UDC 378.147
https://doi.org/10.28925/2312-5829.2023.112

Svitlana Gvozdii
https://orcid.org/0000-0002-8208-2972
Doctor of Pedagogical Sciences, Professor,
Department of Human Physiology,
Health and Safety and Science Education,
Odesa I. I. Mechnikov National University,
2, Dvoryanska St, Odesa, 65082, Ukraine
spgvozdiy77@onu.edu.ua

Anastasiia Litvinova
https://orcid.org/0000-0002-2513-0632
Candidate of Pedagogical Sciences (PhD in Pedagogics),
Associate Professor, Department of Valeology,
V. N. Karazin Kharkiv National University
4, Svobody Sq., Kharkiv, 61022, Ukraine,
anastasia.tymchenko@karazin.ua

Ganna Tymchenko
https://orcid.org/0000-0001-7745-0817
Candidate of Biological Sciences (PhD in Biology),
Associate Professor, Director of Electronic Learning
Centre at the Institute of Postgraduate Education and Distance Learning,
V. N. Karazin Kharkiv National University,
4, Svobody Sq., Kharkiv, 61022, Ukraine
annatymchenko@karazin.ua

Connectivism Theory in Safety and Health Education in Classical Universities

Abstract. *Planet Earth, humanity in general and the education system in particular, in the first quarter of the 21th century have faced a large number of problems and situations that require regulation. The use of modern technologies based on connectivism theory in the study of health and safety issues within classical (non-medical) higher education institutions in Ukraine is relevant. The aim of the article is to test the effectiveness of using online learning, e-learning, as well as open educational resources,*

distance learning technologies based on connectivism theory in safety and health education in classical universities.

The Internet has now become a huge collaborative learning space. In today's dynamic theory of learning "connectivism", it is the Internet that has become the main link. Connectivism is a conceptual framework that sees learning as a networked phenomenon influenced by technology and socialisation and learning as a process of pattern recognition. Connectivism emphasises the need to consider, if possible, all the changes that took place yesterday in order to realise new knowledge today and in the future. In the context of safety and health, the need to learn from yesterday's life experiences to ensure health and safety today and in the future becomes relevant. The article substantiates how connectivism theory can be used to explore issues of safety and health. Many forms of implementation of technologies combining e-learning and open educational services to build a blended learning system in higher education are provided. The first accessible and open educational resource (distance learning course) "My Health" was created to implement quality learning on safety and health issues. The course also uses technology to combine e-learning and open educational services of the educational platforms Coursera, Khanacademy, Canvas, Udemy and Eliademy. Studying health and safety issues based on connectivism theory was implemented using social media; the use of gamification techniques involved performing tasks and exercises and turning them into a competitive game to make learning more interactive. Sites with simulations of different processes engaged students in deep learning that promoted understanding, as opposed to superficial learning that required only memorization.

A post-study survey of both full-time and part-time students showed an increase in academic achievement with the use of e-learning based on connectivism theory. At the same time, the authors draw attention to the need for offline work to build sustainable practical skills in safety and health.

A promising direction remains the development of educational platforms and introduction of open educational services and E-learning in professional training of specialists in other fields of science, creation of high-quality open Ukrainian distance learning courses and services worthy of international level, as well as introduction of mass interactive courses on a modern open Internet platform.

Keywords: *online learning, high education, health, connectivism, distance learning, Open Educational Service, safety.*

Introduction

Planet Earth, humanity in general and the education system, in particular, the first quarter of the 21st century, has faced a great number of problems and situations which

require regulation.

First, the beginning of the 21st century is characterised by an intensification of the global systemic crisis on planet Earth, which has embraced not only the social but also the natural environment: military aggression in Ukraine, environmental degradation, an increase in the number of natural and man-made disasters (earthquake in Turkey), terrorist acts, local and regional sources of instability and danger. Various poisonings and non-contagious diseases, traffic accidents, accidental and intentional injuries, fires, water accidents, industrial and domestic accidents and injuries took 20 times more lives in Ukraine in 2020 than in 2000. The Covid infection pandemic claimed 1147062 lives in 2020–2021 all over the world (Coronavirus, 2022). Therefore, one of the most priority and important tasks for human society now is to improve the conditions of everyday existence, to ensure the safety of life and personal health, and to be able to react adequately to any negative changes in life.

The axiom of potential danger states that it is impossible to design an absolutely safe human activity (an absolutely safe technique or technological process, type of learning activities, etc.); there cannot be zero risks in any human activity. Therefore, preparing young people for safe life and activity, health preservation is impossible without timely mastering the knowledge of health and life preservation in everyday conditions, during emergencies.

The study of the experience of training of the future specialists for the safety of life and professional activity in foreign countries has revealed that universities of the world pay considerable attention to the issues of safety in everyday life, during production activity, in the training of specialists of scientific, pedagogical and specialised profile. Information is provided to university students in the form of instructions, online courses, electronic manuals, specific recommendations for dealing with man-made and natural emergencies, in case of a terrorist attack, etc. Attention is drawn to the need for practical training in practical skills, especially in first aid. All European and world universities have numerical services and committees which are responsible for safety and health in the educational institution.

In Ukraine, the study of safety and health in higher education training has been based on many laws, orders, regulations of the Ministry of Education and Science, the emergency and occupational safety services. The disciplines “Life Safety”, “Occupational Safety”, “Bases of Valeology” for the Bachelor’s level of education have been introduced as compulsory subjects.

However, to date, there is no control over the inclusion of these disciplines in the curricula of training future specialists of different specialities. By the decision of university authorities, the disciplines on preparing future specialists for life safety and professional activity are merged, changed in name, volume, and content or reduced at all. This leads to negative consequences in the study and formation of skills for a healthy and safe way of life among higher education applicants. Training in higher education on health preservation and safe living has become particularly urgent during military operations, natural emergencies, including the Covid epidemic in all countries of the world.

Modern education at the beginning of the 21st century faced the possibility of implementing distance learning on different distance learning platforms and using different services. Therefore, HEIs started to create their educational platforms and train teachers to use different tools and services. And the mastery of the teacher lay in the methodology of using these tools and services. But everyone was actively using one term – blended learning. Parallel to this, teachers started to implement open educational portals because of the availability of knowledge in their learning process.

The current state of E-learning in the world, on the one hand, is determined by the presence of promising trends that have emerged as forms of education of high efficiency and quality, and on the other hand, require careful analysis of the reality of educational space in higher education (Rahiem, 2021; Wolff et al., 2015). Considering these two aspects allow to carry out the effective design of distance learning in the system of high education.

Recently, in pedagogy, distance learning is rapidly gaining popularity as a type of independent work as a learning tool. The results of our analytical search indicate that we need to use distance learning not only as a tool (Timchenko et al., 2017; Rasi et al, 2018),

and to create their educational platforms, environments and portals, which in turn provide a new high-quality and modern educational environment E-learning, which includes not only tools but also new open educational platforms for communication for users from different cities and countries (Singh, K., 2019; Tadesse, T. et al., 2020).

In the system of high education, distance education technologies are mainly used as independent forms of organization of the educational process. Also, in the system of high education begins to form a system of blended learning, which according to V. M. Kukharenko, is a purposeful process of acquiring knowledge, skills, and abilities in terms of integration of classroom and extracurricular educational activities of the educational process based on the use and complementarily of traditional technologies, electronic, distance and mobile learning in the presence of student self-control over the time, place, routes and pace of learning.

In addition, e-learning in the training system based on high education is considered as an educational process aimed at training an educated specialist considering the basic trends of modern education (quality and accessibility), and as a separate complex structured system, the levels of which interact and condition each other. Considering the trends and directions of development of modern e-learning, we should talk about the creation and maintenance of information and educational environments, which include the development and dissemination of modern methods, tools, and technologies of education, especially open, distance, blended learning. In this way, a qualitatively new information and education environment is formed, which is linked to the leading trends in the world's educational space. The main hopes are placed on the creation and support of open and distance learning, on the development of new object creation technologies of educational materials along with the development of traditional development technologies of the electronic textbooks and multiagent technologies of educational portals. In general, this determines the creation of quality information and educational environment, which modern classical educational institutions are trying to implement to maintain their status in the world rankings (Kukharenko et al., 2020; Levchuk et al., 2015, 2017; Tymchenko et al., 2017).

Higher education is facing new challenges and needs to be transformed. The introduction of online learning determined that the degree of readiness of teachers varied. According to our research, the percentage of teachers who were already familiar with and using distance learning, in HEIs, was 30 %. Thanks to the capabilities of distance learning training centres, emergency training events were held at the beginning of the pandemic, where around 40 % of teachers were trained. The remaining 30 % of teachers continued to use those means of communication which by experience were available to them due to convenience and habitualness – chat rooms in social networks and various mobile applications, forgetting that quality education is not only provided by the function of broadcasting and textual presentation of material.

Of relevance is the use of modern technologies, which are based on connectivism theory, in the study of health and safety issues within the framework of classical (non-medical) higher education institutions in Ukraine. Thus, the need to justify different ways of learning has arisen: the methodological basis and justification for the possibility of using connectivism theory in online learning, e-learning, and open educational resources, distance technologies etc. (Pramono et al, 2021; Samat et al., 2020; Sim et al., 2021; Subedi, S. et al., 2020; Kropf, & Dorothy, C., 2013).

The aim of research is to test the effectiveness of using online learning, e-learning, and open educational resources, distance technologies etc., which are based on connectivism theory in safety and health education in classical universities.

Objectives of the study:

1. To reveal the essence of connectivism theory and how it can be used in studying safety and health issues;

2. To substantiate possibilities of online, E-learning, open educational systems in teaching students of classical higher education institutions safety and health issues;

3. To test possibilities of educational connectivism theory and blended learning for safety and health issues.

Literature review

In today's world, changes are constantly taking place, which also applies to education. Experience, acceptance of reality, understanding of what is happening, the flexibility of perception, and knowledge add up to realising the learning process. Traditional learning paradigms – cognitivism, behaviourism, constructivism – have been the model against which learning has been measured (Davis, C., & Edmunds, E., 2008). But new opportunities, new technologies, new resources are emerging that are making a significant contribution to learning in the 21st century. A higher education student today can find information much faster than in the 20th century. And, consequently, the learning process today is more intense, richer, faster through networking, interaction and communication, self-organisation and self-learning. The basis for such learning is provided by George Siemens' connectivism theory (Siemens, G., 2005).

It is common knowledge that the Internet has now been transformed into a vast space of collaborative learning: online courses, social networks, virtual reality or simulated processes and laboratories. The Internet is used to create, reproduce, share, and deliver information to all comers, including teachers and students. And in the modern, dynamic theory of learning "Connectivism", it is the Internet that has become the main link (Kropf, & Dorothy, 2013; MD ENZAI etc., 2021). "Connectivism is a conceptual framework which views learning as a network phenomenon influenced by technology and socialisation and learning as a process of pattern recognition (Siemens, 2005).

The essential premise of connectivism is that the starting point for learning is the point at which knowledge is put into action by learners, through connection to and participation in a learning community. Learning communities are defined as "an association, a clustering of similar areas of interest that allows for interaction, sharing, dialogue and thinking together" (Siemens, 2005).

According to Siemens, "Connectivism is driven by the understanding that decisions are based on rapidly altering foundations. New information is continually being acquired. The ability to draw distinctions between important and unimportant information is vital. The ability to recognize when new information alters the landscape based on decisions made yesterday is also critical." (Siemens, 2005, 24). This definition emphasises the need

to consider, if possible, all the changes that took place yesterday, to realise new knowledge today and in the future. In the context of safety and health, the need to learn from yesterday's experiences of living to ensure health and safety now and in the future become relevant.

We will justify the need to apply connectivism theory to learning about safety and health based on principles:

- Learning and knowledge about safety and health are based on a diversity of opinion when discussing algorithms for behaviour in emergencies, protocols for implementing recreational procedures and so on.
- The learning process is not possible without the use of specialised information sources (official health websites, educational platforms, virtual laboratories, etc.).
- The learning process can be implemented using non-human devices: dummy simulators, remote resources, 3D simulators, etc.
- The motivation to know more than you know now is the most important in matters of learning. This is due to the power of the Internet, which can provide radically opposing views on the same issue. The motivation to seek the truth, the motivation to realise the available data, offers enormous opportunities for professional development. This thesis is underlined by the principle of continuous development and support.
- Understanding safety and health issues require the skill to see the connections between different branches of science, ideas, and concepts.
- Only accurate, up to date, validated knowledge is the goal of all learning events in connectivism theory. This is a fundamental position for learning about health and safety since insufficient or incomplete knowledge sometimes leads to tragic situations (fire safety, inability to provide first aid for heart attacks, etc.).
- Learning how to decide is perceived as a learning process. Analysing what to learn, what to do with this information, separating right from wrong due to

changes in the information field is also seen as a learning process (Siemens, 2005, 24).

The use of Connectivism Theory in Safety and Health suggests that students should integrate thoughts, theories, and general information in a useful way. This theory recognises that technology is an important part of the learning process and that our ongoing connectivity enables us to make choices about our learning.

Integrating information technology into the study of safety and health in classical (non-medical) universities greatly enhances learning. Connectivism can help teachers at the classroom level using the possibilities of the internet and electronic resources. Tips from Goldie, J. G. S. (2016) for the work of the modern teacher:

1. Follow the blogs of those who innovate in educational technology.

2. Experiment with different services and resources (within your competence) that can enrich teaching and learning in your field.

3. Carefully select sources for students to use encourage them to use the Internet to find research facts, resources, and opportunities.

4. Use, publish, share information, resources through the full potential of the internet, personal social media page. This can help to create a flexible learning environment, to create collective resources and share good practices.

5. Task students to make effective use of the media to highlight the process and, where appropriate, the results.

6. Create online communities using social media. This greatly facilitates feedback and collaboration and the development of professionalism. (Cheston et al, 2013, Hollinderbaumer et al, 2013).

A review by Cheston et al (2013) shows that both students and teachers face technical challenges when dealing with social platforms, variable student participation and problems with privacy, professionalism, and client confidentiality, especially when it comes to unsecured networks.

In our study, the theory of connectivism is applied through Open Educational Resources (OER) and distance learning. It is these that provide access to materials in courses, modules, textbooks, streaming videos, tests, software and any other tools,

materials or methods that are used to support access to knowledge in different directions. These include applied sciences, arts and humanities, education, history, social sciences, mathematics, and the exact sciences.

V. N. Karazin Kharkiv National University and Odesa I. I. Mechnikov National University prepared a catalogue of open sources of e-learning in the speciality (educational direction) from such platforms of mass open online courses, such as Coursera, Khan-academy, Canvas, Udemy and Eliademy, etc. The catalogue on the websites of the faculties provided links to the training topics and sections and which are being actively implemented in the learning process as independent work for a section or the whole course. Due to the active implementation of the E-Learning system in V. N. Karazin Kharkiv National University by using open educational services from the catalogue of open sources of e-learning in the speciality (educational direction), distance courses, open distance courses based on the E-learning Center during classroom and independent work, a system of blended learning was formed (Levchuk et al., 2015; Timchenko et al., 2014; Tovkanets, 2018), which was aimed at obtaining quality modern education and digital student development.

To date, the only optimal learning tool is the LMS Moodle platform, which allows you to organise not only the learning process as such, considering the various other services and platforms embedded in it, but also establish communication, control and monitoring of knowledge not only of students but also of teachers, based on a single learning environment of the university.

The technology of combining e-learning and open educational services to build a system of blended learning in the system of high education includes many implementation forms:

- complete sets of information and methodological recommendations for the course using Google, Moodle, and open educational services (analogues of MOOC);
- sequence of tasks during education when mastering the course topics using Google, Moodle, and open educational services (analogues of MOOC);

- control – current and final control of knowledge's level by the teacher and self-control of activities using Google and Moodle services;
- a complete set of documents for planning the educational process (curricula, schedules, etc.) using Google and Moodle;
- video and audio support of training in the form of educational films, video lectures, recordings of lectures, seminars, etc. using Moodle services and own channels on YouTube Open E-learning and Karazin Universarium;
- multimedia presentation materials for classes using Google and Moodle services;
- terminological dictionaries using Moodle services;
- practical and laboratory virtual work with an interactive component using Google and Moodle and YouTube Open E-learning;
- blocks of current and final test tasks with automated verification of results based on LMS Moodle;
- links to open information educational resources by speciality from the world's leading universities using open educational services (analogues of MOOC).

The first accessible and open educational resource (distance course) "My Health" was created to implement quality education in the teaching of health and safety courses, combining the joint efforts of the authors. It was placed in the public access web resources of the E-learning Center based on LMS Moodle, which trained more than 400 people (Litvinova et al., 2019). The course was designed for educational purposes – to provide knowledge about health and safety in the study of courses "Life Safety", "Occupational Safety", "Physical Rehabilitation", "Physical Culture" and "Bases of Valeology" in various forms of information perception (text and audio-visual in several languages). The course also involves valeodiagnostic – automated testing of health, efficiency, obtaining individual recommendations for the correction of daily routine, diet, determining the level of physical activity and resistance to stress by the elements of the LMS Moodle system. The course also implements the technology of combining E-learning and open educational services from educational platforms Coursera, Khanacademy, Canvas, Udemy, and

Eliademy, which have links to educational topics and sections, and created our educational platform for health and safety education, which is in demand among network users.

The study of health and safety issues based on connectivism theory also took place using social media. For example, Facebook groups, Telegram channels were easily used to share information, participate in discussions or do homework together. This helped to increase group engagement and opened opportunities for communication between students and teachers.

The use of gamification techniques involves completing tasks and exercises and turning them into a competitive game to make learning more interactive. There are many learning applications and technologies that teachers can use to add a gamification element to learning. Some examples are LearningApps. Org, TeamLabBody, Kahoot, Quizlet and many others.

Apart from the above, let's mention simulations or virtual reality. Sites with simulations of various processes engage learners in deep learning that promotes understanding, as opposed to superficial learning that requires only memorization. They also add interest and motivation to classroom work and work on assignments online (Scilab, e-Anatomy, TeamLabBody, Virtuallab and others) (MD ENZAI, etc., 2021).

Including some or all these examples is an excellent way to give students control over the pace and content of learning. It also provides an opportunity to individualise learning according to the unique learning needs and strengths of each student.

Research methodology

During the study of knowledge and evaluation of the effectiveness of the use of open educational platform and distance learning technologies, which was an open distance learning resource "My Health", two objectives were implemented:

1. To make the resource accessible to full-time and part-time students.
2. To assess students' knowledge and interest in learning about health and safety.

Recall that the central core of the study courses “Safety of Life”, “Occupational Safety” and “Bases of Valeology”, which were studied by students of V. N. Karazin Kharkiv National University and Odessa I. I. Mechnikov National University, were the concepts of human health and safety in modern conditions.

Participants. The Faculty of International Economic Relations (IER) and Tourism Business (TB) of V. N. Karazin Kharkiv National University and the Faculty of Romance-Germanic Philology of Odesa I. I. Mechnikov National University became the experimental platform. These faculties are implementing distance learning technologies in teaching the courses “Life Safety”, “Occupational Safety” and “Bases of Valeology” based on LMS Moodle and using Google digital tools. Of the group of full-time and part-time students, 403 people took part in the survey. All the students were offered relevant distance learning courses, or their elements based on LMS Moodle and Google Workspace. The indicated courses are in open and partially open access on the above-mentioned platforms (access was given with the permission of the teacher or providing links/access codes).

Procedure. At the beginning and in the end of the course all the students were tested on the basic knowledge of the course in the form of an e-test. These were questions relating to the definition of the main concepts of the course and revealing the level of awareness of these concepts. So, at the beginning of the discipline assessment of the level of knowledge of the basic concepts studied in the course was carried out on a 12-point scale, at the end – on a 40-point scale, based on the conditions of the educational process in the university and the current and final testing in distance learning courses based on LMS Moodle. All grades were finally converted into a 100-point scale according to the ECTS.

In connection with the study of the level of students’ awareness of health, healthy lifestyles, components of health and how to assess it, as well as to determine the place of safety and conscious attitude towards their health, groups with high (grades A (90–100); B (85–89) on ECTS scale), medium (C (75–83); D (65–74) on ECTS scale), low (E – below 64) levels of knowledge were distinguished.

The group of students with a low level of knowledge included students who independently, but not completely, reconstructed the learning material, gave vague definitions of the course concepts. They were able to perform an abstract review, were proficient in basic methods in the field of study, were able to develop practical recommendations for health assessment, assessment of hazardous situations and take preventive measures for their prevention with the help of prompts.

The group of students with an intermediate level of knowledge included students who independently reconstruct the study material, provide clear definitions of the course concepts, can perform an abstract review, have mastered the basic methods in the study area, can develop practical recommendations for health assessment, assessment of hazardous situations and take preventive measures for their prevention with prompting.

The group of students with a high level of knowledge included students who are able to independently solve the tasks assigned to them to develop preventive measures in critical situations, solve problems with a creative approach and compose rational algorithms for solving learning tasks to preserve health and safety of themselves and their surroundings.

In addition, the questionnaire included questions that overlapped with the educational components of the school health and safety course, as children's health and safety is at the centre of the educational process. The final test also included questions on health, its components, healthy lifestyles, ways, and methods of assessing health, as well as basic questions related to human security in modern society.

Statistical analysis. Applied statistical analysis using Microsoft Office 2010 and SPSS Statistics 17.0 was conducted to evaluate the results of the study. The validity of the obtained values was checked using Student's t-test. The p-value level <0.05 was considered significant. The presence of statistical relationships was calculated using Spearman's rank correlation coefficient (r).

Results

The conducted study examined the students' awareness of the main concepts of the

disciplines “Life Safety”, “Occupational Safety” and “Bases of Valeology” in the test form.

The academic years 2020–2021 and 2021–2022 were more in online learning using distance learning technologies, online platforms, etc. Today, for various reasons, about 30 % of the students (in some situations even more) are outside the city in which the university is located or outside the country altogether. This category included students who participated in the dual education system and those who passed practical training abroad; participated in exchange programmes such as Work & Travel, Erasmus; for family reasons they have left the city and Ukraine. For them, either an individual study schedule was made up or distance learning was organised. This approach allowed students to complete their assignments on time and fully absorb the learning material using distance learning courses based on LMS Moodle and Google workspace.

The aim of the experiment was to combine e-learning and open educational services in the training system by introducing distance learning technology. Thanks to this approach, students were not only able to get acquainted with the full list of information materials (textbooks, manuals, lecture texts, presentations, information links), but also to plan and perform independent work at any convenient time, keep in touch with the teacher, have comments and assessments of completed assignments on the course topics.

Today, during martial law and the ongoing national quarantine, the boundary between full-time and part-time education is blurring, and blended learning, which combines offline and online classes, is emerging in the classical education system. Particularly in the faculties where the pilot studies were conducted, both types of learning were used.

As an indicator of the effectiveness of using blended learning based on connectivism theory, we considered the overall level of academic success among full-time and part-time students who actively used distance technologies based on LMS Moodle and Google workspace.

The overall level of success among full-time students at the Faculty of International Economic Relations and Tourism Business *(Figure 1)* in 2020–2021 showed that students of Tourism Business major had higher academic success than students of International Economic Relations major A similar trend was observed in 2021–2022.

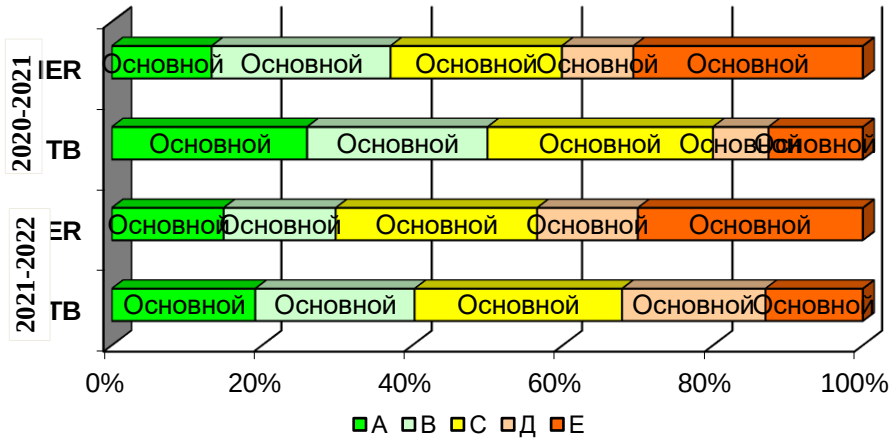

Figure 1: **Distribution of academic success among full-time students by session results in 2020–2021 and 2021–2022, %**

It should be emphasised that the level of academic success with high marks (A and B grades) decreased for both majors. Thus, for students of international economics relations from 37.1 % to 29.8 %, and for students of Tourism Business from 50 % to 40.3 %. This was because students of these very academic years have been subjected to psychological and stress trials, instability of existence (related to military actions on the territory of Ukraine).

However, the same students showed a stable increase in the average success rate (C and D grades). Thus, the students of international economic relations increased from 32.3 % to 40.2 %, and the students of tourism business increased from 37.4 % to 46.7 %. Such figures indicate that it is important for students of different specialisations to understand the safety and health issues of the situation in Ukraine, regardless of the specialisation.

The general level of success among part-time students of international economic relations and tourism business faculty *(Figure 2)* shows an increase of success rate among students of international economic relations specialisation (high success rate A – from 25 % to 43.4 % and B – from 8.3 % to 13 %) compared to 2020–2021 and 2021–2022 academic years. The same tendency was observed among students of tourism business specialisation. Thus, the number of students with a high success rate (this is A+B) has generally changed upwards: 29.4 % to 42.3 %.

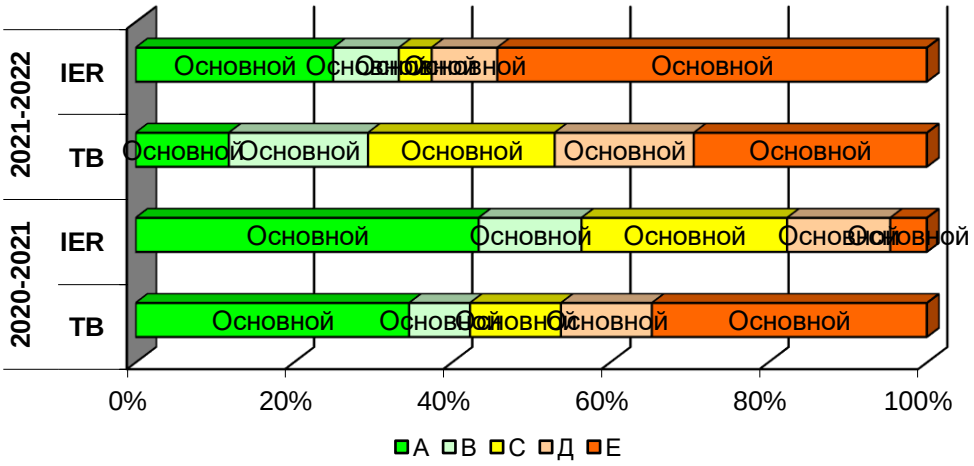

***Figure 2*: Distribution of academic success among part-time students by session results in 2020-2021 and 2021-2022, %**

It should be emphasised that the students of International Economic Relations specialty have significantly changed the indicator with low success rate. So, when comparing 2020–2021 and 2021–2022 academic years, the number of students with low level decreased from 54.25 % to 4.6 %. This level did not have significant changes for students of Tourism Business major (29.4 % and 34.7 %).

In addition to the indicators of theoretical awareness of safety and health issues, we conducted a study to test the successful formation of practical skills among students of the Faculty of Romance-Germanic Philology. The focus was on the students' ability to reproduce practical skills in the classroom (offline) after the theoretical training. The students, during the online sessions on the Zoom platform, had the opportunity to view video material, teacher commentary on emergency pre-hospital care in emergencies. Students were encouraged in the classroom to reproduce and replicate what they had seen in the online classes and e-platforms. Unfortunately, very few were able to demonstrate first aid clearly and adequately on off-line simulators (cardiopulmonary resuscitation, stopping bleeding, first aid for fractures, etc.). This may be due to various factors, including personal factors: fear of harm, insecurity, insufficient theoretical explanation, or demonstration alone. Instability in performance is also related to changing priorities in life, education, and intensification of the learning process in both full-time and part-time students.

Discussion

It should be emphasised that this is the first time in Ukraine that a blended learning system based on a combination of online, E-learning, open educational services, safety and health courses is being explored for the formation and assimilation of knowledge of classical university students. The identification of the essence of connectivism theory and the possibility of its use in the study of safety and health has not previously been investigated in Ukraine. It can serve as a good basis for further research on the possibilities of online, E-learning, open educational systems in teaching students at classical universities. The testing of the possibilities of connectivism learning theory within blended learning on safety and health has demonstrated the effectiveness of this approach according to the success rates of the students who took part in the experiment.

Modern teachers should build on the connectivism learning theory and orient their educational ideas not to reproductive learning, not to a ready-made set of knowledge, but to the organisation of active independent work of students using modern open educational services, platforms, and distance courses. Such resources should allow students to see the specifics of implementing and using knowledge, skills and abilities in future professional and practical activities worthy of a world-class specialist. To meet the challenges of modern classical higher education, it is necessary to improve the learning process, develop new methods and forms of teacher-student interaction, stimulate educational activities through the use of information and communication technologies (Bykov et al, 2016). That is why there has been a recent trend in higher education institutions to intensify the forms and methods of e-learning and distance learning, the combination of which is now commonly referred to as E-learning.

At the same time, the classical education system is being transformed and open educational resources are being developed – distance learning courses based on LMS Moodle, which create new conditions for learning by implementing openness and accessibility of education, introducing participants to the LMS Moodle system (interactive tasks, tests, additional literature and links to useful information resources, forums on

topical issues with leading experts from other universities), becoming an information platform for independent work, participation in Olympiads.

Conclusions

Considering trends and directions of modern e-learning, we are talking about the creation and maintenance of new tools, means and methods in higher education, which become their information and educational environment associated with leading trends in the global educational space – feedback, case-study, interactive learning, new educational theories, etc.

In an information-developed society, it is necessary to change the principle of organisation of the classical educational process: reducing the class load, increasing the share of students' independent work by introducing dual education, increasing the level of analytical search on the Web using ICT, access to open sources and electronic media – any educational institutions of the world, and in their absence, creating personal open educational services (Bykov et al., 2016; Mann et al., 2020). This does not exclude the need to take advantage of offline learning to practise and consolidate practical skills. The research emphasises that only through face-to-face interaction, visual and tactile contact with devices, simulators, and dummies is it possible to sustainably build safe and healthy living skills.

Thus, the most effective directions of development of information and education environment in higher education institution are the following:

1. Implementation of the concept of blended learning as a process involving the creation of a comfortable educational information environment, communication systems that provide all the necessary educational information, which is implemented in the system of professional training on the basis of classical universities.

2. Reliance on the new and innovative theory of connectivism, which encourages group cooperation and discussion, allowing different perspectives and views to be considered when making decisions, solving problems, and making sense of information. Connectivism encourages learning that takes place outside the individual, such as through social networks, online networks, blogs, or information databases.

It is worth concluding that the research undertaken opens new possibilities for implementing health and safety learning both in and out of the classroom, both with the teacher and independently. There is scope for renewal, improvement, and implementation of new approaches in higher education.

Perspectives for further research

A modern e-learning system opens new possibilities for learning and interaction between all participants in the educational process, gradually transforming itself into an information environment with individual learning elements to provide quality education in the complex conditions of modern Ukrainian society: the use of methods, forms and platforms of distance learning aimed at ensuring the quality of the educational process is increasing. A promising direction remains the development of our educational platforms and the introduction of open educational services and E-learning in the professional training of specialists in other fields of science, creating high-quality open Ukrainian distance learning courses and services, worthy of international level, as well as the introduction of modern open Internet platform mass interactive courses such as Coursera, Khan academy, Canvas, Udemy, Eliademy etc. in the educational process for training specialists in higher education.

References

Bykov, V. Yu., & Leshchenko, M. P. (2016). Digital Humanistic Pedagogy: Relevant problems of scientific research in the field of using ICT in education. *Information Technologies and Learning Tools*, *53(3),* 1–17. DOI: https://doi.org/10.33407/itlt.v53i3.1417 [in English].

Cheston, C., Flickinger, T., & Chisolm, M. (2013). Social Media Use in Medical Education: A systematic review. *Academic Medicine*, *88 (6),* 893–901 [in English].

Connectivism Learning Theory. (May 27, 2021). https://www.wgu.edu/blog/connectivism-learning-theory2105.html#close [in English].

Coronavirus (Covid-19) Update on coronavirus. https://coronavirus-info.ru/deaths/ [in English].

Davis, C, Edmunds, E., & Kelly-Bateman, V. (2008). Connectivism. In M. Orey (Ed.), *Emerging Perspectives on Learning, Teaching, and Technology*. http://epltt.coe.uga.edu/ [in English].

Goldie, J. G. S. (2016). Connectivism: A knowledge learning theory for the digital age? *Medical Teacher, 36(10),* pp. 1064–1069. https://doi.org/10.3109/0142159X.2016.1173661 [in English]

Hollinderbaumer, A., Hartz, T., Uckert, F. (2013) Education 2.0 — How has social media and

Web 2.0 been integrated into medical education? A systematical literature review. *GMS Z Med Ausbild*, *30 (1)*, Doc14. DOI: 10.3205/zma000857 [in English].

Kropf, Dorothy C. (2013) Connectivism: 21st Century's New Learning Theory. *European Journal of Open, Distance and E-Learning, 16(2),* pp. 13–2. https://files.eric.ed.gov/fulltext/EJ1017519.pdf [in English].

Kukharenko, V. M., Bondarenko, V. V. (2020). Emergency Distance Learning in Ukraine. Kharkiv: City Printing House, 409 p. [in Ukrainian].

Levchuk, V. G. (2015). The Main Trends of Modern Education and the Development of Open Distance Learning at V. N. Karazin Kharkiv National University. *Distance learning – start from the present to the future – 2015. Materials of the All-Ukrainian Scientific and Practical Conference,* Kharkiv, April 9–10, 33–38 [in Ukrainian].

Levchuk, V. G., Timchenko, G. M. (2017). Modern E-learning in classical University Education. *Modern Information Technologies and Innovative Teaching Methods: Experience, tendencies, perspectives. Materials of the All-Ukrainian Scientific and Practical Internet-Conference,* Ternopil, November 9–10, 159–162 [in Ukrainan].

Litvinova, A. M., Pienov, V. V. (2019). Psychological Features of Attitudes towards Healthy Lifestyle in the Youth Environment. *Bulletin of Chernihiv National Pedagogical University named after Taras Shevchenko, Series: "Pedagogical Sciences. Physical Education and Sports", 157 (1),* 91–97 [in Ukrainian].

Mann, R. V., Kravchenko, O. V., Hanzhala, I. V. (2020). The Use of Information and Communication Technologies as an Element of Innovative Training of Specialists in the Economic Field. *Information Technologies and Learning Tools, 78(4),* 145–162. DOI: 10.33407/itlt.v78i4.2810 [in Ukrainian].

Nur Idawati Md Enzai et al (2021). Development of Augmented Reality (AR) for Innovative Teaching and Learning in Engineering Education. *Asian Journal of University Education*, [S. l.], v. 16, n. 4, p. 99–108. DOI: https://doi.org/10.24191/ajue.v16i4.11954 . [in English].

Pramono, S. E., Wijaya, A., Melati, I. S., Zahariah, S. & Abdullah, H. (2021). COVID-Driven Innovation in Higher Education: Analysing the Collaboration of Leadership and Digital Technology during the Pandemic in UiTM Malaysia and UNNES Indonesia. *AJUE*, Volume 17, Number 2, April 2021, pp. 1–15. DOI: https://doi.org/10.24191/ajue.v17i2.13393 [in English].

Rahiem, M.D.H. (2021). Indonesian University Students' Likes and Dislikes about Emergency Remote Learning during the COVID-19 Pandemic. *AJUE*, Volume 17, Number 1, January 2021, pp. 1–18. DOI: https://doi.org/10.24191/ajue.v17i1.11525 [in English].

Rasi, Päivi and Vuojärvi, Hanna (2018). Toward Personal and Emotional Connectivity in Mobile Higher Education through Asynchronous Formative Audio Feedback. *British Journal of Educational Technology*, 49 (2). DOI:10.1111/bjet.12587 [in English].

Samat, M. F., Awang, N .A. & Hussin, S. N. A., Nawi, F. A. (2020). Online Distance Learning Amidst Covid-19 Pandemic among University Students: A Practicality of Partial Least Squares Structural Equation Modelling Approach. *AJUE*, Volume 16, Number 3, October 2020, pp. 220–233. DOI: http://doi.org/10.24191/ajue.v16i3.9787 [in Ukrainian].

Siemens, G. (2005, January). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology & Distance Learning* http://www.itdl.org/Journal/Jan_05/article01.htm [in English].

Sim, S. P-L., Sim, H. P-K., & Quah, C-S. (2021). Online Learning: A Post Covid-19 Alternative Pedagogy for University Students. *Asian Journal of University Education, 16(4),* 137–151. https://doi.org/10.24191/ajue.v16i4.11963

SIM, Sandra Phek-Lin; SIM, Hannah Phek-Khiok; QUAH, Cheng-Sim (2021). Online Learning: A Post Covid-19 Alternative Pedagogy for University Students. *Asian Journal of University Education*, [S.l.], V. 16, N|. 4, pp. 137–151. DOI: https://doi.org/10.24191/ajue.v16i4.11963 [in English].

Singh, K. (2019). Lecturer's Feedback and Its Impact on Student Learning: A Study of a Public University in Sarawak, Malaysia. *Asian Journal of University Education*, *15*, 70–78. https://doi.org/10.24191/ajue.v15i3.07 [in nEnglish].

Subedi, S., Nayaju, S., Subedi, S., Shah, S. K., & Shah, J. M. (2020). Impact of E-learning during COVID-19 Pandemic among Nursing Students and Teachers of Nepal. *International Journal of Science and Healthcare Research*, 68–76 [in English].

Tadesse, T., Manathunga, C., & Gillies, R. (2020). Teachers' Pedagogical Practices and Students' Learning Experiences in an Ethiopian University Setting. *Asian Journal of University Education, 16(2),* 205–225. DOI:10.24191/ajue.v16i2.8994 [in English].

Tymchenko (Litvinova), A. M. & Tymchenko, G. M. (2014). Formation of Knowledge at the Students of the Classical university in Conditions of Improving the Forms of Classroom and Independent Activity in Life Safety. *Means of Educational and Research Work, 43,* 214–227 [in Ukrainian].

Tymchenko, G. M., Levchuk, V. G., Berezhna, N. I., Zakrevskyi, A. M. (2017). Open Learning Systems Based on the Classical University. *Problems of Integration of Natural Techno-Technological and Humanitarian Disciplines in the Training of Specialists in Higher Education Institutions, Materials of the All-Ukrainian Scientific and Methodical Online Conference.* Kharkiv, April 25–26, 154–156 [in Ukrainian].

Tymchenko, G. M., Litvinova, A. M., Zakrevskyi, A. M., & Levchuk, V. G. (2020). Technologies for Creating Open Educational Resources and Video Services for Teaching the Basics of Health. *Bulletin of Chernihiv National Pedagogical University named after Taras Shevchenko. Series: "Pedagogical Sciences", 7 (163),* 153–161 [in Ukrainian].

Tovkanets, O. (2018). Strategic Directions of Information and Communication Technologies Development in the High European School at the Beginning of the XXI Century. *Information Technologies and Learning Tools, 66 (4),* 14–23 [in Ukrainian].

Теорія конективізму в навчанні питань безпеки та здоров'я в класичних університетах

Світлана Гвоздій
https://orcid.org/0000-0002-8208-2972
доктор педагогічних наук,
професор кафедри фізіології, здоров'я і безпеки людини та природничої освіти,
Одеський національний університет імені І. І. Мечникова,
вул. Дворянська, 2, Одеса, 65082, Україна
spgvozdiy77@onu.edu.ua

Анастасія Літвінова
https://orcid.org/0000-0002-2513-0632
кандидат педагогічних наук (PhD з педагогіки), доцент, кафедра валеології,
Харківський національний університет імені В. Н. Каразіна,
пл. Свободи, 4, Харків, 61022, Україна
anastasia.tymchenko@karazin.ua

Ганна Тимченко
https://orcid.org/0000-0001-7745-0817
кандидат біологічних наук (PhD з біології), доцент,
директор Центру електронного навчання Інституту післядипломної освіти та дистанційного навчання Харківського національного університету імені В. Н. Каразіна;
Харківський національний університет імені В. Н. Каразіна,
пл. Свободи, 4, Харків, 61022, Україна
annatymchenko@karazin.ua

Анотація. *Планета Земля, людство загалом і система освіти зокрема у першій чверті XXI ст. зіштовхнулися з великою кількістю проблем і ситуацій, що потребують регулювання. Актуальним є застосування сучасних технологій, що ґрунтуються на теорії конективізму, у вивченні питань здоров'я та безпеки в межах класичних (немедичних) закладів вищої освіти України. Метою статті було перевірити ефективність застосування онлайн-навчання, електронного навчання, а також відкритих освітніх ресурсів, дистанційних технологій, що ґрунтуються на теорії конективізму, у навчанні питань безпеки та здоров'я в класичних університетах.*

Інтернет сьогодні перетворився на величезний простір спільного навчання. У сучасній динамічній теорії навчання «конективізм» саме глобальна мережа стала головною сполучною ланкою. Конективізм — це концептуальна схема, що розглядає навчання як мережеве явище, на яке впливають технології та соціалізація, а навчання — як процес розпізнавання образів. Конективізм наголошує на необхідності враховувати за можливості всі зміни, які відбулися вчора, щоб реалізувати нові знання сьогодні та в майбутньому. У контексті безпеки й здоров'я актуальною стає потреба вивчення вчорашнього досвіду життя для забезпечення здоров'я та безпеки сьогодні й у майбутньому. У статті обґрунтовано, як теорія конективізму може бути застосована для вивчення питань безпеки та здоров'я. Надано безліч форм реалізації технологій поєднання електронного навчання та відкритих освітніх сервісів для побудови системи змішаного навчання в системі вищої освіти. Перший доступний і відкритий освітній ресурс (дистанційний курс) «Моє здоров'я» був створений для реалізації якісного навчання з питань безпеки та здоров'я. У курсі також застосовано технологію поєднання електронного навчання та відкритих освітніх сервісів освітніх платформ "Coursera", "Khanacademy", "Canvas", "Udemy, "Eliademy". Вивчення питань здоров'я та безпеки на засадах теорії конективізму реалізовувалося з використанням соціальних мереж; методів

гейміфікації; передбачало виконання завдань і вправ, перетворення їх на змагальну гру, щоб зробити навчання більш інтерактивним. Сайти із симуляцією різних процесів залучали учнів до глибокого навчання, що сприяє розумінню, на відміну від поверхневого навчання, яке вимагає тільки запам'ятовування.

Опитування після навчання студентів очного та заочного навчання засвідчило підвищення рівня їхньої успішності у ході застосування електронного навчання на основі теорії конективізму. При цьому автори звертають увагу на необхідності роботи офлайн для формування стійких практичних навичок з питань безпеки та здоров'я.

Перспективним напрямом залишається розвиток освітніх платформ і впровадження відкритих освітніх сервісів та e-learning у професійну підготовку фахівців інших галузей науки, створення якісних відкритих українських дистанційних курсів і сервісів, гідних міжнародного рівня, а також впровадження на сучасній відкритій інтернет-платформі масових інтерактивних курсів.

Ключові слова: *онлайн-навчання, вища освіта, здоров'я, конективізм, дистанційне навчання, відкритий освітній сервіс, безпека.*

Стаття надійшла до редакції: 13.02.2023
Прийнято до друку: 30.03.2023