Improving the quality of distance education of future teachers

Larissa A. Semenova[*], Innovative University of Eurasia, Department of Social and Humanitarian Education and Assembly of Peoples of Kazakhstan, 140000, 102/4 Gorky Str., Pavlodar, Republic of Kazakhstan, https://orcid.org/0000-0001-5454-5442

Anastassiya I. Kazantseva, Innovative University of Eurasia, Department of Social and Humanitarian Education and Assembly of Peoples of Kazakhstan, 140000, 102/4 Gorky Str., Pavlodar, Republic of Kazakhstan, https://orcid.org/0000-0002-5449-0610

Gulmira A. Suleimenova, Pavlodar Pedagogical University, Department of Special Pedagogy, 140000, 60 Mira Str., Pavlodar, Republic of Kazakhstan, https://orcid.org/0000-0003-4975-6557

Bagzhanat D. Kairbekova, Innovative University of Eurasia, Department of Social and Humanitarian Education and Assembly of Peoples of Kazakhstan, 140000, 102/4 Gorky Str., Pavlodar, Republic of Kazakhstan, https://orcid.org/0000-0001-6460-4645

Klara K. Sadirbaeva, Kazakh National Cultural Center of Uzbekistan, Department of Education, 100000, 20 6th Psge Niyozbek Yuli, Tashkent, Republic of Uzbekistan, https://orcid.org/0000-0002-8301-2810

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Abstract

This study aimed to investigate aspects of face-to-face and distance learning and create a model of distance education for university teachers. For this, theoretical methods of comparison, analysis and symbiosis were used. As a result of the study, differences in the characteristics of various types of education and the possibilities of creating an effective programme of distance education for university teachers were revealed. A model has been developed for organising distance learning in higher education. This model can be applied to any university curricula. As a recommendation, the authors put forward several proposals for changing the grading system: adopt criteria-based assessment and, based on criteria-based assessment, carry out educational monitoring.

Keywords: online class, distance education, higher education, pandemic, quarantine.

[*] ADDRESS FOR CORRESPONDENCE: Larissa A. Semenova, Department of Social and Humanitarian Education and Assembly of Peoples of Kazakhstan, Innovative University of Eurasia, 140000, 102/4 Gorky Str., Pavlodar, Republic of Kazakhstan
E-mail Address: semenova6105@murdoch.in

1. Introduction

1.1. Conceptual Framework

In the fight against the outbreak of the novel coronavirus disease in 2019, countries have replaced traditional face-to-face education with distance learning as a protective measure. Although many countries have previously been exposed to natural and man-made disasters, distance education has not been used as a solution to these crises as it was applied after the coronavirus crisis. Crisis Distance Education (CDE) is unique in its philosophy and methods, fundamentally different from typical distance education in several respects. The first difference is its suddenness. CDE was used in schools on an unforeseen basis, without prior rules and training. It was "pushed" into a society without the necessary skills and knowledge (Platonova et al., 2020). It was hastily brought in to save the class and get educational institutions back on their feet. This is an exception that should "become the norm in a short period".

The second difference is internationalisation. CDE has been applied as a non-pharmaceutical intervention around the world, shaping a global reality and making education a worldwide spectacle (Brylevskaya et al., 2020). It is specified as a universal solution, blind and deaf to local requirements. If earlier it was an institutional problem, now it is an international problem. Earlier efforts were focused on institutionalising distance education, but now efforts have gone further and focused on its internationalisation. Its internationalisation takes place almost effortlessly outside public control, as if it was living on its own, independent of human will (Bakeyeva et al., 2020).

The third is popularity. It has become a common interest in all societies, dominating the public sphere. Talk about this quickly spread. Google Trends shows that the frequency of searches for the phrase "distance education" has increased tenfold since the coronavirus crisis (Tomei & Nelson, 2019; Beketova et al., 2020; Mayo, 2020). This phrase (and the terms and concepts that accompany it) are normalising in communities and homes, regulating formal, informal, online, and offline platforms (Gushchin, 2021).

The fourth is its expansion. It exceeded the bounds of its normal zone (i.e., the academic community) to get to school. Distance education is not new to higher education, but its introduction into schools, especially primary ones, is noteworthy. The fifth is its imposition. In many countries, CDE is imposed as a national descending "draconian measure". This imposition took place without a vote or any form of democratic decision-making, even in regions where democracy is a deeply entrenched norm (Serdali et al., 2018). Whereas distance education was once a luxury, nowadays it seems to be a necessity in the face of the coronavirus.

The sixth difference is emergency medical care. While distance education is often touted for reasons such as geographic isolation, disability, and war, it is now being used as a means to combat the medical crisis. The media portrays this almost as the only means of learning and escaping the clutches of the coronavirus (Nabukeera, 2020).

1.2. Related Research

For those with access to the right technology, there is evidence that distance education can be more effective in many ways. Some studies show that, on average, students memorise 25-60% more material when studying online, compared with 8-10% in the classroom. This is mainly since students can learn faster online; E-learning requires 40-60% less time than a traditional classroom because students can learn at their own pace, going back and rereading, skipping, or speeding up concepts of their choice (Scutelnicu et al., 2019; Ramya & Variyar, 2020).

However, the effectiveness of online learning varies by age group. The consensus about children, especially younger children, is that a structured environment is needed because children are more easily distracted. To take full advantage of the benefits of online learning, a concerted effort is needed to provide such a structure and go beyond reproducing the physical lesson/lecture through a

video stream, instead of using a range of collaboration tools and interaction techniques that promote "inclusion, personalisation, and intelligence" (Abdullina et al., 2013; Bojovic et al., 2020).

1.3. Purpose of the Study

The purpose of the study is to investigate aspects of face-to-face and distance learning and create a model of distance education for university teachers.

2. Methods

2.1. Research methods

For this study, the components of the educational process under normal conditions and under quarantine conditions of the COVID-19 pandemic were considered. Further, analysis was carried out. Analysis is a method based on the process of decomposing an object into its component parts. When authors use the analysis, they mentally divide the object under study, that is, find out what parts it consists of, what are its properties and characteristics. In this study, methods and forms for face-to-face and distance education were analysed. Comparison was made based on the following parameters: motivation to learn, constructive communication, communicative conditions. Through comparison, information about an object can be obtained in two different ways. First, it can act as a direct result of comparison. Secondly, very often obtaining primary information does not act as the main goal of comparison, the goal is to obtain secondary, or derived information, which is the result of processing the primary data. The most common and important way of doing this is by inference by analogy. Having compared the aspects of face-to-face and distance learning, the authors have developed an effective model for organising distance education in universities.

2.2. Participants

115 participants from the Pavlodar district of the Republic of Kazakhstan (during the first semester of the academic year 2020/2021) were selected using the convenience sampling technique. The respondents were parties who directly experienced the online learning class, grouped into student respondents and lecturer respondents. A total of 25 lecturer respondents and 90 student respondents participated in this study.

2.3. Data collection tools

Research data were collected using a questionnaire tool, created by the researchers. To build a model for organising distance learning in higher education, the researchers used the structured questionnaire form, which was designed electronically through the services provided by Google Forms. The final version comprised seven questions, as follows:

1. How do you organise distance learning?

2. How complex material do you use?

3. What technical capabilities in the learning process do you use?

4. What network platforms for differentiated work do you choose?

5. What content for lectures, seminars/workshops, individual work, office hours, taking into account the complexity of the material and the technical capabilities can you develop yourself?

6. What activities in each type of lesson, taking into account the complexity of the material and the technical capabilities do you use in your work?

7. What forms and methods of feedback do you use in your work?

2.4. Validity of the data collection tool

To verify the apparent validity of the study questionnaire, it was presented to ten referees from the Innovative University of Eurasia who specialise in curricula and teaching methods. They were asked kindly to express their opinions about the appropriateness of the questionnaire items for the

objectives of the study. The final form of the questionnaire was produced that was designed electronically. It consists of seven questions.

2.5. Reliability of the data collection tool

The reliability coefficient of Cronbach's alpha was extracted for the study tool and it scored 0.87. This indicates that the study tool has high stability and is suitable for conducting the study.

2.6. Data collection process and analysis

The questionnaire was conducted among students and lecturers. Participants were asked to answer all questions. After analysing the problems that have arisen during the forced transition of all educational institutions to distance learning, the authors have built a model for organising distance learning in higher education, which can be used in all types of educational institutions. The model includes two blocks of teacher's preparation for teaching the discipline, which ultimately merge in the third block.

3. Results

Let us consider in more detail the components of the educational process and their features in face-to-face and distance learning. In both cases, the educational process involves the interaction of a teacher and a student. Methods and forms of interaction should be subordinate to the goals and objectives that are formed on the basis of the social requirements of the educational system and should be appropriate and sufficient (Table 1).

Table 1. Methods and forms of interaction in face-to-face and distance learning

Methods and forms	Face-to-face learning		Distance learning	
	+	-	+	-
Motivation to learn	Possibility of verbal impact on the student to increase internal and external motivation			Difficulties in the formation of internal motivation of the student due to the lack of personal contact between the teacher and the student
Constructive communication	A wide range of methods and forms of organising interaction between participants in the educational process (group work, paired activity, joint projects, scholastic debates, discussions), the possibility of monitoring by the teacher, etc.	The time limit within the schedule	A wide range of methods and forms of organising interaction between participants in the educational process (group work, paired activity, joint projects, scholastic debates, discussions), the possibility of monitoring by the teacher, etc.	Limited feedback, Technical failures, poor internet connection
Communicative conditions	Interaction in face-to-face contact (emotions, intonation, gestures, etc.), the development of social communication skills in everyday life (real world)		Online and offline contact through correspondence (expression of emotions can be in the form of	

	emoticons and other capabilities of the software used), contact

The next component is the organisation of the study session. A modern lecture is not just a transfer of information to a student and further verification of its assimilation, but it is a form of organising lessons in which the student plays a decisive role (Baimanova et al., 2019). In distance education, the teacher has to prepare both for the lecture itself (analysis of the possibilities of the educational environment, planning, organisation), and for further support of the process of mastering the educational material. This is a whole separate block that includes the purposeful work of the teacher. Comparing face-to-face and distance learning, it can be seen that today there are a number of features of its planning and organisation. When planning distance classes, each teacher should take into account a number of features:

1.   Prepare for the classes, dividing them into the studied questions (compulsory compliance with the syllabus, each question must be supported by examples, practical tasks, video materials).

2.   The teacher prepares for each question with possible options for misunderstanding on the part of the students (this implies the presence of more questions in the distance lecture, in comparison with the traditional class, the teacher must be ready for additional questions from the students).

3.   It is necessary to try to constantly rely on interdisciplinary interconnection (it is very important in a distance lecture to return to the material that students studied independently).

4.   All formulations should be clear and unambiguous, their essence should be clear to students of different levels (in a distance lecture, a student studies a huge layer of material on his own).

5.   It is imperative to summarise the material covered, its application (this should be done after each lecture since students usually have many questions when studying the material on their own; feedback allows to see the difficulties that the student has).

In addition to the features presented, the difficulties that a teacher encounters when organising a lesson can also be seen. One of these problems that a teacher should take into account in a distance lecture is that not every student has access to the Internet. And then he should think over the options for working with such students (communication by e-mail, questions about the content of the lecture, WhatsApp, the possibilities of the PowerPoint software). Such students must inform the department in advance about the existing problem so that the teacher is ready in advance to provide additional materials in their discipline. The authors provide examples of various methods of a teacher in the format of a distance lecture (Table 2). At the same time, carry out a comparative analysis of the lecture with a well-functioning Internet and the situation when the student does not have constant access to the Internet resources.

Table 2. Characteristics of the methods used by the teacher in the distance lecture

Type of lecture	The student has the Internet access	The Internet access is limited
Introductory lecture	The teacher draws up clear instructions with the requirements for his course: how the presence at the lecture is taken into account, for which a point will be given in the practical lesson and in the office hours. This instruction must be posted in the cloud (the link is sent to students during the online consultation), attached to the offline consultation. The teacher prepares a set of questions on	The teacher draws up clear instructions with the requirements for his course: how the presence at the lecture is taken into account, for which a point will be given in the practical lesson and the office hours. Instructions for organising classes are posted in the cloud and in an offline consultation. The teacher prepares a set of questions on the topic in advance in order to find

	the topic in advance in order to find out the level of knowledge of students. The lecture is conducted in a question-answer format.	out the level of knowledge of students. Students attach their answers to offline consultations or send them to the teacher by mail.
Information lecture	This lecture can be organised as a ZOOM conference with slide show. Another method is watching a film and discussing it. A link to the film is given during an online consultation, while students are asked questions about the film. After viewing, there is a discussion. The film should be no longer than 10-15 minutes.	The teacher prepares a lecture (this can be text or presentation). The lecture must be available to the student in the personal account. Questions for the lecture should be placed at the end of the lecture. The student independently studies the slides on the topic of the lecture. Then he answers questions and attaches offline consultations of the corresponding lecture being studied, or sends it to the teacher by e-mail.
Final lecture (to be held before each midterm control)	Students are offered a video lecture made in the PowerPoint (this is a lecture with sound and slideshow). The lecture includes an overview of the most difficult topics learned over 8 (7) weeks. Lecture duration is 10 minutes. Then, 1 problematic question is asked for each topic. 8 or 7 questions are formulated (according to the number of topics studied). Questions are discussed during an online consultation.	Students are offered a video lecture made in the PowerPoint (this is a lecture with sound and slideshow). The lecture includes an overview of the most difficult topics learned over 8 (7) weeks. Lecture duration is 10 minutes. Then, 1 problematic question is asked for each topic. 8 or 7 questions are formulated (according to the number of topics studied). Students attach answers to questions in offline consultations of the corresponding lecture being studied, or send them by e-mail to the teacher.
Lecture-conference	The first option for conducting such a lecture provides that students study the text of the lecture in advance and make up questions about it (2-3 questions). During the online consultation, the teacher answers students' questions. The second option for organising such a lecture assumes that students formulate questions during an online consultation (they are given 10 minutes for this). After the expiration of the time, the teacher begins to answer students' questions.	The student independently studies the material of the lecture and makes at least 10-15 questions on it. This makes it possible to see that he has studied all the material. Another option would be to compose at least 5 questions for each point of the lecture.
Lecture for two (or binary lecture)	This lecture can be organised as a ZOOM conference. Teachers from other cities and countries, specialists from different fields can be involved. Students listen to the material (10-15 minutes). Then they ask the lecturers questions.	Students are offered a video lecture. There are questions attached to it. Answers to questions are sent to the teacher by e-mail.

The remote lecture should use the capabilities of software programmes such as ZOOM, Skype, WhatsApp, PowerPoint, Prezi, Mail.ru mail. Feedback remains the one important point in a distance lecture. It should be collected after every lecture. This is due to the fact that the teacher cannot track whether the student is actually present at the lecture (or only connected online), whether the

student has studied the material if it was not at the lecture. It should be noted that students willingly enter the dialogue, discuss the most difficult moments of the lecture, discuss films, demonstration materials (problem situations, presentations), if the process is properly organised by the teacher.

A certain algorithm of actions during a remote lecture can be seen: information – student's work with information – feedback. At the same time, it does not matter whether the student has a high-quality Internet connection. This algorithm should work without exception for all students (Schennikov et al., 2006; Cicha et al., 2021). Feedback for students without an internet connection may be delayed (Lockee, 2021). It is very important to understand that planning and organising distance learning is more labour intensive than planning and organising a face-to-face lecture. This is due to a preliminary analysis of the capabilities of the teacher himself as well as the student's capabilities (the presence of the Internet, possession of modern information technologies, etc.), with the additional preparation of the demonstration material (it takes up a large amount in the distance lecture), with the enhanced preparation of feedback.

Analysis of the problems of preparing a teacher for lectures allowed the authors to build a diagram (Figure 1). A feature of teaching in a remote mode is that the teacher does not have direct contact with the students. This implies the specificity of the entire process of organising classes, starting from the preparation of the teacher, the choice of technical means of contact with students, to the organisation of effective control measures.

As already noted, the main difference between classical teaching from distance learning is the specificity of the contact between the teacher and the student (Makransky et al., 2019). Namely, this contact occurs through the use of modern digital technologies. Therefore, in addition to the content component of studying the discipline, it is necessary to take into account the technical side of this issue (Semenova, 2015). Since the training scheme remains classical (Eq. 1):

$$TO + EP + C = R \tag{1}$$

where TO is the training organisation, EP is the educative process, C is control, R is the result.

The authors have analysed each component of this scheme. In more detail, the main focus was directly on the training organisation, since this is the most critical part of this scheme, as well as the most laborious. Analysis of the organisation of distance learning showed that it is necessary to consider two components: content (block 1) and technical (block 2) (Figure 1). The content component is classic in the education system, but the technical component, as evidenced by practice, has its own characteristics (Ibragimov, 2005; Donohue & Bornman, 2021). In particular, this is the presence of the Internet connection, hardware, software, etc. (Aristovnik et al., 2020). Therefore, it is necessary to analyse the technical capabilities of the participants in the learning process.

The analysis scheme will be discussed in more detail in the paper. The organisation of distance education includes the stage of control, which also needs to be worked out in advance, since classic forms may not work remotely. The authors will also consider in more detail the forms and methods of control in various types of classes in the paper. No less responsible is the choice of forms and methods of feedback with students, control measures at each type of lesson, taking into account the complexity of the material and the technical capabilities of students. It is believed that the use of criteria-based assessment technology will significantly increase the efficiency of this block of the model.
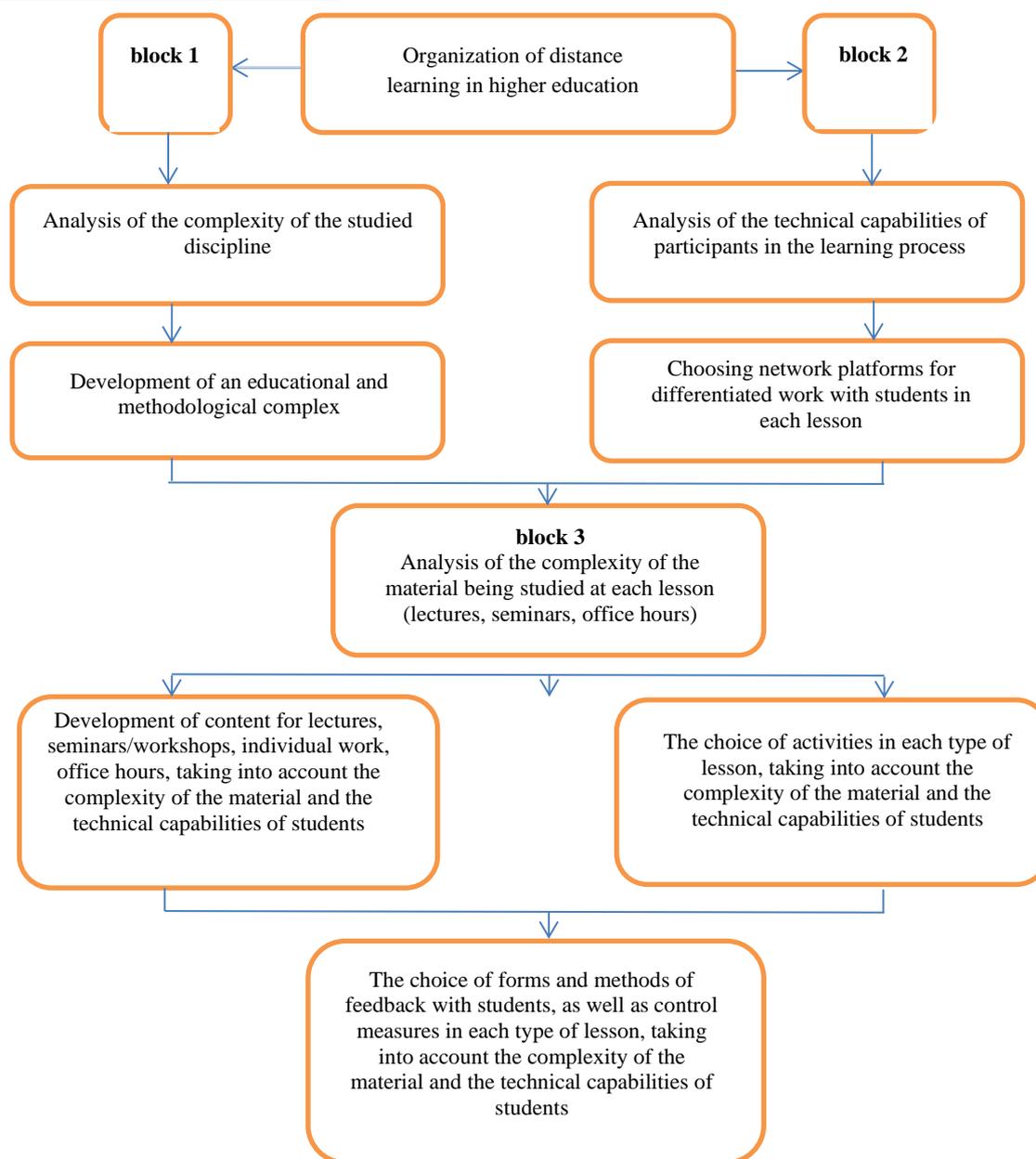
Figure 1. Model of the organisation of distance learning in higher education

It should be noted that the analysis of traditional methods of grading showed that the system for assessing the quality of education does not rely on objective methods of pedagogical measurements, therefore, each teacher develops his own system of assessing tasks. The subjectivity of knowledge assessment is associated to a certain extent with the insufficient development of methods for controlling the knowledge system. Monitoring poses specific methodological tasks for the teacher, the solution of which creates the conditions for its application in the educational process (Bell et al., 2017). Monitoring provides for certain learning outcomes and their correction in accordance with the established standard of assimilation, expressed in specific knowledge and skills that students have acquired in the process of studying the subject.

4. Discussion

Distance education systems stimulate leadership and effective work not only of students, but also teachers, methodologists, and management bodies of educational institutions. At the same time, the

main thing is that the effectiveness of an educational organisation depends on the leader's ability to manage formal and informal communications, as well as create a single communication system, access to reliable and complete information. Competencies for solving this issue are highly efficiently formed through distance learning, which explains its high relevance in the system of educational institutions of society (Al Lily et al., 2020).

This study shows the importance of not only the leadership qualities of students in a group but also the need to correctly formulate tasks remotely and conduct training as a teacher. In their study, scientists from Nepal found that the outbreak of COVID-19 has changed the rules of teaching around the world. Nepal is no exception to this reality as COVID-19 is creating the right time for institutional change. This creates opportunities for exploring new technologies in the education sector, recognising the importance of using technology in teaching and learning (Gautam & Gautam, 2020; Kartushina, 2020). Teaching technologies are not only focused on the use of technological devices but also involve the systematic use of resources that scientifically include the correct pedagogy for the effective transformation of knowledge and skills. For the process of distance education, each university must develop an online system, learning mode as an alternative mode with the development of an easy-to-learn curriculum, updated technologies, assigned faculty members, and active management (Astashova et al., 2020; Ilina et al., 2019).

The effectiveness of online classes, especially during pandemics, depends on the interconnection of factors of the triad: from infrastructure, from students, and from the teacher. Learning is perceived as good when clear goals are formulated, the course becomes interesting and relevant, learning is constructively coordinated for interaction and support (Mullen, 2020). Good relationships with teachers and students for constructive feedback are essential for effective teaching and learning. Individual behaviour, environmental factors, and personal factors constantly influence and determine each other in two ways.

Nepal's faculty and students have positive attitudes and behaviours to prepare for regular teaching, consultation, active participation, genuine commitment, dedication, and attention during the COVID-19 pandemic, which may change over the period as suggested by Newport (2005). However, they are surrounded by technical non-academic issues such as dedicated Internet access, Internet cost, regular electricity supply, online devices, etc. The designated teaching staff is essential to coordinate and develop online courses, although Nepalese teachers take the initiative, making individual efforts rather than institutional ones. To develop online classrooms as alternative teaching and learning methodologies, especially in such pandemic or other critical situations, universities must develop a technology-friendly curriculum, train faculty members, proactive management, IT infrastructure provision, and student support (Zinchenko, 2020). Online classrooms during such a pandemic can be useful methods of managing student and teacher anxiety so that students and teachers can heal potential psychological distress (Gautam & Gautam, 2020). Transition management is difficult but demonstrates leadership skills and is recognised as a catalyst for change.

5. Conclusions

Practical classes help to study the topic in-depth, the main task is to comprehend the theoretical material, the formation of competencies in this direction. As evidenced by practice, when organising and preparing practical classes, problems arose that were similar when organising lectures, but also had their own aspects. Offline is available to every student and he can study, watch the material at any time, while it is not possible online, because a certain time is allocated. Consequently, difficulties arise in operational assessment, the timely motivation of students, creation of individual psychological conditions (for example, emotional support like during face-to-face lesson), etc.

Solving these problems requires the use of new tools and teaching methods, the construction of new learning models. The grading system should make it possible to determine how successfully the student has mastered the educational material or formed a practical skill, to show the dynamics of students' success in various areas of cognitive activity. And this, in the authors' opinion, is possible if:

adopt criteria-based assessment; on the basis of criteria-based assessment, carry out educational monitoring. This will provide a systematic approach to the educational process, and hence its integrity, and will also create conditions for ensuring the civil rights of students and their parents to receive a full-fledged education that meets the personal needs of each individual.

Recommendations

Based on the results of the study, several recommendations are drawn as follows:

1. Further study may include developing a model for organising distance learning in postgraduate education institutions.

2. Creating of new tools and teaching methods of distance education are also worthy of being explored further.

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