



Psychological conditions for the effectiveness of distance education

Condiciones psicológicas para la eficacia de la educación a distancia

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Resumen

El artículo trata sobre las condiciones psicológicas que afectan la educación a distancia en la escuela secundaria. Se utilizaron los siguientes métodos: experimento pedagógico psicológico y formativo, prueba, observación, análisis de tendencias porcentuales, prueba t de Student. La variable independiente del experimento son los ejercicios motivacionales y los informes reflexivos de los cursos a distancia, y la variable dependiente es la competencia profesional de los participantes de la investigación. En el estudio participaron 212 aspirantes al nivel educativo de Máster: 102 personas en la muestra de control y 110 personas en experimental. El cálculo de la prueba t de Student confirmó la importancia de todas las transformaciones detectadas. El estudio demuestra la importancia de las condiciones psicológicas creadas para mejorar la eficacia de la educación a distancia. Los resultados del estudio se pueden utilizar como base para programas de formación psicológica especializados para los profesores que imparten cursos de educación a distancia. Otras perspectivas para la investigación sobre el problema son estudiar el impacto del estado psicológico de los docentes sobre la efectividad de la educación a distancia, así como comparar los resultados de la introducción de ciertas condiciones psicológicas en la educación tradicional y a distancia.

Palabras clave: componente cognitivo, educación a distancia, componente motivacional, ejercicios motivacionales, informes reflexivos, componente actividad operacional, componente reflexivo.

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Abstract

The article deals with the psychological conditions that affect distance education in high school. The following methods were used: psychological and educational pedagogical experiment, test, observation, percentage trend analysis, Student's t-test. The independent variable of the experiment is the motivational exercises and the reflective reports of the distance courses, and the dependent variable is the professional competence of the research participants. 212 applicants to the Master's educational level participated in the study: 102 people in the control sample and 110 people in the experimental sample. The calculation of the Student's t-test confirmed the importance of all the transformations detected. The study demonstrates the importance of the psychological conditions created to improve the effectiveness of distance education. The results of the study can be used as a basis for specialized psychological training programs for teachers who teach distance education courses. Other perspectives for research on the problem are to study the impact of the psychological state of teachers on the effectiveness of distance education, as well as to compare the results of the introduction of certain psychological conditions in traditional and distance education.

Keywords: Cognitive component, distance education, motivational component, motivational exercises, reflective reports, operational activity component, reflective component.

Introduction

The COVID-19 pandemic and related quarantine restrictions have dramatically changed the usual content and forms of many areas of life (Fedosenko, 2020). For more than a year, society has been trying to solve the problem of maintaining the effectiveness of social practices in the face of limited physical contact. The importance of implementing an effective distance education system is growing rapidly (Agung, Surtikanti & Quinones, 2020; Sujarwo et al., 2020). While the theoretical and practical justification for the use of distance learning technologies often remained at the level of declaratory statements before, the fulfilment of this task has become a vital necessity in modern realities (Irawan, Dwisona & Lestari, 2020; Thandevaraj, Azizah & Khalid, 2021). Quality education is the starting point for building a successful state, which is especially relevant in the context of higher education providing training for specialists in various social fields (Kucherenko, 2018; Prybylova, 2017).

The aim of the article is to evaluate the effectiveness of the use of motivational exercises and reflective reports as conditions for the implementation of distance education in the professional training of students of higher pedagogical educational institutions. Research objectives are to determine the psychological conditions for the effective implementation of distance education in the system of professional training of students of higher pedagogical educational institutions and

to analyse the effectiveness of the use of motivational exercises and reflective reports for distance education in the professional training of students of higher pedagogical educational institutions.

Literature review

The phenomenon of distance education is a relevant subject of research in modern psychological and pedagogical science. Distance learning is most often interpreted as a form of organization of the educational process based on student's independent work (Prybylova, 2017). Analysing the theoretical sources that study this problem, Kucherenko (2018) identifies the following main components of the phenomenon: learning is carried out in synchronous and asynchronous form; elements of the educational process are organizational forms, content, goals, teaching aids, methods; availability of the subjects of learning; use of information and communication technologies (ICT). It should be noted that the use of ICT has recently become the basic criterion for distance learning (Kucherenko, 2018).

The terminological problem of using the terms “distance education” and “distance learning”. Let us note that quite often these categories are used as synonyms. In our opinion, the position of delimitation of these concepts is correct, where distance education is interpreted as a result of distance learning (Havrilova & Katasonova, 2017). At the same time, distance education is characterized by a number of positive features compared to the traditional educational process, namely: the formation of a global educational space; possibility to choose the optimal pace and time of study; studying in off-work hours; the ability to access many sources of educational information; providing mobile communication through network resources; concentrated teaching of educational information; mastering the skills of working with the latest information technologies; equal opportunities for education; the ability to overcome communication barriers; expanding the teacher's role, which provides for more creative involvement in the pedagogical process (Prybylova, 2017).

One of the main positive aspects of distance education is the ability to freely complete educational assignments, as they are not limited by time and space (Sujarwo et al, 2020). It has been proven that the positive aspects of using Google services in distance education are mobility, setting clear boundaries for tasks, providing feedback (Sukmawati & Nensia, 2019). It is also worth emphasizing the typical problems of introducing distance education in higher education: lack of personal communication between teacher and student; low learning motivation; lack of possibility

of mobile practical application of obtained knowledge; technical problems, as Internet access and the availability of the necessary hardware and software; the need for strong investment at the initial stage of the organization of distance education (Prybylova, 2017). Teachers' uncertainty in their own ability to effectively implement distance education programs was revealed (Wingo, Ivankova & Moss, 2017). It is argued that the effective implementation of distance learning requires from teachers a set of competencies: pedagogical, design, technological, institutional, communicative (Albrahim, 2020). Readiness for distance education is influenced by the expected results and projected efforts of students (Yakubu & Dasuki, 2019). However, these difficulties are becoming less significant every year. In particular, access to distance learning systems and ICT is improved, providing constant high-quality communication between the subjects of the educational process.

The analysis of the psychological specifics of distance education is topical in the context of our study. A study conducted with students from Ukraine, Portugal, and the UAE identified the main psychological difficulties in perceiving distance education courses: self-planning, motivation level, and language barrier (Fidalgo et al., 2020). The main directions of optimization of distance learning are the development and adaptation of pedagogical methods to online courses, social and personal support of students, which is carried out through network resources; staff training and development in the context of introducing distance education (Simpson, 2018). Distance learning involves activities in which the subject is engaged in learning while managing this process himself/herself. In this context, the phenomenon of readiness for distance education should be considered as the ability to manage, which involves fixation of the project and its implementation in the minds (Smulson, 2012).

It should be remembered that the implementation of distance education is especially difficult in times of crisis. In particular, studies of the implementation of distance programs during the socio-political crisis (Czerniewicz, Trotter & Haupt, 2019) and natural disasters (Tull, Dabner & Ayebi-Arthur, 2017) attract attention. Undoubtedly, the COVID-19 pandemic is a powerful stressor affecting education. With this in mind, there are five key components of distance learning that should be considered during an epidemic: proper instruction, course content, motivation, relationships between actors, and maintaining mental health (Martin, 2020). The latter component is especially relevant in modern conditions, in particular, the need to create an accessible distance education system, design optimal learning communities and prevent stressors (Lister, Seale & Douce, 2020).

According to Fedosenko (2020) the following main psychological effects of quarantine we can be identified: fear, apathy, stupor, depression, bad mood, irritation, insomnia, anger, emotional exhaustion. All these emotional phenomena must be taken into account in the implementation of distance learning courses in high school. Attention should be paid to the research of Indonesian scholars, which aimed to study the psychological consequences of distance learning at the beginning of the pandemic (Irawan, Dwisona & Lestari, 2020). The researchers came to the following important conclusions: 1) the subjects got tired of distance learning and most of them began to experience intense boredom within two weeks; 2) mood swings associated with a large number of educational assignments and the lack of their proper justification. Therefore, the analysis of theoretical literature showed an increased intensity of research on the peculiarities of the implementation of distance education in higher education. However, those studies are usually of a theoretical or ascertaining nature, while there are almost no experiments on process optimization.

Methods and materials

The aim and objectives of the study involved planning and conducting a pedagogical formative experiment. Testing and observation were used as auxiliary methods. The experiment was implemented in the context of distance learning, which was carried out during the quarantine period of 2020-2021. An experimental hypothesis is formulated, according to which the creation of specific psychological conditions has a positive effect on the effectiveness of distance education. Independent variable is psychological conditions for the organization of distance education, which involved the use of motivational exercises and reflective reports. Motivational blocks are a set of assignments aimed at stimulating the productivity of educational activities, increasing cognitive interest, skills of independent work.

Reflective reports are open questionnaires where the student must indicate the results of the self-analysis. In these reports it is necessary to evaluate own achievements, indicate possible difficulties, as well as the ways to improve the results. The dependent variable of the experiment is the professional competence of future teachers, which was studied through the following components: motivational, cognitive, operational and reflexive (Chornous, 2020). The levels of each criterion (high, medium, low) were determined through a set of diagnostic tools: 1) motivational: the Level of Satisfaction with the Profession test (Starosta, 2019); 2) cognitive: test technologies to determine the level of knowledge of future specialists, which was implemented

depending on the chosen major of the respondents; 3) operational-activity: observation of professional skills and abilities, carried out according to a certain programme; 4) reflective: a questionnaire to determine the level of pedagogical reflection. Each of the levels of the component corresponds to the scales of the methods used. The tests selected to diagnose the motivational and reflective component meet the psychometric requirements of reliability and validity. Additional methods of checking the reliability and validity of test tools were expert evaluations and re-conducting the method on a sample of 30 people.

For the other hand, the experimental and control groups were formed from among the students of the Institute of Pedagogy and Psychology (former Faculty of Primary Education of Olexandr Dovzhenko Hlukhiv National Pedagogical University. The sample included 102 people (control sample) and 110 people (experimental sample). The respondents aged 21-22 (master's students) All participants of the experiment previously agreed to participate in the study. The following methods were used in the research: 1) pedagogical experiment; 2) testing; 3) observation; 4) Student's t-test to determine the significance of the identified differences. The data were calculated using the SPSS software. The main methodological guidelines of the study were: the theory of psychological and pedagogical experiment, the principle of unity of psyche and activity, ideas about the psychological mechanisms of distance education.

Distance education was carried out in both samples because of the requirements of the current social situation. In the control sample, the teacher's role was limited to presenting materials and testing knowledge. Both samples provided effective feedback through GoogleMeet and Zoom. A block of motivational exercises and reflective reports were introduced during the classes in the experimental sample. Primary and secondary diagnostics were also performed online. The total duration of the experiment is seven months (2020 - 2021 academic year).

Results

Analysing the features of psychological assignments in the experimental group, we can conclude that most students have a responsible and high-quality attitude to this work. At the same time, it can be stated that the students were more interested in performing motivational exercises, compared to writing reflective reports. We explain this situation by the fact that motivational tasks are presented in the form of games, so they better stimulate cognitive interest and positive emotional experiences. There is also a tendency to gradually reduce the quality of self-analysis

during the experimental period. Students wrote more detailed reports at the beginning of the study, while they often reduced to a simple statement of actions taken at the end of the course. In this case, teachers constantly directed the study participants to the responsible self-analysis. Note that students are more willing to record and analyse their own successes than failures. Attempts to determine the reasons for their success or failure were also difficult. Quantitative results of the study are presented in Table 1. Let us analyse the results of primary diagnostics in order to determine the level of the components of professional competence of students of higher pedagogical educational institutions.

Table 1

Dynamics of levels of the components of professional competence in students in the course of distance education

Components of professional competence	Levels	Number of respondents							
		Control group				Experimental group			
		Before the exposure	After the exposure	Before the exposure	After the exposure	Before the exposure	After the exposure	Before the exposure	After the exposure
		%	Num ber of peop le	%	Num ber of peop le	%	Num ber of peop le	%	Num ber of peop le
Motivational	Low	37.26	38	34.31	35	35.45	39	6.36	7
	Medium	51.96	53	51.96	53	55.45	61	63.64	70
	High	10.78	11	13.73	14	9.1	10	30	33
Cognitive	Low	13.73	14	3.92	4	14.54	16	2.73	3
	Medium	66.67	68	45.09	46	64.55	71	43.64	48
	High	19.6	20	50.99	52	20.91	23	53.63	59
Operational-activity	Low	30.39	31	13.73	14	27.27	30	4.54	5
	Medium	62.75	64	57.84	59	65.45	72	50.91	56
	High	6.86	7	28.43	29	7.28	8	44.55	49
Reflective	Low	44.12	45	40.2	41	44.55	49	12.73	14
	Medium	52.94	54	55.88	57	50.91	56	54.55	60
	High	2.94	3	3.92	4	4.54	5	32.72	36

The motivational component is determined by indicators of satisfaction with the profession, focus on self-improvement, ability to stimulate their own activities. The medium level of motivational component prevails in both groups. Low indicators of this component of professional competence were found in almost a third of students in both groups. High indicators of professional motivation of the motivational component were found in approximately ten percent of respondents. The obtained results indicate an insufficient level of the studied component in master's students. This trend, in particular, can be explained by the crisis of professional choice, when studies in the HEI is coming to an end and graduates begin to assess the acquired profession in the context of its financial capabilities.

The cognitive component is a set of professional knowledge of the respondents. The predominance of medium indicators has still been recorded, and they were found in more than 60 percent of respondents in both groups. Low indicators of the cognitive component were diagnosed

in 13.73% and 14.54% of the subjects. A high level of knowledge of professional information is observed in about one-fifth of the respondents. In our opinion, the obtained results are insufficient for master's students. In general, the levels of the cognitive component of competence are slightly higher than motivational. The main criteria of the operational-activity component are indicators of the development of professional skills and abilities that are manifested in the performance of relevant assignments. A medium level exceeding 60 percent dominates in both groups. Approximately one third of the respondents were diagnosed with low levels of the component. A high level of professional knowledge and skills of students was found in less than ten people in both groups. It is noteworthy that the level of the operational component is lower in general than the cognitive one.

The reflective component includes the ability of pedagogical self-analysis, being the basis of professional self-esteem. In general, this component has the lowest level among the studied components. Low rates (44.12% and 44.55%) are very pronounced in the studied students. Medium values were recorded in half of the respondents of both groups, and high — only in nine respondents. Such trends can be explained both by the general features of the structure of the individual's self-consciousness and by the lack of purposeful work on the development of this component. Thus, the medium level of the components of professional competence prevails in students of the studied samples, which indicates the need to change the methodological approaches to the organization of the pedagogical process.

For the other hand, the indicators of the motivational component in the control sample changed insignificantly after the distance educational course. The low level decreased, and the high level increased in three people, by 2.95%. The medium level remained stable (51.96%) in quantitative terms. There is a significant decrease in the number of people with low levels of professional motivation in the experimental group, by 29.09%. The medium level of the component increased in 8.19% of subjects. The number of students with high indicators of the motivational component increased by 20.9% after the experimental programme. Thus, the use of game exercises for the development of the motivational sphere of the future specialist has a positive effect on the development of the motivational component.

Let us analyse the dynamics of the cognitive component. In the control group, the low level of this component changed in 9.81% of the students. The medium level of professional knowledge decreased by 21.58%. High indicators of the cognitive component increased in 31.39% of

respondents. In the experimental group, the low level of knowledge improved by 11.81%. The medium level decreased in 20.91% of subjects. The high level of the cognitive component of the students of the experimental group increased by 32.73%. That is, we see that the level of information training of the subjects improved in both groups, where distance learning was conducted. So, the effectiveness of knowledge acquisition remotely is recorded regardless of the specific psychological conditions of the process.

The operational component was being formed during the practical training, which was also implemented remotely. In the control group, low rates transformed in 16.66% of students, while in the experimental group this figure is 22.73%. The medium level of the component of the control group under quantitative restrictions changed insignificantly: by 4.91%. In the experimental group, the medium indicators of professional skills and abilities changed more significantly: in 14.54% of subjects. The high level of the operational-activity component after the experiment increased in both groups: in 21.57% of the control group and 37.27% of the experimental one. That is, we can state significant changes in the activity component in both samples, but the exercises of the motivational block and writing reflective reports have a positive effect on the development of professional skills and abilities. This situation can be explained by the fact that motivation is an important component of the activity and determines particular actions.

The reflective component of professional competence in the control group has hardly changed. The low level of the component decreased in 3.92% of respondents, the medium one increased by 2.94%, and high values changed in only one person. Significant changes in the reflective component towards improvement were revealed in the experimental group. The low level decreased in 31.82% of subjects, the medium one increased in 3.64%, and high level increased in 28.18%. That is, the use of motivational exercises and reflective self-reports has a positive effect on the productivity of pedagogical self-analysis of students. Obviously, the use of reflective techniques is especially relevant in this case.

Statistical significance criteria were calculated for a more in-depth analysis of the differences identified as a result of the experiment. The nonparametric Student's t-test was used since the results of the tests are presented in ordinal scales. The implementation of this statistical procedure allows determining the significance of changes in the dependent samples, that is comparing the results of each group at the beginning and end of the experiment. The results of the analysis are presented in Table 2. The coefficients marked with an asterisk reflect the significance

of the differences at the level of $p=0.05$, and the coefficients with two asterisks — at the level of $p=0.01$.

Table 2

Indicators of Student's t-test of the components of professional competence in the control and experimental samples

Components of professional competence	Student's t-test	
	Control group	Experimental group
Motivational	0.89	2.87**
Cognitive	3.14**	3.23**
Operational-activity	2.98**	3.34**
Reflective	0.75	3.17**

It was found that the motivational and reflective components did not undergo statistically significant changes during the experiment in the control group ($t=0.89$, $t=0.75$). At the same time, there are significant changes ($p=0.01$) in the cognitive and operational-activity components ($t=3.14$, $t=2.98$).

In the experimental group, significant changes ($p=0.01$) were found for all components of professional competence. The coefficients for the motivational, cognitive, operational-activity and reflexive component, respectively, are: $t=2.87$, $t=3.23$, $t=3.34$, $t=3.17$. We see that the results of the calculation of Student's t-test confirm the conclusions derived from the analysis of the percentage shifts in the formative experiment.

Discussion

The obtained results indicate the importance of using motivational exercises in the synchronous interaction of distance education subjects. However, there are studies that indicate the performance of both parallel and asynchronous teacher-student interaction to optimize motivation. In particular, the importance of the asynchronous distance learning approach for situations that require reflection and detailed analysis of educational material is noted (Watts, 2016).

The positive results of the experiment correspond to the recommendations of other scholars on the optimization of distance education. In particular, the following areas of work are urgent: 1) providing and maintaining the motivation of students and teachers to the quality implementation

of educational programmes; 2) preliminary technical and methodological preparation of students for a possible change in the format of the educational process; 3) the focus of the process on meeting the students' needs, the development of the cognitive component, ensuring emotional stability; 4) organization of an effective social educational environment by means of information technology, which operates on the basis of mutual support; 5) preparation of teachers for the practical implementation of methods of motivating students; 6) support for the emotional well-being of teachers; 7) solving the problem of equal access to distance education technologies; 8) improving the concept of e-learning (Chiu, Lin & Lonka, 2021). Effective interaction between teachers and students, control of group dynamics of the community, interesting content of courses, stimulating the development of independence are also effective for increasing the motivation of students in the course of distance education (Meşe & Sevilen, 2021). At the same time, attention should further be paid to the development of research on the teacher's psychological conditions in the course of distance learning.

There is a growing popularity of an approach that examines the impact of self-determination on the student's motivation in distance learning (Hartnett, 2016). That is, such studies criticize the behaviourist view of the motivational sphere and focus on the internal motives of learning. The results of that scientific research can serve to individualize the developed motivational exercises. The focus of distance learning courses to meet the students' basic needs (social, security, self-determination, etc.), which increases the efficiency of knowledge acquisition, is also a promising direction (Hsu, Wang & Levesque-Bristol, 2019). It is important to study the impact of mutual assistance atmosphere on the success of distance education (Wong et al., 2019; Yeh et al., 2019).

Other scholars also confirm the importance of reflection in distance education in their works. In particular, it is noted that such metacognitive processes as self-observation and self-analysis are the basis of quality self-learning (Ritter, 2020). Independent learning is, in turn, the basis of distance education. The relevance of the sample of our study is determined by the insufficient study of various aspects of reflection in training of future teachers (Korthagen, 2017). Recent research confirms the important role of reflective practices in improving the effectiveness of e-learning and distance learning (Jung et al., 2021).

Optimization of distance education in higher education requires certain guidelines. Such strategic directions may be the principles identified in recent research (Bao, 2020): 1) the principle of relevance — the number and complexity of training materials must meet the features of students;

2) the principles of optimal speed of learning; 3) the principle of sufficient support, which provides effective feedback; 4) the principle of stimulating student activity; 5) availability of a contingency plan in case of unforeseen circumstances. Effective implementation of these principles requires the study of psychological characteristics of students: motivational, cognitive, activity, reflective.

Therefore, the obtained research data correspond to the results of the latest scientific research on this issue. At the same time, certain limitations should be emphasized. In particular, the experiment was conducted in the pedagogical HEI, so the results, first of all, concern the students of the relevant majors (Fathelrahman, 2019). Further research should expand the range of samples based on age and focus of professional training. The study of the teacher's reflective processes in distance education is also topical. It is worth paying attention to self-analysis based on students' feedback on the teacher's work, the level of student self-regulation in the network environment (Garip, Seneviratne & Iacovou, 2020), the impact of self-determination on educational efficiency (Panadero, 2017).

The developed distance education program for students has demonstrated effectiveness. The use of motivational blocks and reflective reports is a theoretically and practically significant area of research. It is worth noting the expansion of the study of psychological conditions of distance education, in particular, the psychological climate, intellectual orientation, emotional state of participants in the educational process.

Regarding the limitations of this study, the disadvantage of this study is the limited sample, as the research groups included only students of pedagogical HEI. The obtained data can be used in the practice of HEIs in the context of the introduction of distance education technologies. In particular, the results of the study can be used as a basis for specialized psychological training programmes for teachers who deliver distance learning courses. Further prospects for the study of the problem are to study the impact of the psychological state of teachers on the effectiveness of distance education. It is also topical to compare the results of the use of motivational exercises and reflective reports in traditional and distance learning.

Conclusions

The problem of effective implementation of distance education has always been declared as very important for psychological and pedagogical science, but the COVID-19 pandemic and its consequences for the society necessitated an immediate transition from theory to practical

implementation of particular courses. In this context, special attention should be paid to the study of the educational process in higher education, which is responsible for the development of professional competence of specialists in a particular field. The productivity of higher education in modern conditions significantly depends on the introduction of distance technologies, which, in turn, is determined by the justification of the relevant psychological conditions, because the process focuses on the individual with his/her features and problems.

The following typical problems were identified in the process of implementing distance higher education: pedagogical, psychological, organizational, technical. It was found as a result of the initial diagnostic section, that the medium level of the components of professional competence prevail in future specialists. The use of motivational exercises and reflective reports has demonstrated effectiveness in shaping the professional competence of students in the course of distance education. It should be noted that the analysis of the dynamics of the level of professional knowledge (cognitive component) revealed positive significant changes in both the control and experimental samples. The indicators of the operational-activity component have changed in both samples, but these changes are more significant in the experimental one. Motivational and reflective parameters of professional competence showed positive dynamics in the experimental group as a result of the study, while such changes were not found in the control group.

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