 E-mail: nvbankova@mail.ru

ASIYAT TAGIBOVA
Moscow State Institute of International Relations (MGIMO), Russia. Orcid id: https://orcid.org/0000-0002-6731-5395 E-mail: a.a.tagibova@mail.ru

ELENA MAKOVETSKAYA
Industrial University of Tyumen, Russia. Orcid id: https://orcid.org/0009-0000-8564-5606
E-mail: makovetskaya_eg@mail.ru

RESUMO

Objetivo: Este estudo explora cenários de desenvolvimento e regulação para o ensino superior no contexto da transformação digital, destacando a integração de tecnologias e a evolução de paradigmas educacionais.

Métodos: A pesquisa adota uma abordagem mista, incluindo revisão de literatura em periódicos indexados e uma pesquisa com 45 especialistas da academia. As respostas foram analisadas utilizando o coeficiente de concordância de Kendall para classificar quatro cenários-chave para a digitalização do ensino superior.

Resultados: Foram identificados quatro cenários principais para o desenvolvimento do ensino superior: (1) Aprendizagem ao longo da vida com microcredenciais, (2) Foco em habilidades para o futuro, (3) Trajetórias de aprendizagem personalizadas e (4) Universidades em rede com colaboração multi-institucional. A aprendizagem ao longo

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

da vida surgiu como prioridade, refletindo a crescente importância da adaptabilidade no mercado de trabalho.

Conclusões: A transformação digital está remodelando o ensino superior em um ecossistema dinâmico e orientado por tecnologias. As instituições devem adotar modelos de aprendizagem flexíveis, enfatizar o desenvolvimento de habilidades e fomentar redes colaborativas para se manterem relevantes. Essas estratégias permitirão que o ensino superior atenda de forma eficaz às demandas da sociedade e do mercado de trabalho.

Palavras-chave: Ensino superior. Transformação digital. Aprendizagem ao longo da vida. Aprendizagem personalizada. Tecnologias digitais. Habilidades futuras.

ABSTRACT

Objective: The study is focused on the scenarios of development and regulation of higher education in the context of digitalization, which, at present, is fundamentally altering the principles of operation of all institutions, including universities.

Methods: The research draws on research articles from scientific periodicals and a survey of 53 experts in higher education.

Results: Based on the literature review and expert survey, the key scenarios of the development and regulation of higher education in the context of digitalization are identified. The experts suggest that the transformation of universities will proceed in line with the scenarios of lifelong learning, the skills of the future, the choice of learning trajectories, and network learning.

Conclusions: The authors conclude that upcoming changes in higher education are associated with an increased use of technology in education, management, and communication with the internal and external environment. The digital transformation of higher education is of particular interest from the point of interaction with the socio-economic environment and research, education, and university management. Higher education institutions should fully use the opportunities offered by the digital transformation and recognize digital technology as a key factor in their development.

Keywords: Higher education. Digitalization. Digital transformation. Digital technologies. Scenario development. Higher education development scenarios.

INTRODUCTION

Today, research and education are powerful drivers of social progress, producing new knowledge and improving the population's living standards and quality of life (Hernández García de Velazco, 2022). Developed countries pay increasing attention to supporting the development and effective integration of education and research activities to ensure sustainable socio-economic development (Roorda & van

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

Son, 2016). In today's world, a country can only enjoy a high level of socio-economic development if it has correspondingly well-developed education, science, and innovations.

The interaction between education, science, and business takes many forms today, yet experience suggests that universities remain fundamental (Popov et al., 2018). Modern universities transform in line with today's demands, adapting their work's paradigms to current socio-economic changes and the global conditions of their work (Seres et al., 2018).

The historical development of universities illustrates the transformation of higher education and its evolution from the traditional model of science funded by the church and private and public institutions through mixed models focused on scientific inquiry and cooperation with the industry and onto internationalized models based on innovations and directed toward entrepreneurship and collaboration with international corporations in knowledge transfer with a broadly defined environment (Borodkin, 2023; Markuerkiaga et al., 2014).

Literary sources covering the evolution of education point out at least three models of universities: the first generation (classical universities) rooted in science, the second generation (research universities) founded on science and research, and the third generation (entrepreneurial universities), relying on science, research, and the transfer and commercialization of knowledge (Bronstein & Reihlen, 2014) and adopting modern methods of trans-learning (e-learning) and digital technologies in education, which build digital competencies needed in the labor market (Williamson, 2015).

In recent decades, literature has started using the concept of a fourth-generation university, although its nature is not clearly defined. Researchers refer to broadly understood technology and equate University 4.0 with the electronic university (Vally, 2020), smart university (Canhoto et al., 2016), the university that manages knowledge in educational clouds (cloud-based university) (Bouyer & Arasteh, 2014), or the university that cooperates with Industry 4.0 (Király & Géring, 2019). This university model envisages meeting the needs of the labor market and following the principles of sustainable development in education (Zhang et al., 2020).

Thus, researchers conclude that universities and the models based on which they operate and develop change in connection with a multitude of factors: changes in requirements for modern specialists, high mobility of students and teachers, the accessibility of distance learning, the emergence of new educational technologies, etc.

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

(Falkner & Stålbrandt, 2023). All this results in a blurred understanding of the tasks of contemporary higher education and the emergence of different, almost opposing judgments about its purpose in the future.

S. Rothblatt (2012) believes that further development of higher education will rely on the persisting trends of its massivization and the development of online learning. V. Hey and L. Morley (2011) define the radical changes experienced by the higher education system in recent years due to the aggravation of economic and social crises and conclude that the future is expected to see the development of mega-universities that will cater to the educational needs of a wide range of students from different parts of the world. S. Vincent-Lancrin (2004), analyzing the transformation of the organizational model of the university, determines that its future lies in the network forms of organization of educational and scientific activities. A more radical opinion is held by T. McCowan (2017), who argues that universities will only be demanded by the public if the meaning of education is significantly revised (for example, if it allows students to realize their interests and receive education for free). C. Daraio et al. (2015) expand the content of training, which goes beyond the acquisition of knowledge in individual fields, and include students in the academic community, administrative decision-making, and the formulation of directions for the university's development. A. Amory (2014) sees the future of higher education in the abandonment of formal institutions, whereas R. Koris et al. (2021) believe it to lie in the creation of "open universities" that use online resources for training courses and educational programs.

Thus, modern higher education institutions' growing role in socio-economic growth requires increased attention to possible development scenarios. This situation urges the search for ways to improve modern higher education and calls for future universities to be formed in accordance with scenarios and trends in the development of the educational process.

In this connection, the present study aimed to analyze the scenarios of the development and regulation of higher education in the context of digitalization.

METHODS

In accordance with the features of the development and regulation of higher education in the context of digitalization, a qualitative-quantitative research approach was chosen to determine their scenarios.

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

Data collection was performed from December 15, 2023 to March 15, 2024 through the analysis of scientific literature on the research problem, the selection of the expert pool, the subsequent expert survey via e-mail, and the processing and analysis of the survey results.

The first stage of the research consisted in selecting the source base for the study. It included analytical reports, as well as articles and reviews published in journals indexed by Scopus and Web of Science. The sources were selected using the keywords "higher education", "scenario development", "digitalization of higher education", and "higher education development scenarios" in English and Russian.

The second stage involved conducting an expert survey. Emails with invitations to participate in the study were forwarded to 53 experts. The selection criterion for the pool of experts was the expert having at least three publications on the research problem published in peer-reviewed journals. Agreement to partake in the study was expressed by 45 experts, after which they were emailed the survey questions with a request to respond in free form. The outcome of the second stage was the identification of four trajectories for the development of higher education in the next 10-15 years in the context of digitalization.

After the responses were received, the experts were sent a second letter asking them to rate the proposed scenarios of higher education development and regulation in order of importance by assigning them points. The rank of each scenario was determined proceeding from expert scores.

For greater objectivity in the analysis of expert survey data, the degree of consistency of expert opinions was measured by means of mathematical processing using Kendall's coefficient of concordance.

RESULTS

The analysis and summarization of the expert survey results allowed us to formulate the following main scenarios and put them in order of importance (Table 1).

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

Table 1. Main scenarios for the development and regulation of higher education in the context of digitalization

Scenario	Brief characteristic	Rank	Weight
Lifelong higher education scenario	Continuous lifelong learning will be as important as primary higher education. Working students will be the predominant type, choosing their portfolio of modules based on their personal needs for skills and competencies with high autonomy throughout their lives. Educational institutions offer microprograms/micromodules that students collect individually according to their interests	1	0.35
Scenario of "the skills of the future"	Universities will focus on developing the skills of their graduates following the demands of the labor market, i.e., exist to consolidate professional skills	2	0.23
Scenario of the choice of learning trajectories	The university is seen as a space where the elements of choosing one's learning trajectory are enhanced and students can build their training programs based on their interests. The curriculum of academic programs in this scenario becomes a more flexible, personalized model formed with the direct participation of students who actively collaborate with professors/teachers/coaches in developing the curriculum of higher education programs	3	0.19
Network learning scenario or the network university	Higher education is organized around a networked learning experience in which curricula involve multiple institutions rather than a single university participating in the learning process. The standard learning structure will change from a "single institution" model to a "multi-institution" model. This implies that "digital import" and "digital export" will play a major role in the implementation of training programs	4	0.13

Note: compiled based on the expert survey; the concordance coefficient W = 0.72 ($p < 0.01$), suggesting a strong consistency of expert opinions

DISCUSSION

Our findings suggest that contemporary higher education will adhere to one of the following scenarios: the scenario of lifelong higher education, the scenario of "the skills of the future", the scenario of the choice of learning trajectories, or the network learning scenario (the network university).

Research on higher education development scenarios has received significant attention in developed countries. Back in 2004, research by the OECD defined the following paths of higher education development (Vincent-Lancrin, 2004):

- Higher education as an open interaction network – the higher education system is highly internationalized, relying on networking between universities,

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

scientists and researchers, students, industrial enterprises, and other stakeholders. The open networking model is founded on cooperation between all participants;

- Higher education serving the interests and needs of regional and local communities – universities in their activities are geared to the needs of regions and local communities, are deeply integrated into their life, contribute to their economic development, and satisfy their needs through teaching and research (Akhmetshin et al., 2021b). The management and financing of higher education are exercised predominantly by the state. Scientists are held in high esteem by society and the state and are treated as professionals who control educational and research processes. A small number of elite universities and university research departments are integrated into international professional networks;

- Higher education as a new form of public-state responsibility – universities are predominantly financed from the state budget. Much attention is paid to the instruments of the "new form of public-state management", including market mechanisms and financial incentives. Higher education institutions are autonomous. Universities enjoy the advantages of the expanding foreign market for educational services and decentralized control over tuition fees, the patenting of research results, and the expansion of financial links with industry for the sake of diversification of funding sources;

- Higher education as a corporation – universities are involved in global competition for the provision of educational and research services on a commercial basis. As a result, research universities face difficulties in providing quality educational services, while most vocational and classical universities are fully focused on teaching. Most segments of the educational services market are formed by the respective demand and regulated by the rules of the organization and conduct of business.

In 2008, the scenarios were revised and elaborated, which led the OECD to identify six scenarios for the development of higher education (OECD/CERI, 2005):

- *Scenario 1. Traditional university*. Most universities are similar to current ones, servicing a relatively small portion of young people to find employment. Universities engage in training and research without being overly dependent on or involved with the public sector. The government continues to play a prominent part in financing, regulating, and managing universities. Lifelong learning and e-learning are developed largely outside of universities.

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

- *Scenario 2. Entrepreneurial universities*. Universities are distinguished by autonomy. There is a mixed model of public-private financing. Research is an important and profitable activity. Universities utilize a market approach in their work without losing basic academic values. Lifelong learning takes place in a university setting but in institutions of lower status. The three missions of universities – teaching, research, and community service – are well balanced. Commercial approaches to international markets and e-learning occupy an important place.

- *Scenario 3. Free university market*. Market forces are the main drivers for the development of higher education, regulated by private quality assurance and accreditation companies and financed mainly through market mechanisms. Market forces give rise to institutions that become specialized by function (teaching, research), sector (business, humanities, etc.), and audience (young students, part-time students, distance education, adult education, lifelong learning), while business companies provide corporate training for their employees (Kenzhin et al., 2021). Competition between universities is increasing. The significance of educational technology development is increasing. Research is transferred to public research centers and corporate research units.

- *Scenario 4. Lifelong learning and open education*. Universities are the universal avenue for education at any age. The knowledge economy is succeeding, and higher education is becoming a source of continuous professional development, financed by companies, by individuals seeking recognition of advanced training, and by the state. Universities focus more on students and their demand for short-term courses and the expansion of distance and e-learning (Akhmetshin et al., 2021a; Budnik, 2023). Research is conducted largely outside of the higher education system, and the best researchers move to private companies and specialized institutes. All university education follows the vocational school model.

- *Scenario 5. A global network of educational and research institutions*. The following major innovations are envisaged: 1) students determine their course of study and learning trajectory from the available courses in the global postsecondary education network (Malika et al., 2022); 2) higher education institutions increasingly collaborate, including with industry (Rakhimgalieva et al., 2021). The influence of e-learning is growing. The content of education is increasingly standardized. The market for lifelong learning is growing stronger. Most research is carried out outside of the higher education system. There is a dramatic polarization of statuses in the scientific

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

community: academic superstars and the developers of learning tools gain high status, while middle teaching staff become less qualified and are given a lower status.

- *Scenario 6. Diversity of recognized training and the extinction of universities*. The formal higher education sector is disappearing. People learn throughout their lives – at work, at home, for personal and professional purposes, with increasing autonomy, sharing their experiences with others interested in the same area. New technologies stimulate the dissemination of information and knowledge. The global Internet network that transcends institutions plays a prominent part. Knowledge and experience gained in all life situations are validated through formal competency assessments by specialized assessment bodies. Research requiring large investments is carried out in public research centers and corporate research units.

The most recent studies published in 2021 by the American EdTech platform HolonIQ, which specializes in analyzing the international market for educational services, point to the following three most probable scenarios of higher education development (HolonIQ Global Higher Education Network, 2021):

Scenario 1. Education State. Universities are funded by the state. Cross-border mobility is slowing down. The role of short courses is increasing, coupled with higher qualification requirements for teachers and universities accredited by public institutions. International education decelerates, but cooperation between individual institutions intensifies. Contingent loans and/or government-funded loans for students are appearing. Technology plays a prominent role in learning. The B2C business model is less viable; a shift to a B2B model is underway to serve the strong demand from the business sector.

Scenario 2. Practicum Pivot. Universities split to preserve their research role and transfer the role of professional development to the vocational and community college systems. Competency-based certificates for 3 months to 2 years of study predominate. The number of 3- and 4-year study programs is declining rapidly. Distance learning using electronic media dominates (Akhmetshin et al., 2021c). Funding is allocated mainly for practical research programs.

Scenario 3. Learning Market. The regulation follows free market rules with incentives for efficient performance and labor market outcomes. Education regulators merely play the role of an ombudsman. Competition for applicants between educational institutions intensifies. Funding for training programs and research is

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

focused on performance and outcomes. Revenue-sharing agreements are the dominant source of funding.

Despite the variety of higher education development scenarios, they largely agree with the results of our expert survey and envisage the integration of scientific and educational activities in various forms, as well as the implementation of e-learning and lifelong learning.

CONCLUSIONS

The conducted research and literature review have led us to conclude that the changes in higher education in the near future will consist primarily of the increase in the role of technology in education, management, and communication with the internal and external environment. Contemporary higher education is a changing ecosystem that, as argued by the surveyed experts, is going to adhere to one of the following scenarios: the scenario of lifelong higher education, the scenario of "the skills of the future", the scenario of the choice of learning trajectories, or the network learning scenario (the network university). Universities are transforming into Universities 4.0 (electronic university, smart university, cloud-based university), responding to the industry needs and public concerns about the environment.

The digital transformation of higher education is of note from the point of view of interaction with the socio-economic environment and research, education, and university management. Digital competencies are becoming not just educational requirements but a basic precondition for knowledge acquisition and employment. Open science, innovative practice, e-learning, digital learning systems, and communication using information technology have already become widely popular in universities. Higher education institutions should fully use the opportunities provided by digital transformation and recognize digital technologies as key to their development.

REFERENCES

Akhmetshin, E., Vasilev, V., Zekiy, A., & Zakieva, R. (2021a). Massive open online courses as the initial stage of development of a digital university. *Journal of Social Studies Education Research, 12*(2), 126-151.

Akhmetshin, E. M., Kozachek, A. V., Vasilev, V. L., Meshkova, G. V., & Mikhailova, M. V. (2021b). Development of digital university model in modern conditions: Institutional

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

approach. *Digital Education Review, 40*, 17-32. https://doi.org/10.1344/der.2021.40.17-32

Akhmetshin, E. M., Vasilev, V. L., Kozachek, A. V., Meshkova, G. V., & Alexandrova, T. N. (2021c). Analysis of peculiarities of using digital technologies in the university professional training content. *International Journal of Emerging Technologies in Learning, 16*(20), 101-118. https://doi.org/10.3991/ijet.v16i20.24245

Amory, A. (2014). Toll-mediated authentic learning in an educational technology course: A design-based innovation. *Interactive Learning Environments, 22*(4), 497-513. http://dx.doi.org/10.1080/10494820.2012.682584

Borodkin, L. (2023). Transformatsiya universitetskogo istoricheskogo obrazovaniya na fone tsifrovoy epokhi: Nauchno-metodicheskiy seminar v MGU [Transformation of university history education against the backdrop of the digital era: Academic and methodological seminar at Moscow State University]. *Istoricheskaya informatika, 1*, 1-10. http://dx.doi.org/10.7256/2585-7797.2024.1.70393

Bouyer, A., & Arasteh, B. (2014). The necessity of using cloud computing in educational system. *Procedia – Social and Behavioral Sciences, 143*, 581-585. http://dx.doi.org/10.1016/j.sbspro.2014.07.440

Bronstein, J., & Reihlen, M. (2014). Entrepreneurial university archetypes: A meta-synthesis of case study literature. *Industry & Higher Education, 28*(4), 245-262. http://dx.doi.org/10.5367/ihe.2014.0210

Budnik, R. A. (2023). Risks and prospects of creativity tokenization. *Journal of Digital Technologies and Law, 1*(3), 587-611. https://doi.org/10.21202/jdtl.2023.25

Canhoto, A. I., Quinton, S., Jackson, P., & Dibb, S. (2016). The co-producton of value in digital, university–industry R&D collaboratve projects. *Industrial Marketng Management, 56*, 86-96. http://dx.doi.org/10.1016/j.indmarman.2016.03.010

Daraio, C., Bonaccorsi, A., & Simar, L. (2015). Efficiency and economies of scale and specializaton in European universites: A directonal distance approach. *Journal of Informetrics, 9*(3), 430-448. http://dx.doi.org/10.1016/j.joi.2015.03.002

Falkner, K., & Stålbrandt, E. E. (2023). Meanings of authentic learning scenarios: A study of the interplay between higher education and employability of higher education graduates. *International Journal of Teaching and Learning in Higher Education, 35*(2), 171-183.

Hernández García de Velazco, J. J. (2022). Sociedades del conocimiento y ciencia abierta en la nueva normalidad. *Jurídicas CUC, 18*(1), 1-4.

Hey, V., & Morley, L. (2011). Imagining the university of the future: Eyes wide open? Expanding the imaginary through critical and feminist ruminations in and on the university. *Contemporary Social Science, 16*(2), 165-174. http://dx.doi.org/10.1080/21582041.2011.580618

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

HolonIQ Global Higher Education Network. (2021, April 23). 3 scenarios for higher education. Alpha prototype. https://www.holoniq.com/notes/3-scenarios-for-higher-education-alpha-prototype

Kenzhin, Z. B., Tulegenova, A. U., Zolkin, A. L., Kosnikova, O. V., & Shichkin, I. A. (2021). Labour market under economy digitalization. *E3S Web of Conferences, 311*, 08007. https://doi.org/10.1051/e3sconf/202131108007

Király, G., & Géring, Z. (2019). Introduction to 'Futures of Higher Education' special issue. *Futures, 111*(3), 123-129. https://doi.org/10.1016/j.futures.2019.03.004

Koris, R., Palmer, Z., & Oswal, S. (2021). Empowering cross-disciplinary learning through Online collaboration among students and faculty from Business English, Website Building, and Accessible Design Fields. *Journal of University Teaching & Learning Practice, 18*(7), 112-134.

Malika, B., Ybyraimzhanov, K., Gaukhar, S., Nurdaulet, S., & Ainur, A. (2022). The effect of information technologies on the development of moral values of future teachers based on innovations in education. *World Journal on Educational Technology: Current Issues, 14*(1), 164-174. http://dx.doi.org/10.18844/wjet.v14i1.6713

Markuerkiaga, L., Errasti, N., & Igartua, J. I. (2014). Success factors for managing an entrepreneurial university: Developing an integrative framework. *Industry and Higher Education, 28*(4), 233-244. http://dx.doi.org/10.5367/ihe.2014.0214

McCowan, T. (2017). Higher educaton, unbundling, and the end of the university as we know it. *Oxford Review of Educaton, 43*(6), 733-748. http://dx.doi.org/10.1080/03054985.2017.1343712

OECD/CERI. (2005). OECD/CERI experts meeting on “University futures and new technologies”: Discussion paper. Six scenarios for universities. https://web-archive.oecd.org/2012-06-15/144982-36758932.pdf

Popov, V. N., Kharin, A. N., & Zhukalin, D. A. (2018). Innovatsionnaia deiatelnost universiteta pri vzaimodeistvii s realnym sektorom ekonomiki [The university's innovative activity and the real sector of the economy]. *Vysshee obrazovanie v Rossii, 27*(8-9), 111-116. https://doi.org/10.31992/0869-3617-2018-27-8-9-111-116

Rakhimgalieva, P., Serikbayeva, N., Seiitkazy, P., Kaishatayeva, A., & Suleimenova, Z. (2021). Adaptation of students to professional activity through innovative technologies. *World Journal on Educational Technology: Current Issues, 13*(4), 1102-1123. http://dx.doi.org/10.18844/wjet.v13i4.6312

Roorda, N., & van Son, H. (2016). Education for sustainable development. In H. Heinrichs, P. Martens, G. Michelsen, & A. Wiek (Eds.), *Sustainability science* (pp. 335-374). Dordrecht: Springer. http://dx.doi.org/10.1007/978-94-017-7242-6_28

Rothblatt, S. (2012). The future isn't waiting. In R. Barnett (Ed.), *The future university: Ideas and possibilities* (pp. 15-25). New York: Routledge.

Submetido em: 15/02/2024
Aprovado em: 19/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

Seres, L., Pavlicevic, V., & Tumbas, P. (2018). Digital transformation of higher education: Competing on analytics. In *Proceedings of INTED2018 Conference* (pp. 9491-9497). IATED. http://dx.doi.org/10.21125/inted.2018.2348

Vally, S. (2020). Between the vision of yesterday and the reality of today: Forging a pedagogy of possibility. *Education as Change, 24*, 1-24. https://doi.org/10.25159/1947-9417%2F6984

Vincent-Lancrin, S. (2004). Building futures scenarios for universities and higher education: An international approach. *Policy Futures in Education*, *2*(2), 245-263. https://doi.org/10.2304/pfie.2004.2.2.3

Williamson, B. (2015). Digital education governance: Data visualization, predictive analytics, and 'real-time' policy instruments. *Journal of Education Policy, 31*(2), 123-141. http://dx.doi.org/10.1080/02680939.2015.1035758

Zhang, T., Shaikh, Z. A., Yumashev, A. V., & Chład, M. (2020). Applied model of E-learning in the framework of education for sustainable development. *Sustainability, 12*(16), 6420. http://dx.doi.org/10.3390/SU12166420