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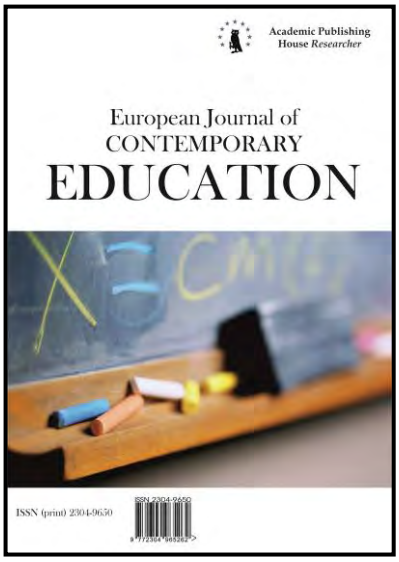

Digitalization of Higher Education: Advantages and Disadvantages in Student Assessments

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Abstract

The authors analyze the assessments of Russian students in terms of digitalization of higher education, their attitude to the introduction of digital technologies in the educational process. The study was conducted in two stages. At the first stage (February-April 2020), a questionnaire survey of students of Russian universities was conducted (N = 1553). At the second stage (January-February 2021), two focus groups (N = 24) were conducted, which allowed us to refine the previously obtained data. The authors conclude that the attitude of students to the digitalization of education is determined by the experience of distance learning during the pandemic. According to the research, students' expectations are related to the content aspect of using digital technologies in the educational process: developing practical skills and maintaining interest in learning. However, young people are not fully focused on the consumption of educational content for the development of their competencies in the chosen field of study. The availability of educational materials, video recordings of lectures in the virtual educational space does not serve as a compensator for key dysfunctions: a decrease in the share of live communication, narrowing of communication channels, lack of motivation to learn, etc. This educational requirement determined the prospects for the transformation of the professional role of the teacher: from the "translator of knowledge" to the "moderator of the creative space".

Keywords: higher school, online education, digital technologies, digital literacy, pandemic.

1. Introduction

Digitalization of business, economy and society actualizes the issue of effective response of higher education institutions to new challenges and opportunities (Saeedi, Visvizi, 2021; Savina, 2020). To meet the new requirements, higher education institutions are devoting considerable attention to digitizing their services, including teaching services (Alhubaishy, Aljuhani, 2021). Digital technologies are becoming more popular in education due to the profitability they gain

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through scalability (Sprenger, Schwaninger, 2021). These advantages are particularly relevant in the context of reduced funding for the education system, the need to ensure the economic efficiency of universities.

In the modern scientific discourse about the trajectories of education development, there are such concepts as "digital natives", "digital skills of the 21st century", "digital trust". However, in recent years, scientists have expressed doubts about the prevailing digital optimism, and practitioners have put on the agenda the question of the limits of the use of digital technologies in the educational process (Herrmann et al., 2021).

The increased use of digital technologies in education, the replacement of face-to-face meetings with digital interactions, is leading to radical changes in the educational space (Marquez-Ramos, 2021). A number of scientists believe that "digital capitalism", which is supported by the power of digital indicators and academic networks, is making significant changes in the production of academic knowledge and the professional life of teachers (Saura, Caballero, 2021). The social roles of all participants in the educational process are changing. Digitalization is modernizing both the information and social constructs of learning activities (Hult, Bystrom, 2021; Bahaj, 2021). Particular risks are associated with the transformation of social interactions, educational experiences, and forms of communication (Kroner, 2021). A number of scientists consider new technological solutions as an opportunity to compensate and/or supplement the narrowed communication channels between participants in the educational space (Ibrahim et al., 2021a).

Thus, universities use digital technologies to assess students' knowledge acquired in various informal and informational learning environments. According to experts, the introduction of electronic exams provides students and staff with more flexibility and convenience (Heinonen, Tuomainen, 2020).

The analysis of international experience shows that the digitalization of education includes the expansion of learning means (the creation and use of electronic campuses) and the modernization of teaching practices and digital innovations in learning (Xiao, 2019).

The introduction of the quarantine measures has accelerated the digitalization of education. The COVID-19 pandemic has forced educational organizations to look for urgent solutions to reconfigure traditional curricula (Secundo, 2021). Digital technologies have made it possible to provide distance learning in conditions of social isolation. However, as the research results showed, this experience was not always successful. The problem was the desire to realize the formal goals of the educational process, while pedagogical considerations were on the periphery of attention. In particular, the main factors of increasing the effectiveness of distance learning were not always taken into account: individualization, joint discussion, evaluation procedures (Medves, 2020). The results of a number of studies show a decrease in the quality of education in the context of the pandemic, the following destructive trends are highlighted: a significant increase in the load on teachers, a decrease in the control of the implementation of educational tasks (Vinichenko, 2021). The active digitalization of higher education sometimes comes into conflict with the need to develop students' creative abilities (Matraeva, 2020).

An important role in overcoming the negative consequences of a sharp transformation of the educational process was played by an active position of a teacher, their planning skills, the ability to adapt quickly, and, most importantly, the willingness to interact with their students (Marek et al., 2021).

Additional factors are the digital competence of the teacher (Börnert-Ringleb et al., 2021), the formation of norms of "cyberethics" (McGarr, McDonagh, 2021), the consideration of situational factors and socio-cultural conditions (Melikov, Skorodumova, 2020).

Given the uncertainty of the epidemiological situation, the prospects for combining distance and traditional learning formats, the introduction of hybrid forms, as well as the strengthening of the digitalization of universities are considered as the most likely scenario for the development of education. In these conditions, the analysis of the prospects for the introduction of digital technologies in the educational process is both scientific and practical significance. Of particular interest is the study of students ' assessments as the main consumers of educational services, the study of their expectations and needs, and the understanding of the distance learning experience in a period of social isolation.

2. Methods

The purpose of the article is to analyze the Russian students' assessments of the processes of digitalization of higher education and the attitude to the introduction of digital technologies in the educational process.

To achieve this goal, the authors relied on a set of analytical procedures and research methods. They include general scientific methods (induction, generalization, systematization, comparison, unstructured observation, etc.), as well as methods of factor analysis and analysis of scientific sources, the questionnaire method, and the focus group method.

The authors conducted the study in two stages. At the first stage, a questionnaire survey of Russian university students (N = 1553) was chosen as the leading research method that provides the necessary empirical data. The survey was conducted in the period from February to April 2020, which coincided with the beginning of the mass transition of Russian universities to a remote work format. The choice of this method is due to both the possibility of mass coverage of respondents from different regions of the Russian Federation, and the objective limitations caused by the COVID-19 pandemic. In view of the latter circumstance, the questionnaire was conducted in an online format using the Google platform, the link to which was distributed through the student virtual communities. This approach assumes a spontaneous selection, due to the lack of necessary control over the selection of respondents, which can be considered as a certain limitation of the study. However, the spontaneous nature of the selection of respondents provided only an insignificant shift in the representation of individual socio-demographic groups of students, which suggests that the sample is representative.

The questionnaire consisted of several blocks: self-assessment of the level of digital literacy of students; attitude to the digitalization of higher education, its negative and positive consequences; assessment of the specifics of the introduction of digital technologies in the educational process. In this article, the authors focus on analyzing students' responses to questions about the impact of digital technologies on the quality of educational process.

The second stage of the study took place in early 2021 (January-February). The task of this stage was to clarify the previously obtained data, both in view of the adaptation of students to the remote format of work, and the accumulation by universities of certain experience in organizing online learning, digitalization of the educational process. The focus group method was chosen as the leading research method. In particular, the authors organized and conducted 2 focus groups, each of which was attended by 12 people (full-time and part-time students). Due to the continued quarantine restrictions, the focus groups were conducted online on the Skype platform. Most of the questions of the focus group guide were discussed during an open discussion, and some of the participants were asked to write their answers in the chat.

The selection of participants for the focus groups was based on invitations, which were sent out to randomly selected e-mails of the students from the first stage of the study. One hundred students who had previously participated in the questionnaire were randomly selected. Those who were the first to confirm their participation were included in the focus groups (N = 24). Another 10 students made up the reserve group, but their participation was not required in the future. A brief conversation was held with them in order to maintain the interest of the participants and reflect on the answers received earlier in the course of the questionnaire. The results of the conversation were not taken into account when compiling the report on the second stage of the study and are not reflected in this article.

To determine the key patterns and trends in the transformation of students' attitudes towards digitalization of education, the authors used the methods of statistical analysis (the Pearson's chi-square, The critical value of $\chi 2$). In the course of the analysis, the presence or absence of a relationship between factorial and resultant features was revealed.

3. Results

The majority of the surveyed students are optimistic about the processes of digitalization of higher education. The majority of the respondents agreed with the statements that digitalization is one of the priority areas for improving the quality of education (Table 1)

Table 1. Distribution of the answers to the question: "Do you agree with the following statements?"

	yes	**no**	**I find it difficult to answer**
Digitalization is an important condition for improving the quality of education	67,4	17,9	14,7
The use of digital technologies is a competitive advantage of the educational institution	67,4	18,9	13,7
Lectures via Skype, online teaching, communication via networks will become a new format of teaching in educational institutions	58,9	23,8	17,3
Digital technologies increase motivation, interest in learning	54,9	25,9	19,2

It is interesting that more than half of the respondents see the prospects for the development of higher education in the formation of remote learning formats.

A third of the respondents (36.3 %) when answering the question: "Do you think the digitalization of education in general is..." chose the answer "positive phenomenon", almost half (47.5 %) – "rather positive". Similar results were obtained among the focus group participants: 18 out of 24 participants gave positive responses. Negative assessments of the digitalization of higher education are due to the experience of remote training of the informants during the introduction of quarantine measures. For a number of students, this format of lectures and seminars initiated the formation of negative stereotypes regarding the digitalization of the educational process.

Table 2. Dependence of students' attitude to the experience of remote learning during the quarantine measures and assessments of the process of digitalization of education (based on the results of the focus group), N = 24

Assessment of the process of digitalization of education	**Relation to the experience of remote learning during the quarantine period**			**Sum**
	negative	neutral	positive	
positive	0	6	12	*18*
negative	4	1	0	*5*
I find it difficult to answer	0	0	1	*1*
Total	*4*	*7*	*13*	*24*

The value of the Pearson's chi-square test is 19.358. The critical value of $\chi 2$ at the significance level $p = 0.01$ is 13.277. The relationship between factorial and resultant features is statistically significant at the significance level $p < 0.01$. The significance level is $p < 0.001$. Based on the data obtained, it can be concluded that the experience of remote learning has determined the attitude of the students to the digitalization of education.

The following statements of the focus group participants illustrate the negative experience of distance learning of the students:

Anastasia N.: "*This is an imitation of education... I might as well watch lectures on YouTube.*"

Katya P.: "*There is no motivation to write something down, to strain to remember something....I notice that there is less knowledge left in my head.*"

Anna M.: "*It was difficult in these conditions... It is difficult for me to communicate through the computer screen, it is impossible for me to ask the teacher something in case I need to.*"

The students see the advantages of digitalization in the expansion of information boundaries in the process of acquiring knowledge (availability of the best educational materials), as well as in the possibility of building individual learning trajectories (Table 2).

Table 3. Distribution of answers to the question: "The positive consequences of the development of digitalization can be.... (multiple choice)"

Answer variants	%
no such answers	6,1
the availability of the best materials in the information space	64
the increase in the level of students' knowledge, including a more accessible presentation of material, use of advanced technologies to search for information and its illustration	46,1
the possibility of building an individual learning paths (to get education at a convenient time, regardless of the territorial availability)	56,9
increases the interest in learning	32,4
reduces the level of social inequality (opens equal opportunities to an accessible educational environment)	26,3
reduces the level of stress due to the transfer of communication to a virtual environment	30
expands the opportunities for exchange of experience, cooperation in the information environment	43,7
other	1,2

Taking into account the fact that the answer "availability of the best educational materials in the information space" received the greatest weight in the students' assessments, the focus group clarified the actual practices of consumption and use of educational information. Despite the wide opportunities for obtaining additional knowledge, the students rarely realize this advantage of digitalization of the educational space in practice. Students' interest is centered in the field of entertainment content. Analyzing the topics of training podcasts, we can conclude that the request of young people is not related to the chosen training profile. For the most part, we are talking about an interest in a particular field: psychology, a foreign language, business, politics. Listening to lectures by teachers of leading universities is also not among the educational priorities of young people. The search for educational information is related to completing tasks received from the teacher.

Table 4. Dependence of assessments of the process of digitalization of education and the use of training podcasts (based on the results of the focus group), N = 24

Evaluation of the process of digitalization of education	Frequency of use of training podcasts			Amount
	often	rarely	never	
positive	8	4	6	*18*
negative	3	1	1	*5*
I find it difficult to answer	0	1	0	1
Total	*11*	*6*	*7*	*24*

The value of the Pearson's chi-square test is 3.583. The critical value of $\chi 2$ at a significance level of $p < 0.05$ is 9.488. The relationship between factorial and resultant features is not statistically significant, the significance level is $p > 0.05$. Significance level is $p = 0.466$. Based on the data obtained, it can be concluded that, in general, the use of training podcasts is not a determinant factor defining the attitude to the digitalization of education.

The negative consequences of digitalization are mostly associated with the deterioration of interpersonal communication skills (58.3 %) and a decrease in the time of classroom work, live communication with the teacher (49.3 %). Interestingly, with the dominant position in the responses about the availability of educational materials in the information space as a positive consequence of digitalization, some students see negative trends in this aspect. So more than a third of the respondents (37.3 %) believe: this (the confidence that all information can be found online) leads to a decrease in the level of knowledge of the students. In addition, 33.4 % of the respondents attributed the negative consequences of digitalization to a decrease in concentration, distraction from educational goals. It should also be noted that in the answer to this question, there was a significantly greater number of choices of the "other" option with the clarification of their personal position than when assessing the positive consequences of digitalization. In particular, such responses as "problems with speech", "addiction", various variations of wording related to poor health and reduced intelligence were recorded.

To analyze the specifics of the impact of digital technologies on the quality of the educational process, students were asked to evaluate a number of characteristics of the educational process in the context of digitalization by personal example. The respondents' concern is associated with a decrease in the level of accessibility of communication with the teacher and information overload of students. The vast majority of the respondents (86.6 %) agreed with the statement that the search for materials has become easier. Three-quarters of the respondents agree that in the conditions of digitalization, the requirements for the quantity and quality of work are clear (74.1 %), and the tasks are interesting (74.2 %). The students' ratings in terms of clear presentation of the material are slightly lower (61.6 %).

The participants of the focus group shared the positive assessments of the respondents, but in this case, the optimism was more concerned with the forecast characteristics of the development of higher education in the future than with personal experience. Despite the fact that the majority of the focus group participants (20 out of 24) assess the level of digitalization in their educational institution as high or quite high, during the conversation the impact of digital technologies on improving the quality of education was revealed as insignificant. Therefore, only some participants of the focus group were able to describe the real practices of implementing digital technologies in the educational process. The following was mentioned: the experience of using digital tools to engage the group in work (Mentometer, Kahoot, Quizizz, Socrative and Padlet); platforms for organizing and conducting online training: Webinar.ru, Discord. The students who noted the high level of digitalization of education in their universities were asked clarifying questions with a request to more fully disclose their answer. The results of the focus group showed that in this case we are talking about the elements of informatization of the educational process.

Anastasia N.: "*We have a distance learning system at the university, there is a personal account of the student, there you can see the tasks, attach the answers, which the teacher checks"*

Valeria M.: "*There is an electronic educational portal at the university, there is different information available. For example, videos of interesting lectures of invited speakers"*

The students positively assess high level of digitalization of the university at the admission stage.

Olga B.: "*As an applicant, I really liked the electronic document submission system. Everything is clear and transparent. You can view all the documents*"

It should be noted that students' expectations for the results of digitalization of the educational space are quite high. The consumption of entertainment content based on digital technologies forms the demand of young people for similar practices in the educational sphere.

Olga B.: "*I would like more variety, maybe game methods in a virtual environment"*

Nikita T.: "*There are many opportunities that modern digital technologies provide, but we do not use that enough..... Ideally, I would like not just to prepare a report with a presentation, but with the help of, I don't know, virtual simulators or something to work out the necessary skills*"

Anna M.: "*I think in the future it will become more interesting to learn. Some elements of a video game, for example, will be used*"

The students' demand for the professional qualities of the teacher is also changing in the context of digitalization. The unsatisfactory assessments are of those teachers who focus their

attention on theoretical concepts. The students' request is concentrated in two planes: "interest" and "practical skills".

Olga B.: "*Too much theory. What for? We can find all this in the Internet. I want to get practical skills. Again, if all the information is online, then I want to get more in the auditorium. I want it to be interesting*."

Nikolai P.: "*In the context of digitalization, education must change. And teachers have to change. Less theory, more practice, more discussion*."

In the course of the questionnaire survey, 67.1 % of the surveyed students expressed the opinion that the success of learning in the conditions of digitalization depends on the competence of the teacher.

4. Discussion

The majority of students positively assess the processes of digitalization of education, believe that the introduction of digital technologies in the educational process provides a competitive advantage of higher education institutions (67, 4 %), improves the quality of education (67,4 %). The analysis of the responses of the focus group participants showed that negative assessments of the digitalization of education are due to the problematic experience of remote learning during the pandemic.

The results of the study demonstrate a high level of concern among Russian students about the decrease of communicative interaction with the teacher (49,3 %). These findings are similar to other studies that note the "marginalization" or exclusion of the human factor from educational practices in the context of digitalization (Fenwick, Edwards, 2016). What consequences can this lead to? Experts identify such negative trends as dehumanization, formalization of the educational process (Manikovskaya, 2019), loss of the fundamental nature of education (Strekalova, 2019), reduced effectiveness in the formation of creative competencies of the individual, interpersonal communication skills (Cladis, 2018).

For the new generation of "digital natives", traditional forms of knowledge translation are losing their relevance. Today's young people have formed a steady demand for entertainment content, the introduction of interactive, game methods that will increase their interest in learning. It is obvious that, in one way or another, the modern educational system should take into account these needs of young people. However, at this stage, the digitalization process has largely affected the system of monitoring and evaluating knowledge, provided access to full-text educational content, and facilitated the system of requesting and processing documentation (virtual personal account of the student, electronic educational portals, distance learning system, etc.). Informatization of the educational process in this aspect shows good results, first of all, at the stages of admission of applicants, document processing, ensuring information openness of training areas (Chernikova, 2020), optimizing the management activities of universities, their business processes, quality management (Ibrahim et al., 2021).

It should be noted that digital technologies in modern higher education act as a basis for independent work of students. Thus, more than half of the respondents (64 %) believe that the availability of the best educational materials in the information space is the most positive consequence of digitalization. However, the research results have shown that the presence of potential digital opportunities does not guarantee their implementation and realization in the students' real experience. Young people primarily focus on the consumption of entertainment content. The request for educational podcasts is not related to obtaining additional knowledge on the main program of study of a student. In foreign studies, similar conclusions were obtained. Most students reject the mobile potential of podcasting in favor of a traditional learning space (Sutton-Brady et al., 2009). Motivation to use educational podcasts is provided by the control system, the integration of these materials into the learning process (Moss et al., 2015).

The results of the research showed the transformation of students' expectations to the personal and professional qualities of the teacher. According to the students, sharing theoretical knowledge cannot relate to the priority tasks of the teacher in the conditions of digitalization. The key demand of students is centered on the formation of practical skills and interest in learning. The data obtained is confirmed by international studies. In the work of M. Ideland based on empirical data, the portrait of the "desired teacher" is compiled. Such a teacher teaches, not lectures, and is flexible and ready to work at any time and in any place. He/she adapts his/her

work to the individual student and their needs for knowledge, location, and timing. "The teacher must promise fun and creativity" to educate a new generation of students (Ideland, 2021). Thus, in the conditions of digitalization, maximum availability of educational materials on the Internet, the student's view of the role of the teacher is changing. The teacher today cannot be limited to the function of knowledge transfer; largely it should serve as a "moderator of the creative space" for the formation and development of practical skills of students, maintaining educational motivation and interest. In these conditions, digital technologies are an integral attribute of the educational process, tools that allow students to form practical skills in an interactive form. International studies confirm these findings. The use of mobile games as an additional tool in the educational process shows statistically significantly higher learning outcomes (Saraubon, 2021).

The level of competence of the teacher, his/her motivation and readiness for the introduction of digital technologies are among the most significant factors for the success of the digitalization of the educational space. However, as the research results show, teachers today face either a lack of motivation to introduce digital technologies in the educational process or dysfunctions of this system (Frolova et al., 2019). One of the possible strategies for overcoming organizational resistances in the field of digitalization of education can be distribution of the digital society values, the support of pedagogical practices based on the recognition of the "usefulness" of digital technologies. We are talking about the formation of socially approved patterns of behavior in the educational environment, the orientation of teachers to find new solutions to optimize the educational process in the context of digitalization (Frolova et al., 2020).

5. Conclusion

The analysis of the results of the study, their comparison with the domestic and foreign experience of digitalization of education allowed us to draw the following conclusions:

1. The attitude to the digitalization of education is determined by the experience of distance learning of students during the pandemic. Among the most significant negative consequences of digitalization, the students include the narrowing of communication channels between participants in the educational space. The availability of educational materials and video recordings of lectures in the virtual educational space does not serve as a compensator for these dysfunctions.

2. Despite the fact that the students see the availability of the best educational materials as a positive consequence of the digitalization of education, not everyone takes advantage of this opportunity. Young people do not fully focus on the consumption of educational content for the development of their competencies in the chosen field of study. The search for educational materials is determined either by the need to complete tasks received from the teacher, or by an interest in a particular field of knowledge: politics, psychology, business.

3. The results of the study showed a certain contradiction. On the one hand, students positively assess the information saturation of the educational space. On the other hand, they see new threats in this trend: a drop in motivation to form sustainable knowledge, a decrease in concentration.

4. In modern conditions, the digitalization of education has largely ensured the expansion of students' instrumental capabilities in the learning process: a virtual personal account, access to educational content, and a knowledge assessment system. However, students' expectations are related to the content aspect of using digital technologies in the educational process: developing practical skills and maintaining interest in learning. This educational request determines the transformation of the professional role of the teacher: from the "knowledge translator" to the "moderator of the creative space".

The results obtained can be used to improve the activities of universities in the context of digitalization, to take into account the educational needs of students, and to optimize teacher training programs.

References

Alhubaishy, Aljuhani, 2021 – *Alhubaishy, A., Aljuhani, A.* (2021). The challenges of instructors' and students' attitudes in digital transformation: A case study of Saudi Universities. *Education and information technologies*. DOI: 10.1007/s10639-021-10491-6

Bahaj, 2021 – *Bahaj, S.O.A.* (2021). The use of internet in management sciences: Evidence from higher educational institutions. *International Journal of Advanced and Applied Sciences*. 8(2): 60-63. DOI: https://doi.org/10.21833/ijaas.2021.02.008

Börnert-Ringleb et al., 2021 – *Börnert-Ringleb, M., Casale, G., Hillenbrand, C.* (2021). What predicts teachers' use of digital learning in Germany? Examining the obstacles and conditions of digital learning in special education. *European Journal of Special Needs Education*. 36:1: 80-97. DOI: 10.1080/08856257.2021.1872847

Chernikova, 2020 – *Chernikova, A.A.* (2020). Foreign Students' Satisfaction of Russian Educational Environment in 2019. *Contemporary Problems of Social Work*. 6.2(22): 44-50. DOI 10.17922/2412-5466-2020-6-2-44-50

Cladis, 2018 – *Cladis, A.E.* (2018). A shifting paradigm: An evaluation of the pervasive effects of digital technologies on language expression, creativity, critical thinking, political discourse, and interactive processes of human communications. *E-Learning and Digital Media*. DOI: https://doi.org/10.1177/2042753017752583

Fenwick, Edwards, 2016 – *Fenwick, T., Edwards, R.* (2016). Exploring the impact of digital technologies on professional responsibilities and education. *European Educational Research Journal*. 15(1): 117-131. DOI: https://doi.org/10.1177/1474904115608387

Frolova et al., 2019 – *Frolova, E.V., Ryabova, T.M., Rogach, O.V.* (2019). Digital technologies in education: problems and prospects for "Moscow electronic school" project implementation. *European Journal of Contemporary Education*. 8(4): 779-789. DOI: 10.13187/ejced.2019.4.779CrossRef

Frolova at al., 2020 – *Frolova, E.V., Rogach, O.V., Ryabova, T.M.* (2020). Digitalization of education in modern scientific discourse: new trends and risks analysis. *European Journal of Contemporary Education*. 9(2): 313-336. DOI: 10.13187/ejced.2020.2.313

Heinonen at al., 2020 - *Heinonen, A., Tuomainen, S.* (2020). Enhancing assessment in the recognition of prior learning with digitalization. *Language learning in higher education*. 10(2): 403-420. DOI: 10.1515/cercles-2020-2027

Herrmann at al., 2021 – *Herrmann, K. J., Lindvig, K., Aagaard, J.* (2021). Curating the use of digital media in higher education: a case study. *Journal of Further and Higher Education*. 45(3): 389-400. DOI: 10.1080/0309877X.2020.1770205

Hult et al., 2021 – *Hult, H.V., Bystrom, K.* (2021). Challenges to learning and leading the digital workplace. *Studies in continuing education*. DOI: 10.1080/0158037X.2021.1879038

Ibrahim el al., 2021 – *Ibrahim, N.M.G., Ibrahim, M.H., Abdelrahman, T.A.* (2021). E-governance and its relationship to University of Ha'il excellence from the viewpoint of the students in light of the Kingdom's vision 2030. *International Journal of Advanced and Applied Sciences*. 8(7): 89-96. DOI: https://doi.org/10.21833/ijaas.2021.07.011

Ibrahim et al., 2021a – *Ibrahim, Y., Hidayat-ur-Rehman, I.* (2021). COVID-19 crisis and the continuous use of virtual classes. *International Journal of Advanced and Applied Sciences*. 8(4): 117-129. DOI: https://doi.org/10.21833/ijaas.2021.04.014

Ideland, 2021 – *Ideland, M.* (2021). Google and the end of the teacher? How a figuration of the teacher is produced through an ed-tech discourse. *Learning, Media and Technology*. 46(1): 33-46. DOI: 10.1080/17439884.2020.1809452

Kroner et al., 2021 – *Kroner, S., Christ, A., Penthin, M.* (2021). Digitalization in aesthetics, arts and cultural education-a scoping review. *Zeitschrift fur erziehungswissenschaft*. 24(1): 9-39. DOI: 10.1007/s11618-021-00989-7

Manikovskaya, 2019 – *Manikovskaya, M.A.* (2019). Digitalization of education: challenges to traditional norms and principles of morality. *Vlast' i upravlenie na Vostoke Rossii*. 2(87): 100-106.

Marek et al., 2021 – *Marek, M.W., Chew, C.S., Wu, W.C.V.* (2021). Teacher Experiences in Converting Classes to Distance Learning in the COVID-19 Pandemic. *International journal of distance education technologies*. 19(1): 40-60. DOI: 10.4018/IJDET.20210101.oa3

Marquez-Ramos, 2021 – *Marquez-Ramos, L.* (2021). Does digitalization in higher education help to bridge the gap between academia and industry? An application to COVID-19. *Industry and higher education*. 0950422221989190. DOI: 10.1177/0950422221989190

Matraeva at al., 2020 – *Matraeva, A.D., Rybakova, M.V., Vinichenko, M.V., Oseev, A.A., Ljapunova, N.V.* (2020). Development of Creativity of Students in Higher Educational Institutions:

Assessment of Students and Experts. *Universal Journal of Educational Research*. 8(1): 8-16. [Electronic resource]. URL: http://www.hrpub.org/download/20191230/UJER2-19513842.pdf

McGarr at al., 2021 – *McGarr, O., McDonagh, A.* (2021). Exploring the digital competence of pre-service teachers on entry onto an initial teacher education programme in Ireland. *Irish Educational Studies*. 40(1): 115-128. DOI: 10.1080/03323315.2020.1800501

Medves, 2020 – *Medves, Z.* (2020). Distance learning – a missed opportunity. *Sodobna pedagogika-journal of contemporary educational studies.* 71(4): 14-26.

Melikov at al., 2020 – *Melikov, I.M., Skorodumova, O.B.* (2020). The contradictory nature of the implementation of information technologies in Russian education. *Social'naya politika i sociologiya*. 19.2(135): 141-148. DOI: 10.17922/2071-3665-2020-19-2-141-148

Moss at al., 2015 – *Moss, N.D., Hamilton, K., White, K.M., Hansen, J.* (2015). The changing motivations of students' use of lecture podcasts across a semester: an extended theory of planned behaviour approach. *Innovations in Education and Teaching International*. 52(6): 599-609. DOI: 10.1080/14703297.2012.746513

Saeedi at al., 2021 – *Saeedi, K., Visvizi, A.* (2021). Software Development Methodologies, HEIs, and the Digital Economy. *Education sciences*. 11(2): 73. DOI: 10.3390/educsci11020073

Saraubon, 2021 – *Saraubon, K.* (2021). Development and evaluation of a mobile game as an English learning tool for ESL learners. *International Journal of Advancedand Applied Sciences.* 8(7): 7783. DOI: https://doi.org/10.21833/ijaas.2021.07.009

Saura et al., 2021 – *Saura, G., Caballero, K.* (2021). Digital academic capitalism. *Revista espanola de educacion comparada*. 37: 192-210. DOI: 10.5944/reec.37.2021.27797

Savina at al., 2020 – *Savina, M. V., Stepanov, A.A.* (2020). Features of the formation of the production potential of enterprises in the era of digitalization. *Social'naya politika i sociologiya*. 19.1(134): 13-20. DOI: 10.17922/2071-3665-2020-19-1-13-20

Secundo at al., 2021 – *Secundo, G., Mele, G., Del Vecchio, P., Elia, G., Margherita, A., Ndou, V.* (2021). Threat or opportunity? A case study of digital-enabled redesign of entrepreneurship education in the COVID-19 emergency. *Technological forecasting and social change.* 166: 120565. DOI: 10.1016/j.techfore.2020.120565

Sprenger at al., 2021 – *Sprenger, D.A., Schwaninger, A.* (2021). Technology acceptance of four digital learning technologies (classroom response system, classroom chat, e-lectures, and mobile virtual reality) after three months' usage. *International journal of educational technology in higher education.* 18(1): 8. DOI: 10.1186/s41239-021-00243-4

Strekalova, 2019 – *Strekalova, N.B.* (2019). Risks of introducing digital technologies into education. *Vestnik Samarskogo universiteta. Istoriya, pedagogika, filologiya.* 25(2): 84-88.

Sutton-Brady et al., 2009 – *Sutton-Brady, C., Scott, K.M., Taylor, L., Carabetta, G., Clark, S.* (2009). The value of using short-format podcasts to enhance learning and teaching. *ALT-J*. 17(3): 219-232. DOI: 10.1080/09687760903247609

Vinichenko at al., 2021 – *Vinichenko, M.V., Narrainen, G.S. Melnichuk, A.V., Pheni Chalid.* (2021). The Influence of Artificial Intelligence on Human Activities. *Frontier Information Technology and Systems Research in Cooperative Economics, Studies in Systems, Decision and Control 316.* Springer Nature Switzerland AG: 561-570. DOI: https://doi.org/10.1007/978-3-030-57831-2_60

Xiao, 2019 – *Xiao, J.* (2019). Digital transformation in higher education: critiquing the five-year development plans (2016-2020) of 75 Chinese universities. *Distance Education*. 40(4): 515-533. DOI: 10.1080/01587919.2019.1680272