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The Use of Information Technology in the Educational Process during Martial Law

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ABSTRACT

The aim of the article was to evaluate the effectiveness of emotional support in the introduction of information technology in higher educational institutions during martial law. The following methods were used: general theoretical; testing, analysis of products of activity, formative experiment, statistical methods. Motivational, cognitive, activity and reflective components of professional competence were identified in the course of theoretical analysis. The medium indicators of dominance of cognitive, activity and reflective components of professional competence of students during martial law were recorded. The motivational component was the least developed. Experimental impact is effective for the development of motivational and cognitive components, but requires further clarification in the development of activity and reflective components. The significance of the changes is confirmed by statistical verification of the data. Prospects for research on the problem involve expanding the number and duration of research on the use of educational information technology during martial law.

KEYWORDS: Professional ability, cognitive part, motivational part, emotional development.

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El uso de la Tecnología de la Información en el proceso educativo durante la ley marcial

RESUMEN

El objetivo del artículo fue evaluar la eficacia del apoyo emocional en la introducción de la tecnología de la información en las instituciones de educación superior durante la ley marcial. Se utilizaron los siguientes métodos: teórico general; ensayo, análisis de productos de actividad, experimento formativo, métodos estadísticos. Los componentes motivacionales, cognitivos, de actividad y reflexivos de la competencia profesional fueron identificados en el curso del análisis teórico. Se registraron los indicadores medios de dominio de los componentes cognitivo, de actividad y reflexivo de la competencia profesional de los estudiantes durante la ley marcial. El componente motivacional fue el menos desarrollado. El impacto experimental es efectivo para el desarrollo de los componentes motivacionales y cognitivos, pero requiere mayor aclaración en el desarrollo de los componentes de actividad y reflexivos. La importancia de los cambios se confirma mediante la verificación estadística de los datos. Las perspectivas de investigación sobre el problema implican ampliar el número y la duración de la investigación sobre el uso de la tecnología de la información educativa durante la ley marcial.

PALABRAS CLAVE: Habilidad profesional, parte cognitiva, parte motivacional, desarrollo emocional.

Introduction

According to Tondeur et al. (2016), the effective use of information technology is the necessary condition for successful reform of the education system, as the technological impact on learning and teaching will only increase. The problem is studied in many aspects. In particular, Simon & Ngololo (2015) determine the impact of the level of technical support to the educational process on the quality of education. Islam & Grönlund (2016) emphasize the need to develop teacher competence in the implementation of modern technologies in education. Yilmaz (2017) explored students' readiness to study in the information society. It is appropriate to use information technology at different stages of the educational process. Traditionally, as Shute & Rahimi (2017) note, the use of computer technology was effective in assessing students' academic performance. Fernandez-Robles (2017) proved the importance of information technology for optimizing the educational environment and

enhancing cooperation. At the same time, Lange & Costley (2019) pay attention to the problems of self-regulation of students when using information technology.

The social crisis urges the need for the use of information technology in the educational process. In particular, as Dhawan (2020) states, the Covid-19 pandemic necessitated the total use of information and communication technologies in education. Czerniewicz et al. (2019) confirm the effectiveness of the use of information technology in the political crisis. Tull et al. (2017) studied the use of information technology in cases of natural disasters, particularly in areas affected by earthquakes.

The problem of the effectiveness of education in times of war, which was partially studied, is worth noting. Ragab K.D. (2018) points to the successful use of distance learning technologies in the educational process in areas affected by the military conflicts. The experience of such research should be studied and expanded in the context of the current situation in Ukraine. The war that began on February 24, 2022 urges a rapid revision of methodological approaches to educational policy. First of all, this applies to the principles and mechanisms of introduction of information technologies in the educational process of higher educational institutions, which requires appropriate research. At the same time, the research should take into account the specifics of the socio-political and military situation, as well as socio-cultural characteristics of participants in the educational process. So, the theoretical, practical and national significance of the problem determines the research topicality.

The aim of the article involved evaluation of the effectiveness of emotional support in the introduction of information technology in higher education during martial law.

-Research objectives:

- 1) review previous studies on the problem of using information technology in the educational process of higher educational institutions;
- 2) empirically measure the students' performance during martial law;
- 3) determine the conditions for the effective use of information technology in the educational process during martial law.

1. Literature review

According to Duran et al. (2019), an unconditional advantage of educational information technology is the possibility of distance learning in real time. Laskaris et al. (2017) substantiated the positive impact of information technology on motivation. Lopez-Gil & Bravo (2019) proved the development of students' creativity in the information environment. Agung et al. (2020) recorded improved digital literacy, development of information retrieval skills, improved quality of solving educational problems using information technology. Schindler et al. (2017) found that electronic development games, web conferencing and social networks have a positive effect on student involvement in the educational process.

It is necessary to pay attention to the difficulties accompanying use of educational information technologies for completeness of the theoretical analysis. Vázquez-Cano et al. (2022) consider that the main problems that arise in the implementation of information technology in the educational process are the preservation of personal data, technical capabilities of participants in the educational process, the need to translate existing educational materials into electronic format, lack of skills to search for information on online resources, reduced students' performance. Gogus & Saygin (2019) emphasize that data confidentiality is one of the main problems in the use of information technology in higher education. Students may experience symptoms of Internet addiction in cases of longer use of the Internet. In particular, Kilic et al. (2016) confirmed increased anxiety of students under the impact of longer use of information technology. Alhumaid (2019) states that uncontrolled use of information technology by students can cause problems with the development of reading competence, distortion of pedagogical interaction and isolation of participants in the educational process.

In addition to purely technical problems of information technology implementation, Blanchard et al. (2016) consider it important to review the essence and form of the pedagogical process by its participants. According to Hanimoglu (2018), effective use of technology in education requires special training of teachers — not only technical but also methodological, which involves the development of appropriate didactic competence. In particular, Cabero-Almenara & Barroso-Osuna (2016) emphasize the importance of methodological and didactic training of teachers in the use of augmented reality technologies.

Carstens et al. (2021) consider it appropriate to use special trainings to make the teachers' use of information technology more efficient.

Kucherenko (2018) considers information technology as the basis for distance learning. Smulson (2012) noted that assessment of readiness for distance learning is based on the orientation of a certain system of criteria. Zinchenko et al. (2022) proved the positive effect of motivational exercises and reflective reports in distance learning. Simpson (2018) specified the following main areas of optimization of distance learning: the creation of methods for online courses, psychological support for students, which is carried out through network interaction; training of specialists on the use of information technology.

The Covid-19 pandemic has urged the use of information technology in education in recent years. Irawan et al. (2020) identified such negative effects of the use of technology at the beginning of the epidemic as boredom and mood swings of students. Martin (2020) notes that the following aspects of information technology implementation must be taken into account during the pandemic: the quality of guidance, the content of the subject, motivation, relationships between participants, stabilization of mental state.

In the context of the Russian-Ukrainian war, the study of the use of information technology in times of military conflict is becoming increasingly topical. Musisi & Kinyanda (2020) hold that the impact of hostilities on deteriorating mental health, anxiety and depression is evident, as evidenced by studies among the population of Africa. We state the minimum number of scientific researches of educational processes during martial law as a special legal regime established during military conflicts. At the same time, Rajab (2018) claim that information technology allows obtaining quality education and partially meet the security needs in times of war.

So, the theoretical literature survey showed that the problem of using information technology in education is studied in depth. At the same time, there are almost no studies on the use of educational information technology during martial law.

2. Methods and materials

The study was planned and conducted in the shortest possible time. The research involved the following stages.

Theoretical stage (late February — early March 2022) involved the identification of the main research categories and methodological approaches. The hypothesis about the effectiveness of the influence of information technology in higher education during martial law provided the creation of the emotional support programme is formulated. The influence of information technologies on the professional competence of future specialists was studied.

Organizational stage (March 8-15, 2022) involved research planning, selection of empirical methods, sampling, obtaining participants' consent.

Collection of primary empirical material (late March — early April 2022).

Experimental stage (April - May 2022) — the implementation of information technology with emotional support provided to students.

Secondary diagnostic test (end of May 2022), which followed the experimental exposure.

Stage of interpretation of the data obtained (early June 2022) involved generalization of the results of the experimental study.

The research was carried out by the authors of the article and competent specialists who could provide qualified psychological support. The samples were formed at the Faculty of History and Theory of Art, as well as the Faculty of Decorative and Applied Arts of Lviv National Academy of Arts. Two samples were formed for the experiment — control (97 people) and experimental (107 people). The study involved third- and fourth-year students of the educational institution. GoogleMeet multimedia platform was used for classes.

The following methods were used: general theoretical; testing, analysis of products of activity, formative experiment, statistical methods.

General theoretical methods — theoretical literature survey to advance a hypothesis and determine the structure of the phenomenon under research. The structural components of the professional competence of future professionals were identified as the changes in the students' academic performance were studied (Chornous, 2020).

Motivational component — motivation of professional activity, a value attitude to students' own future profession in the context of its specifics. Diagnostic tool Profession Satisfaction Test.

Cognitive component — the level of theoretical knowledge on the future profession. Diagnostic tool — the Assessment of Professional Knowledge.

Activity component — building professional skills and abilities, which was tested by studying the products created by students and developed projects. Diagnostic tool — analysis of products of activity.

Reflective component — self-assessment when performing professional tasks. Diagnostic tool — Self-assessment of Ontogenetic Reflection Test.

Three levels of components — high, medium, low — were determined on the basis of coordination of results of ordinal scales of diagnostic tools.

Testing is aimed at determining the level of motivational, cognitive and reflective components of professional competence. The validity of the tests was determined by expert evaluation. Experienced teachers and psychologists were invited as experts.

Analysis of products of activity is aimed at determining the activity component of professional competence. The main criteria of product quality are the correspondence of the result and the initial goal, the reflection of theoretical knowledge in the final product, the aesthetic appearance of the product.

Formative experiment — the main research method. The educational process was remote because of the martial law, so information technology was the main means of didactic influence in the control and experimental sample. The emotional support provided to the participants was the independent variable of the experiment. Professional competence of future specialists was a dependent variable.

We will describe the procedure of the experiment in more detail. The start of classes with students of the experimental group was preceded by regular rapid surveys to find out the emotional state of students. The strategy of conducting classes was determined depending on the survey results. If the student did not show a desire for further work, he or she was offered an option to complete assignments independently, which did not provide for attending classes. Special exercises to maintain emotional state, which were conducted at the beginning of the assignment, were also identified in the course of consultation with psychologists. The use of jokes and interesting stories was also provided to stimulate motivation and emotional background of the individual. Emphasis was placed on the possibility of providing qualified psychological assistance by specialists of the educational institution. That is, the overall strategy of experimental impact involved a combination of

empathy, friendliness and optimism in the educational process with the use of information technology. Note that the mentioned emotional support did not reduce the requirements for completing the assignments. In the control group, classes were conducted in a friendly manner, without increased attention to the emotional state of students.

Statistical methods — percentage analysis, Student's t-test. These methods allowed testing the effectiveness of the experiment. Data analysis was performed using computer programs.

An important aspect of the study was the participants' consent which addressed the ethical contradictions of the research. The content of the methods used does not affect the respect and dignity of the subjects, which is confirmed by expert assessment.

3. Results

Table 1 provides the generalized results of the experiment. Analysis of the results of the initial diagnostic test showed that the percentage distribution of indicators in both groups is similar. Let's analyse the results of the dynamics of each component of professional competence.

The motivational component is characterized by the dominance of low and medium indicators (Table 1, Figure 1). High values of the component were recorded in only three individuals of the studied samples. Such results can be explained by socio-psychological aspects of the military situation in Ukraine, which significantly destabilizes the emotional state and motivation of participants in the educational process. This trend justifies the importance of emotional support in the use of information technology. The results did not change after the experimental impact in the control group. Even the growth of low manifestations of the component is recorded. The percentage of subjects with a high level of motivational component in the experimental group decreased by 12.15%. Quantitative indicators of the medium level of the component have hardly changed. High values of the component increased in 10.98% of students. The results indicate that emotional support provided in the course of implementation of educational information technology is moderately effective for increasing professional motivation during martial law. At the same time, the traditional approach to distance education is not effective for building the motivational component of professional competence.

Table 1. Dynamics of levels of students' professional competence criteria under the influence of information technologies

Components of professional competence	Levels	Number of respondents							
		Control group				Experimental group			
		Before the impact		After the impact		Before the impact		After the impact	
		%	Number	%	Number	%	Number	%	Number
Motivational	Low	48.45	47	52.58	51	47.67	51	35.52	38
	Medium	49.48	48	43.28	42	51.4	55	53.27	57
	High	2.07	2	4.14	4	0.93	1	11.21	12
Cognitive	Low	21.65	21	18.56	18	25.23	27	5.61	6
	Medium	69.07	67	56.7	55	66.36	71	60.75	65
	High	9.28	9	24.74	24	8.41	9	33.64	36
Activity	Low	31.96	31	19.59	19	31.76	34	23.37	25
	Medium	62.89	61	64.95	63	64.49	69	68.22	73
	High	5.15	5	15.46	15	3.75	4	8.41	9
Reflective	Low	25.77	25	23.71	23	27.1	29	27.1	29
	Medium	62.89	61	64.95	63	60.75	65	60.75	65
	High	11.34	11	11.34	11	12.15	13	12.15	13

The medium indicators of the cognitive component of professional competence of future specialists dominate (Table 1, Figure 2). At the same time, the cognitive component is more developed than the motivational one. High levels of the component were found in approximately 10% of subjects. It was found after the study that the results changed in both the control and experimental groups. Learning without strong emotional support stimulated the growth of high indicators of the component in 15.46%. A positive shift in the medium levels was found in 12.87% of the control group respondents. The distribution of low component values has changed the least. The data obtained show that traditional methods of using information technology have a moderate effect on improving students' knowledge without causing profound transformations. In the experimental group, low values decreased by 19.62%, indicating deeper changes in performance. High values of the cognitive

component increased by 25.23% after the experimental impact. The analysis of the results indicates the effectiveness of the proposed method of using information technology to improve knowledge during martial law.

Figure 1. Dynamics of change of the motivational component of students' professional competence under the impact of information technology

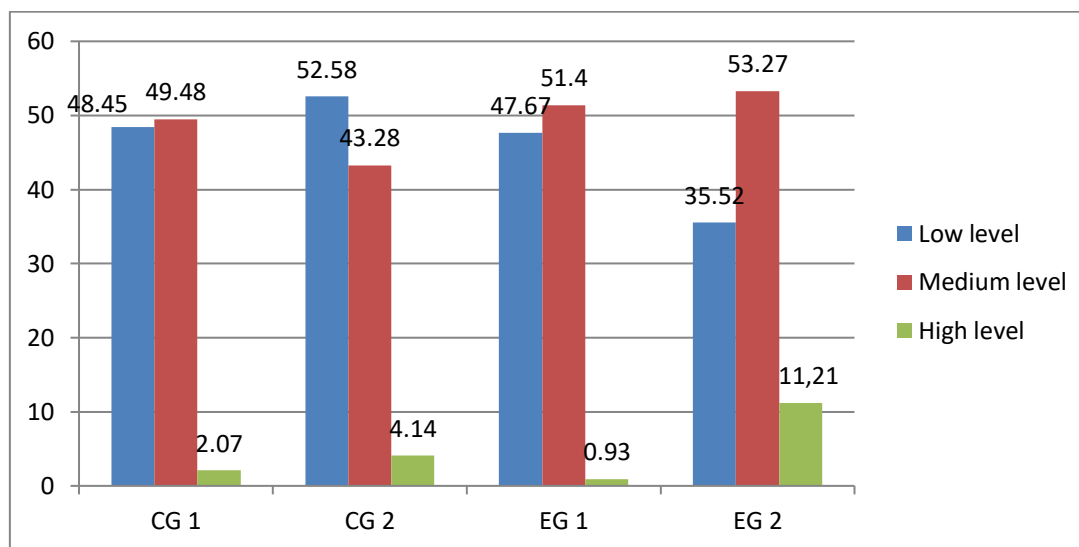
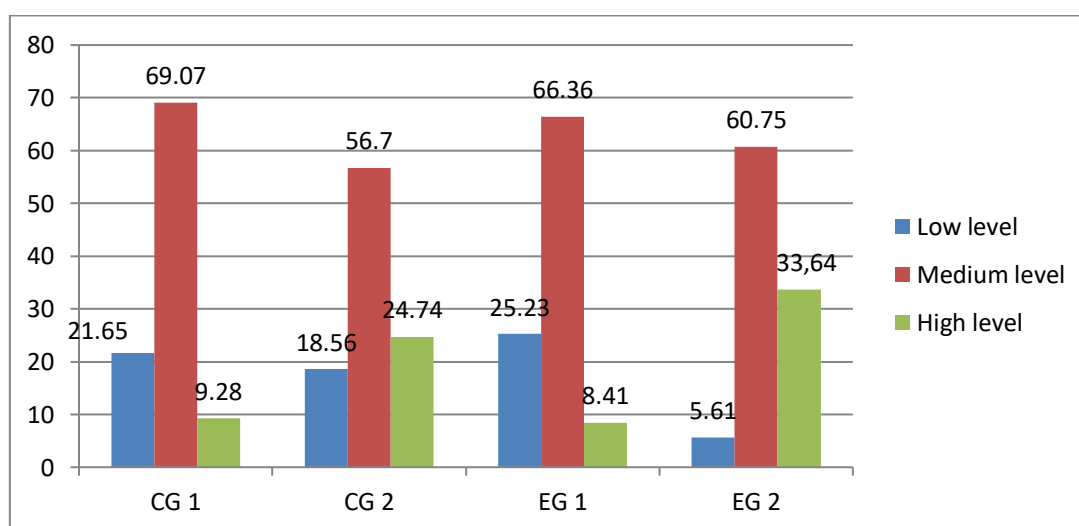


Figure 2. Dynamics of change of the cognitive component of students' professional competence under the impact of information technology



The medium indicators of the activity component of professional competence prevail (Table 1, Figure 3). At the same time, low levels of this component were recorded in a third of the subjects. In the control group, component shifts were recorded in an average of 10% of

subjects. The shift of the component in the experimental group was recorded in 8.39% of the surveyed students at low indicators. High values increased by 4.66% (five people). The dynamics of averages in both groups is insignificant. Therefore, the results of re-diagnostics in the control group were better than in the experimental group.

Figure 3. Dynamics of change of the activity component of students' professional competence under the impact of information technology

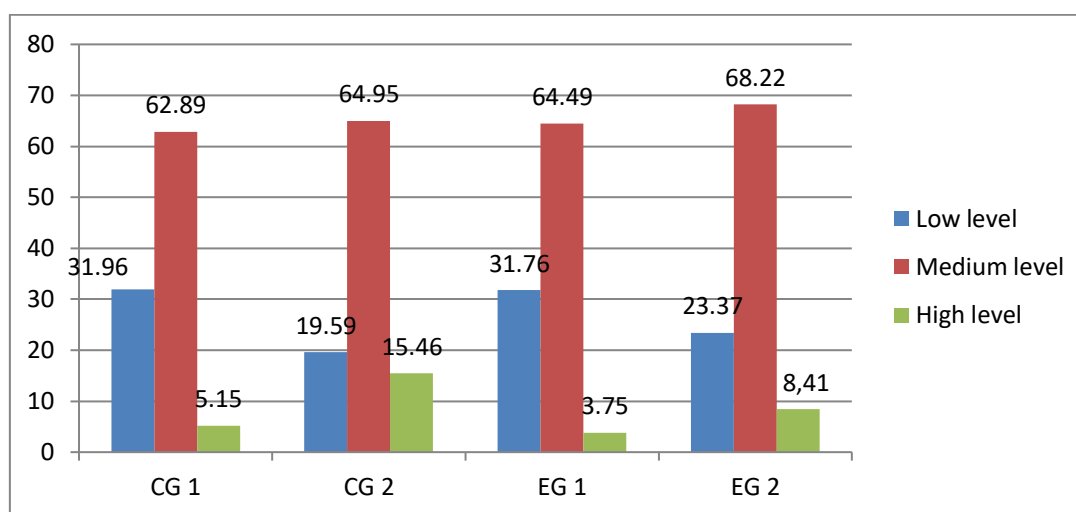
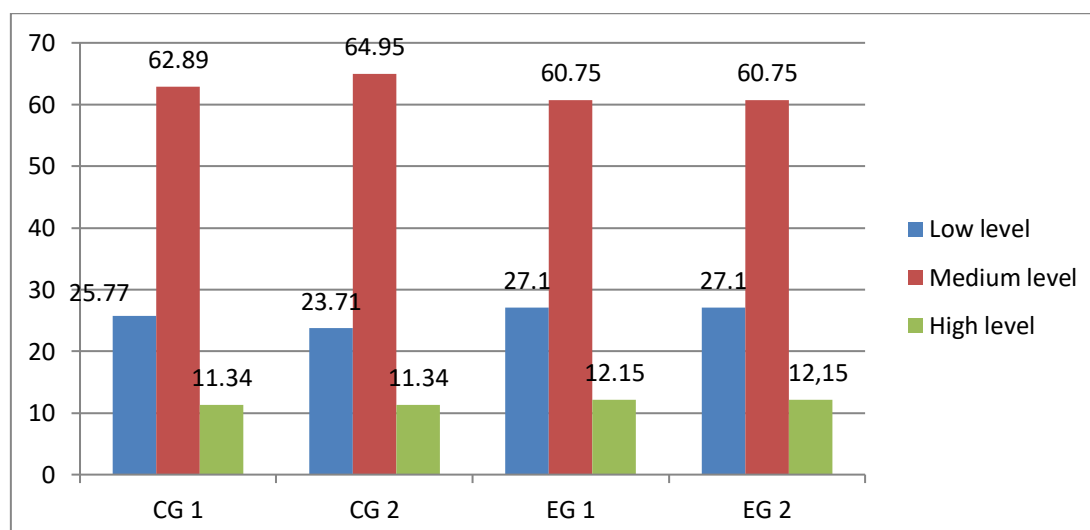


Figure 4. Dynamics of change of the reflective component of students' professional competence under the impact of information technology



About 60% of the respondents of both groups were diagnosed with medium level of the reflective component. A low level of the component was recorded in a quarter of students,

and a high level – in 10%. No significant changes in the component were recorded after the experiment in the control and experimental samples. So, the proposed method of using information technology has failed to show the effectiveness for the development of professional reflection during martial law.

Table 2. Student's t-test indicators for the components of students' professional competence in the studied samples

Components of professional competence	Student's t-test	
	Control group	Experimental group
Motivational	1.11	3.22**
Cognitive	2.39*	2.77**
Activity	2.84**	1.56
Reflective	1.03	1.19

The results of the analysis of changes in percentages indicate the effectiveness of the use of information technology in building cognitive and motivational components of professional competence during martial law. Student's t-test was calculated to confirm the previous conclusions (Table 2).

The analysis of statistical data demonstrated that significant changes were recorded in the control group for the cognitive and activity component. There were no statistically significant changes in other components of professional competence. The changes in the motivational and cognitive components were recorded in the experimental group (significance of changes at $p=0.01$). Experimental impact is not effective for building activity and reflective components.

The observation over the peculiarities of the study revealed a number of features. Note that information technology and distance education were used extensively before the war in connection with the coronavirus pandemic. Therefore, it was interesting to compare the specific features of participants in the educational process in different circumstances. In particular, students were much more disposed to work with the camera off, which made contact difficult, especially during seminars. Students often complained about the security

situation, anxiety for themselves and their loved ones, guilt, lack of motivation to work. It should be noted that the classes started at the end of March, so the participants of the educational process have already undergone initial adaptation to the conditions of martial law. An important factor in improving the effectiveness of learning in the conditions under research is self-control and stability of the teacher's emotional state.

4. Discussion

The research results are ambiguous. The introduction of emotional support techniques in educational technology during martial law has demonstrated effectiveness in stimulating professional motivation and increasing the volume of theoretical knowledge. At the same time, the independent variable of the experiment was not effective for the development of professional, practical skills and professional reflection. The positive impact of emotional support in the learning process on motivation associated with the affective mechanisms of the motivational sphere — the stimulus to activity depends on the current experiences of the individual. Accordingly, the acquisition of theoretical knowledge is also integrated with the emotional background. At the same time, we can assume that the formation of practical skills is more related to purposeful systemic activities, and the role of the emotional component is insignificant. That is, actions can distract from negative environmental conditions. The use of information technology during martial law is not effective for building a reflective component of professional competence.

The obtained results are absolutely optimistic, especially in the context of data on the effectiveness of information educational technologies in combat zones (Rajab, 2018). At the same time, the mentioned scientific research focused on quantitative indicators of success of secondary school students. Our study examines the dynamics of students' professional competence, not just changes in formal grades.

The analysis of ways to increase the effectiveness of the impact of information technology during martial law is relevant. Researchers say that the educational process in crisis situations should be consistent, coordinated and carried out through the usual communication channels for students, in particular, popular social networks (Tull et al., 2017). It is possible to use educational multimedia games (Schindler et al., 2017). In this context, it is necessary to consider the use of Facebook, Instagram and Tik-Tok tools in

higher education. It is necessary to develop training programmes for teachers on the use of technology (Hanımoğlu, 2018). Simpson (2018) also substantiated the issue of psychological support for the use of information technology. Carstens et al. (2021) consider it appropriate to plan, organize and implement relevant trainings. Zinchenko et al. (2022) advise to involve reflective reports in the use of information technology in order to stimulate the development of the ability to professional self-assessment.

Yilmaz (2017) note that the readiness of students to use information technology is quite high, as distance learning is systemically implemented in higher education institutions since 2020. At the same time, martial law poses new challenges to a person who changes his or her attitude to life in general and to learning in particular.

Some of the results obtained are consistent with data from other scientific studies. In particular, Lange & Costley (2019) hold that the low level of motivation and reflective component of students corresponds to the data on the difficulties of self-regulation under the impact of the use of information technology. Earlier, Laskaris et al. (2017) substantiated positive changes in the motivational structure of students during distance learning. At the same time, Lopez-Gil & Bravo (2019) didn't confirm the results on the development of creative abilities in the information space, which is related to the socio-cultural and political features of the educational process.

So, the aim of the research was achieved and the objectives were fulfilled. The hypothesis about the effectiveness of the use of emotional support in the implementation of educational information technology in higher education was partially confirmed. In particular, the positive dynamics of cognitive and motivational components of professional competence was recorded, but changes in the structure of activity and reflective components were not recorded. The obtained results are of practical significance and can be used by teachers to increase the effectiveness of education during martial law. Future research should focus on expanding the sample and time interval of research on the use of educational information technology during martial law.

Conclusions

Modern pedagogical science offers almost no studies on the effectiveness of information technology in times of war. The available scientific research is incomprehensive and non-

systemic. Hostilities on the territory of Ukraine and the martial law requires a rapid revision of approaches to the functioning of higher education, as education is one of the foundations of society. Research should take into account the specifics of the military situation, as well as socio-cultural, psychological, national characteristics of participants in the educational process. These considerations determine the topicality of the research.

The initial diagnostic test showed the dominance of the average indicators of cognitive, activity and reflective components of professional competence of students during martial law. The motivational component is the least developed, which is explained by the peculiarities of the social situation and the specifics of the emotional background. The method of emotional support in using information technology in education proved to be partially effective. Experimental impact is effective for enhancing motivation for professional training and the cognitive component of professional competence. At the same time, emotional support for the use of information technology is not appropriate for the development of the activity component and professional self-assessment of students. The positive impact of the developed methodology is associated with the emotional regulation of the motivational sphere and acquiring theoretical knowledge. The significance of the changes is confirmed by statistical verification of the data. So, we can state that the research hypothesis was partially confirmed. The results obtained should be used by teachers to improve the effectiveness of education during martial law. In particular, the psychological justification for the use of information technology is appropriate. Prospects for research on the problem involve expanding the number and duration of research on the use of educational information technology during martial law.

Limitations

It is appropriate to extend the duration of the experimental impact in order to obtain more reliable results of the study on the use of information technology during martial law.

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