ISCKMC 2022
International Scientific Congress «KNOWLEDGE, MAN AND CIVILIZATION»

PEDAGOGICAL SUPPORT FOR STUDENT LEARNING DESIGN IN THE INTERNET SPACE

Nadezhda Alexandrovna Ivanishcheva (a)*, Lyubov Gennadyevna Pak (b),
Lyubov Alexandrovna Kochemasova (c)
*Corresponding author

(a) Orenburg State Pedagogical University, 19, Sovetskaya Str. Orenburg, Russia, lyubov-pak@mail.ru
(b) Orenburg State Pedagogical University, 19, Sovetskaya Str., Orenburg, Russia, ivanicheva@list.ru
(c) Orenburg State Pedagogical University, 19, Sovetskaya Str., Orenburg, Russia, lkochem@mail.ru

Abstract

The epidemiological situation caused by the coronavirus infection has strengthened the trend of mass entry of students of pedagogical universities into the Internet space, communication in the virtual network, and expansion of the range of digital products. The most well-known interpretations of design in the scientific community remain the subject of research, disputes and discussions. The authors define the design as any creation of the subject environment of the university in the Internet space. The mass distribution of online learning actualizes the problem of pedagogical support for the design of student learning in foreign and domestic research. In the digital environment, educational independence, freedom of choice of courses, orientation of educational activities to cognitive abilities become priorities. Learning design acts as a pedagogically accompanied and personally regulated process of successful mastering of an educational program. Distant teaching, mixed and hybrid teaching modes require changes in the ways of learning, adaptation to the new format. The results of the electronic survey of students of pedagogical universities of the Volga Federal District (Orenburg, Ufa, Samara) are presented. 1137 students were participated in the survey. The empirical study showed that the design of educational activities in the Internet space "looms with a sketch" of digital tools for synchronous interaction and asynchronous educational work: electronic sources of educational information, relationships between subjects of the educational process, technologies of interaction in the Internet.

Keywords: Distance learning, Internet space, learning design, online course, pedagogical support, student

1. Introduction

In the context of the COVID-19 pandemic, the forced transition of foreign and domestic universities to the blended learning model has accelerated the digital transformation of the educational process. Information technology turned out to be the only opportunity that allowed students to continue their education in a new format. The technological innovation processes that have affected the education system are linked with the mechanism for their adaptation to the changes in higher education. The pedagogical support of student learning design provides for a variety of resources, tools and technologies for learning in special information and educational environments, in which it is possible to build individual educational roadmaps (Vanhemping et al., 2021). The educational process in these environments is focused on solving real problems using various search methods in the open educational information space of the Internet, observing the norms of information selectivity and a combination of various communication methods without regard to borders and time zones.

The key mechanism for pedagogical support of learning design in the digital educational environment of the Internet space is personal logistics, which allows for using resources chosen required for the educational route in Just-in-Time and (or) On Demand (Kushnir et al., 2019). The subject's awareness of educational needs for resources in accordance with educational goals becomes a priority (Knowledgeworks, 2021).

The design of education in the "University 4.0" paradigm, where the importance of the "digital footprint" is updated as a mechanism for increasing the effectiveness of students' learning and their demand in the competitive labor market, determines the future in the following way:

> ... the creation of new services based on the analysis of digital data, which will make it possible to offer students the best individual trajectories in obtaining education, find more effective solutions in the field of digitalization of education, implement innovations and share best practices (HSE Institute of Education, 2020).

2. Problem Statement

The use of the concept "design" requires an additional clarification of its content, since in the humanities, the concept "design" is polymorphic and diverse. Technological progress has significantly accelerated the process of transition from an idea to its direct execution due to a variety of computer programs for working with images and projects.

Design is any project of the subject environment of the university in the Internet space. In the pedagogical support of the design of student learning in the digital environment, educational independence, free choice of courses, orientation of educational activities to cognitive capabilities become priorities. Learning design acts as a pedagogically accompanied and personally-regulated process of successful mastering the educational program. In academic discourse, there is a common understanding of the need to change the format of educational activities in the self-isolation. Teaching university students remotely requires changes in students' living conditions, a new format of learning and new forms of behavior during the training session. The pedagogical support of the student's ability to manage his

educational trajectory within the academic discipline is of particular relevance in the context of decision-making on the architectonics of learning design.

3.   Research Questions

The subject is the pedagogical support for the design of student learning in the Internet space. The general scientific term "design" is used in a wide range of human activities: from traditional object design to communication design, from environmental design to virtual reality design. The design of the modern subject world, which is dependent on technologies and materials, is a way to establish communications between subjects of the educational process in visualized learning models in the digital age.

Scientific interest is caused by foreign studies. For example, according to Walder (2017), learning design approaches should be supported in a professional setting. In the digitalization world, it is necessary to work with interactive methods, electronic didactic tools, to be competitive. Stupnisky et al. (2018) consider the problem of a comprehensive rethinking of educational activities in the format of innovative digital technologies. The main actors of transformation are the subjects of educational activities (students, teachers, employers, etc.), who transform activities, build relationships, use required resources, and create new ones. In the article by Zuocheng et al. (2020), the problem of interaction between students from different countries through the web pages was analyzed in the context of the urgent transition to online learning (2020). The study by Polyakova and Galstyan-Sargsyan (2021) allows us to conclude that work in a global interethnic team, virtual projects, web cases, online interaction on a sustainable basis can be considered the result of scientific research on the transformation of university educational practices in the context of the challenges of the 21st century. New types of interaction imitate the real ones. Ghani and Taylor (2021) have been searching for ways to develop students' thinking skills and the effects of their cognitive presence in the implementation of new learning formats. The flexible educational environment of the Internet space offers a variety of ways to master a particular competence, and acts as a means of developing "global literacy" among students (Ghani & Taylor, 2021). According to the official data of the American Clayton Christensen Research Institute (2020), a noticeable increase in the number of universities offering various designs of online learning forms has been observed. The share of online courses in the USA is 50%. The epidemiological situation has strengthened this trend. Currently, the developers of the Harvard educational platform HarvardX have relied on the modular structure of courses, which is based on the case method introduced by the Harvard Business School at the beginning of the 20th century. The active problem-situational analysis is based on the development of students' research skills.

Puchkova argues that the structuring of information, critical thinking, destruction of stereotypes, synergistic intersubjective communication (from teacher to student, from student to student, from student to teacher) caused a higher level of the online interaction. This learning design creates an effective assimilation of information, acquisition of the required competencies and successful completion of the course (Puchkov, 2020). Of scientific interest is the federal project of the Ministry of Economic Development "Digital University 20.35" launched in 2017. The fundamental difference between this structure and other digital educational organizations lies in the implementation of a conceptually innovative educational platform. University 20.35 operates on the basis of Digital twin chain (digital

twins"), which accumulates and processes personal data, modeling a digital projection of the person (Peskov, 2017). However, the innovative digital programs are designed to train specialists in the field of economics and education management, they need to adapt the design of the program content of the training courses for students of the pedagogical university. Hybrid forms of education are most promising in the current educational environment. The design of remote learning goes beyond the transfer of tasks in a special electronic environment and implies the presence of the important component as social communication (Ivanishcheva & Kochemasova, 2021).

4. Purpose of the Study

The purpose of the article is to present the results of the study, expanding the understanding of the pedagogical support of the design of learning for students who positively perceive new formats of learning in the Internet space.

5. Research Methods

The following methods were used: systemic, comparative and theoretical analysis; generalization of pedagogical experience; diagnostic methods (questionnaires, conversations, content analysis); observational methods (direct and indirect observation, self-observation); sociological (survey, analysis of products of students' activities) methods. In data processing, the methods of descriptive mathematical statistics, Spearman's rank correlation coefficient rs, and the Microsoft Excel program were used.

6. Findings

The empirical part of the study is based on the electronic questionnaire through the distribution of QR codes for mobile devices and links to the questionnaire page on the CAWI service, where the questionnaires were generated. The respondents were students in the field of Psychological and pedagogical education (Orenburg State Pedagogical University, Bashkir State Pedagogical University, Samara State Social and Pedagogical University).

The characteristics of the respondents were as follows: the level of education (bachelor's degree – 75 %, master's degree – 25 %), form of education (full-time – 88 %, part-time – 12 %). 34 % of male and 66 % of female students were interviewed. The subject was the design of learning in the Internet space in the context of the COVID-19 pandemic. The period was – November 2021. The total number of participants was 1137 students. The sample was representative: the sample size was 560 questionnaires from 3 universities. The questionnaire included questions compiled by the authors and selected with adaptation to Russian-speaking respondents from the ToOLS Online Learning Success Test questionnaire (Kerr et al., 2006). The questionnaire included four blocks of closed and semi-closed questions related to electronic sources of educational information, the logistics of the university, the relationship between the subjects of the educational process, and the technology of interaction between the subjects in the Internet space. The questionnaire included questions for assessing personal results on given scales (likert scales).

The ToOLS Online Learning Success Test (M.S. Kerr, K. Rinerson, M.K. Kerr) contained 45 items and five scales: computer and academic skills, independent / dependent learning, the need for online

learning (Kerr et al., 2006). The test predicts results of students' learning, and the successful student in the distance learning format is independent, motivated, responsible and has ICT skills.

6.1. Electronic sources of educational information

The study involves the identification of resources, tools and technologies for pedagogical support of student learning design during the COVID-19 pandemic in special information and educational environments of the Internet space.

The first block of questions in the questionnaire assumed a detailed assessment of the demand for information resources by respondents in mastering the educational program (Figure 01).
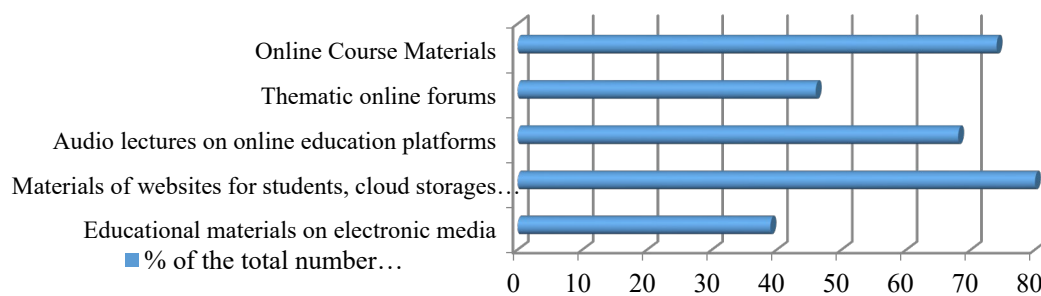

Figure 1. Assessment of the demand for electronic sources of educational information

81 % of respondents gave priority to the websites for students, cloud files, and computer social networks. According to 74 % of respondents, the demand for online course materials is inferior to the content of social networks and educational sites "for students", where ready-made term papers, practice reports, abstracts and other materials intended for assessing the formation of competencies are loaded. Audio lectures by professors from leading Russian and foreign universities turned out to be "very important" for 68 % of respondents. However, realizing the importance of electronic information resources in the context of distance (blended, hybrid) learning, they do not always show this understanding in their activities. On the one hand, a positive correlation ($rs = 0.28$, $p \leq 0.01$) was found between the assessment of the significance of learning design and the rank of the purpose of using the Internet for learning (among the purposes of entertainment, communication, online shopping, etc.). In other words, the more important online learning is the more time students allocate to it. On the other hand, about 31 % of respondents study up to 5 hours a week online. In addition, respondents (about 42 %) of all three universities emphasized the weak pedagogical support of massive open online courses (MOOCs) on special platforms (Coursera, Udacity, edX, FutureLearn, OpenupEd, etc.). 39 % of respondents rarely use educational materials on electronic media such as CD-ROM, flash memory, considering them "a relic of the past."

6.2. University logistics

The second block of questions concerned the assessment of the university logistics (Figure 02). According to the data obtained, junior students ($rs = 0.43$, $p \leq 0.01$) were more in need of "navigator programs" that would contain "useful tips" on working with electronic libraries
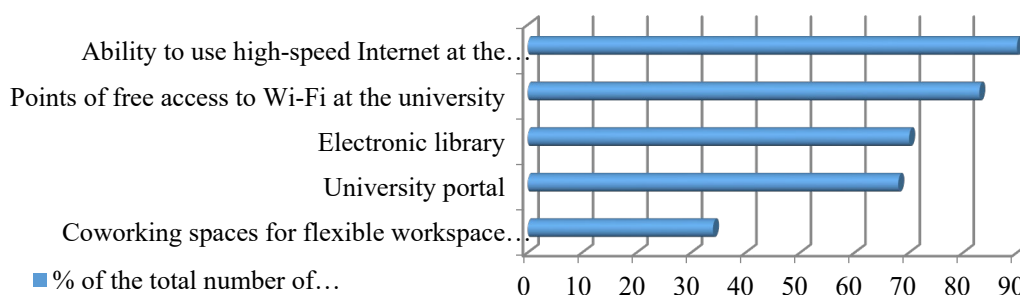
Figure 2. Assessment of the material base

On their part, there is a desire for an independent choice of information channels, mainly with flexible support by the teacher. 34 % of respondents expressed serious concern about the provision of universities with "platforms for intellectual growth" as a comfortable space for preparing for classes, communication, holding events.

6.3. Relationships between the subjects of the educational process

The third set of questions was aimed at the assessment of the synchronous and/or asynchronous interaction of participants in the educational process (Figure 03).
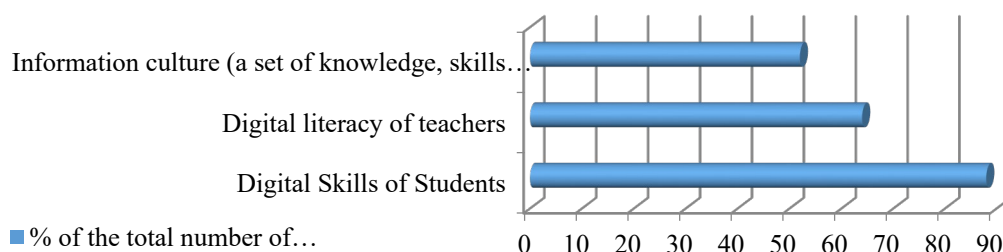

Figure 3. Assessment of the relationship between the subjects of the educational process

Against the backdrop of the importance of direct interaction with classmates and teachers, the loss of which during the transition to remote learning was perceived as one of the risks of online learning, 32 % of respondents indicated the presence of difficulties in online communication with fellow students and teachers. The majority of students (23 % – high level, 46 % – average level) said that they have sufficient skills in written and oral online communication. The more confident students feel in oral interaction in the online environment, the higher their readiness for online learning ($rs = 0.44$, $p \leq 0.01$). The survey data showed that the majority of respondents (88 %) have digital skills. However, the digital literacy of teachers (64 %) leaves much to be desired. Unfortunately, a small part of the respondents (21 %) do not appreciate the need to use digital educational databases.

6.4. Technologies of interaction between subjects of education in the Internet space

The fourth block of questions assumed the assessment of technologies of interaction between the subjects of education in the Internet space (Figure 04).
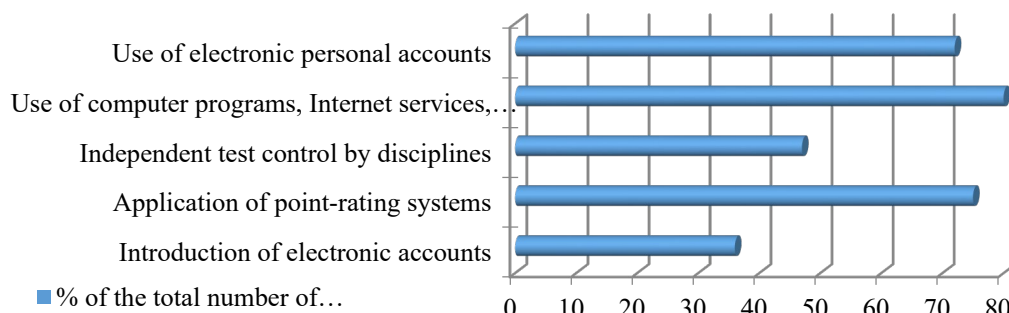

Figure 4. Assessment of interactions between the subjects of education in the Internet space

The three universities involved in the study have developed IT infrastructures that meet their needs, taking into account available external resources. In the context of pedagogical support, they are scenarios for learning in the online environment. At pedagogical universities, the educational process was remote supported by technical services of the university on the platforms Zoom, Moodle, Google Meet, Microcoft Teams, SMART Notebook, etc. Respondents attributed online videoconferencing to the most popular forms of educational activities. When asked about the use of computer programs, Internet services, online tools, 80 % of respondents answered positively, explaining their choice as "importance for learning success". At the same time, the more students are ready to master computer programs and services to acquire new skills, the higher their average readiness for online learning (rs = 0.29, p ≤ 0.01). 72 % of respondents indicated the importance of a personal electronic account, which provides the student with information about his/her studies. Keeping an electronic record book optimizes the information service for providing a quick access to information about student's progress.

7. Conclusion

The COVID-19 pandemic has accelerated large-scale changes in the information and educational environment of pedagogical universities, requiring quick decisions and actions. Pedagogical support as a special kind of professional activity provides for a variety of resources and technologies for teaching students for the effective implementation of the educational process in the Internet space.

The pedagogical support of the design of education requires the renewal, within which the student can achieve educational results, taking into account the individual characteristics of the individual, the development of self-organization, activity and reflection of the student in the digital environment. The empirical study showed that the design of educational activities in the Internet space "looms with a sketch" of digital tools for synchronous interaction and asynchronous educational work: electronic sources of educational information, logistics of the university, relationships between the subjects of the educational process, technologies for the interaction of subjects of education on the Internet. The

conditions for the successful use of "open educational resources" is of particular relevance in the practice of foreign and domestic higher education in terms of decisions on the architectonics of learning design.

The results contribute to the development of hybrid learning aimed to improve the mechanisms of learning design in the digital transformation of educational processes. The authors' conclusions are consistent with the research of foreign and Russian colleagues: the Internet space changes the nature of the interaction of subjects of the educational process, expands the boundaries of students' participation in their own development, design and implementation of an individual learning path (Choi et al., 2021); The "image" of the design of learning using the Internet (in formal educational environments and the open Internet space) is considered as online learning (Lyz & Istratova, 2021). The development of further research in the problem field of student learning design is associated with the development of psychological and pedagogical foundations for the standardization of digital educational products/technologies, the creation of a digital profile of a student, and the study of this issue in terms of the methodology of institutionalizing online education in a transforming educational environment of higher education.

References

Choi, J. J., Robb, C. A., Mifli, M., & Zainud-din, Z. (2021). University Students' Perception to Online Class Delivery Methods during the COVID-19 Pandemic: A Focus on Hospitality Education in Korea and Malaysia. *Journal of Hospitality, Leisure, Sport & Tourism Education*, *Nov, 29*, 100336

Christensen institute (2014). What are we using technology to scale? *The Clayton Christensen Institute for Disruptive Innovation.* https://www.christenseninstitute.org/blog/what-are-we-using-technology-to-scale/

Ghani, S., & Taylor, M. (2021). Blended Learning as a Vehicle for Increasing Student Engagement. *New Directions for Teaching and Learning, 167*, 43–51.

HSE Institute of Education (2020). Students will be led to success in their "digital footprints". *HSE Institute of Education*. https://ioe.hse en/news/298865782.html

Ivanishcheva, N. A., & Kochemasova, L. A. (2021). Self-education as a trend of the knowledge culture paradigm of a student of a pedagogical university. *Bulletin of Orenburg State University. Electronic scientific journal, 1*(229), 22–30.

Kerr, M. S., Rynearson, K., & Kerr, M. C. (2006). Student Characteristics for Online Learning Success. *The Internet and Higher Education, 9*(2), 91–105.

Knowledge works (2021). *Finding Your Path. A Navigation Tool for Scaling Personalized, Competency-Based Learning.* https://knowledgeworks.org/resources/navigation-tool-finding-your-path-scaling-personalized-learning/

Kushnir, M. E., Rabinovich, P. D., Khramov, Yu. E., & Zavedensky, K. E. (2019). Educational logistics in the digital school. *Informatics and education, 9*, 5–11.

Lyz, N. A., & Istratova, O. N. (2021). Educational activities of students in the Internet space: readiness and self-efficacy. *Education Integration, 25*(4), 661–680.

Peskov, D. N. (2017). Model of the University 20.35 and the conditions for joining its creation. Ekaterinburg: Publishing solutions. http://ncrao.rsvpu.ru/sites/default/files/library/universitet_20.35.pdf

Polyakova, O., & Galstyan-Sargsyan, R. (2021). Sustainable higher education via telecollaboration: improving pluri-lingual and pluricultural competence. *Integration of education, 25*(4), 544–561.

Puchkov, M. Yu. (2020). *Innovative activity of the Pedagogical University: tasks and methods.* h https://www.herzen.spb.ru/uploads/asemihina/files/%D0%98%D0%BD%D0%BD%D0%BE%D0%B2%D0%B0%D1%86%D0%B8%D0%BE%D0%BD%D0%BD%D0%B0%D1%8F%20%D0%B4%D0%B5%D1%8F%D1%82%D0%B5%D0%BB%D1%8C%D0%BD%D0%BE%D1%81%D0

1%82%D1%8C%20%D0%BF%D0%B5%D0%B4%D0%B0%D0%B3%D0%BE%D0%B3%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0%BE%D0%B3%D0%BE%20%D1%83%D0%BD%D0%B8%D0%B2%D0%B5%D1%80%D1%81%D0%B8%D1%82%D0%B5%D1%82%D0%B0_%20%D0%B7%D0%B0%D0%B4%D0%B0%D1%87%D0%B8%20%D0%B8%20%D0%BC%D0%B5%D1%82%D0%BE%D0%B4%D1%8B%282%29.pdf

Stupnisky, R. H., BrckaLorenz, A., Yuhas, B., & Guay, F. (2018). Faculty members' motivation for teaching and best practices: Testing a model based on self-determination theory across institution types. *Contemporary Educational Psychology, 53*, 15–26.

Vanhemping, E. G., Ivanishcheva, N. A., & Petrenko, E. I. (2021). *Design of education in the paradigm "University 4.0"*. Publishing and Printing Association of Higher Educational Institutions.

Walder, A. M. (2017). Pedagogical Innovation in Canadian higher education: Professors' perspectives on its effects on teaching and learning. *Studies in Educational Evaluation, 54*, 71–82.

Zuocheng, Z., Tan, S., Wignell, P., & O'Halloran, K. (2020). Addressing international students on Australian and Chinese university webpages: a comparative study. *Discourse, Context & Media, (Aug.), 36.* https://www.sciencedirect.com/science/article/pii/S2211695820300362