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EXPERIMENTAL STUDY OF COMPUTER-ORIENTED METHODOLOGY OF FOREIGN LANGUAGE COMMUNICATIVE DEVELOPMENT OF FUTURE MEDICAL PROFESSIONALS

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ПРАКТИЧНЕ ЗНАЧЕННЯ КОМП'ЮТЕРНО ОРІЄНТОВАНОЇ МЕТОДИКИ РОЗВИТКУ ІНШОМОВНОЇ КОМУНІКАТИВНОЇ КОМПЕТЕНТНОСТІ МАЙБУТНІХ ЛІКАРІВ

Abstract. The paper studies a complex research of the problem of computer-oriented methodology for the development of foreign language communicative competence of future medical professionals. Electronic educational resources at Ukrainian medical universities, in particular I. Horbachevsky Ternopil National Medical University (TNMU) is described and analyzed : Moodle program, Teams, Skype programs, electronic correspondence, Google Apps, interactive whiteboard, Power Point for presentations, online resources such as Rosetta Stone, Oxford Latin Course, Internet Workbook for the Oxford Latin Course, author's resource Anatom (anatom.ua), electronic dictionaries glosbe.com, ABBYYLingvo 12. A computer-oriented methodology of conducting Latin language classes is described in detail and analyzed. Tools and resources are recommended to increase the level of ICC development of future medical specialists. Criteria and levels of foreign language communicative competence' evaluation of future medical professionals were found out.

An experimental study of the effectiveness of this methodology is explored. The study makes it possible to conclude that the proposed methodology is effective and can be recommended for implementation in the system of higher medical education. The recommendations for improving curricula, developing new computer-oriented tools to improve the level of development of ICC at higher medicinal institutions of Ukraine are proposed. Further research prospects for the development of foreign language communicative competence of future medical professionals by means of information and communication technologies are outlined.

Key words: foreign language communicative competence; future medical professionals; computer-oriented methodology; Latin.

Анотація. У роботі здійснено комплексне дослідження проблеми впровадження комп'ютерно орієнтованої методики розвитку іншомовної комунікативної компетентності майбутніх фахівців лікувальної справи. Проаналізовано комп'ютерно орієнтовані методики розвитку іншомовної комунікативної компетентності майбутніх спеціалістів лікувальної справи в університетах зарубіжних країн. Виявлено, що найбільшої ефективності при застосуванні комп'ютерно орієнтованих методик вивчення іноземних мов досягається за рахунок використання дистанційних та змішаних форм навчання. Розглянуто і проаналізовано електронні освітні ресурси у вітчизняних медичних університетах, зокрема в Тернопільському національному медичному університеті ім. І. Я. Горбачевського. Детально описано і проаналізовано комп'ютерно орієнтовану методику проведення занять із латинської мови. Запропоновано засоби та ресурси для підвищення рівня розвитку ІКК майбутніх спеціалістів лікувальної справи. Результати експериментального дослідження дозволили дійти висновку, що запропонована методика є ефективною і може бути рекомендована для впровадження в систему вищої медичної освіти. Обґрунтовано критерії та рівні оцінювання іншомовної комунікативної компетентності майбутніх спеціалістів лікувальної справи. Розглянуто рекомендації щодо вдосконалення робочих програм, розробки нових комп'ютерно орієнтованих засобів для покращення рівня розвитку ІКК у медичних та інших ЗВО України.

Ключові слова: іншомовна комунікативна компетентність; майбутні лікарі; комп'ютерно орієнтована методика; латинська мова.

Inroduction. Recently, important steps have been taken in Ukraine towards the modernization of the higher education system, the creation of mechanisms for the introduction of computer-based learning technologies. However, the analysis of works of domestic and foreign researchers shows that the problem of development of foreign language communicative competence with the use of ICT tools is studied mostly in the system of higher and general secondary education.

In modern scientific works, problems of development and use of computer-oriented methods of development of foreign language communicative competence of future medical professionals are given insufficient attention. A study was conducted to determine the level of development of the ICC of future physicians and to outline prospects for improving computer-based techniques. Because of the difficult epidemiological situation associated with the spread of COVID-19, in 2020, in terms of implementation of blended and distance learning in the higher professional education Ukrainian universities moved to the environment of digital education.

Institutions of higher education in Ukraine, including medical one, faced a number of challenges, which are:

– searching for a model of digitalization by each institution of higher education within a certain autonomy;

– the necessity to form the optimal structure of the institution of higher education an the integration of the components of this structure into an effective system, on the basis of which the digital university is formed;

– a combination of elements of information and communication technologies, which is in each university, in the system on the basis of which the digital university is formed, and technical means of training in effective network tools;

– definition of the role, tasks and types of activity for scientific, scientific-pedagogical and pedagogical workers of such university;

– replacement of the traditional "classroom" educational space with a virtual network;

– searching for appropriate educational tasks of methods and techniques of distance learning;

– establishing effective communication of all participants in the educational process in the network space.

The aim. The research goal is to develop and experimentally test a computer-oriented method for the development of foreign language communicative competence of future doctors.

Methods. Methods of our research: *theoretical* – analysis of psychological-pedagogical, methodical,

special literature on the problems of FLCC development in future doctors, legislative and regulatory documentation regarding higher education matters in order to clarify the basic definitions, as well as theoretical and methodological approaches to research, determine the regulatory framework of the research, substantiate the methodology; *empirical* – generalization of domestic and foreign experience in the use of ICT tools for the FLCC development in General Medicine specialists, personal pedagogical experience; pedagogical questionnaires, interviews with students, teachers, methodologists in order to determine the status of implementation of computer-based methods of FLCC development in future doctors; method of analysis of hierarchies to determine the effectiveness of innovative methods of teaching foreign medical vocabulary; correlation analysis of the dependences of current performance and the results of the end-of-term test exams in medical students; monitoring the process of using the proposed methods, selection and testing of appropriate tools. *Pedagogical experiment* was the main empirical method used in the research. The methods of mathematical statistics were used during data processing to test the working hypothesis; *modeling* – to create an organizational and pedagogical model of FLCC development in future doctors.

Results. The importance of developing information and communication competence of teachers, students and all participants in the teaching and educational process is outlined in the documents of international organizations aimed at supporting reforms in the education systems of the European Union and other European countries (Council of Europe, European Union, UNESCO, OECD, etc.). In particular, the Declaration of the Second International UNESCO Congress "Informatization and Education" states that governments, structures, business industry communities concerned with the education sector should focus their efforts and find new forms of cooperation in order to provide all levels of education with appropriate new ICTs to support all subjects of the educational process within the framework of ongoing education for everyone. Specifically, it is emphasized that the rapid development of ICTs significantly affects progress of the information society, and this raises an important issue, that is, formation of the necessary competences in the ICT field [4].

The Declaration on the Development of European Policy on the Use of New Information Technologies (1999) by the Council of Europe indicates the need

to develop a European policy on the use of new information technologies to ensure the respect of human rights and cultural diversity, promote freedom of speech and information, and maximize educational and cultural potential [4].

The Recommendations of the European Parliament (2001) identify eight key competences for lifelong learning, among which digital competence holds an important place; it is necessary for the formation of a competitive personality in modern society. These recommendations identify the special role of ICTs to modernize education and create a global world learning environment with a purpose of improving its effectiveness on lifelong learning. Digital competence is interpreted by EU experts as a set of knowledge, skills, attitudes of an individual, which are necessary when using ICTs to perform tasks, solve problems, communicate, manage information and data, establish cooperation, create and distribute content, acquire knowledge for productive, responsible, creative, independent, flexible, ethical, reflective activities in all areas of human life, as well as its enhancement [5].

Considerable experience has been achieved thus far in the use of modern ICTs in the educational process of schools and higher educational institutions.

Theoretical and methodological provisions, principles of foreign language communicative competence (FLCC) are relevant and continue to be a field of scientific interest in the works of T. Koval [1], O. Ovcharuk [7], N. Fedchyshyn [6] and others.

Qualitative mastering of ICTs by future healthcare professionals results in the effective organization of processing and storage of information, as well as saving of space and time barriers for its distribution. Based on the integration of educational, information and communication technologies in the future doctors' training, the common tendencies today include the development of fundamentally new computer-based teaching methods, widespread use of e-learning platforms and various ICT tools and instruments, which allows to create and organize effective online courses, conduct distance learning with students, as well as manage the learning process and joint actions through web access to ICT resources and tools.

In medical higher educational institutions, the use of ICTs in the training of medical professionals is integrative and important, as it is based on knowledge and skills acquired by students in other disciplines; use of ICTs actualizes this knowledge, stimulates the formation of stable links between knowledge gained from different subjects.

ICTs and their use in the educational process at all stages of training are important in the training of future medical professionals today, especially considering the current situation, when the question of introducing the distance learning format came up before the system of higher education in 2020 due to the spread of the pandemic associated with COVID-19.

As part of the research, we developed a computer-based methodology for the FLCC development in future medical professionals that was tested during 2019-2020 at the I. Horbachevsky Ternopil National Medical University.

At the beginning, we determined the readiness of future doctors to use computer-based tools. A questionnaire called "Readiness to use computer-based tools in the educational process of future doctors" was conducted in order to determine the readiness of future doctors to use ICT tools to improve the development of their FLCC. The results of the questionnaire in the control and experimental groups (CG studied according to the traditional methodology during 2018-2019 and EG - according to the methodology developed during 2019-2020) showed that most students have a medium and high level of readiness to use computer-based tools. In particular, answers to the question: "What do you think is your level of preparation for the use of computer technologies in classroom and individual work?" demonstrated mainly average (48.1 % in CG and 38.9 % in EG) and a sufficient level (24.4 % in CG and 26.9 % in EG) of readiness (Fig. 1).
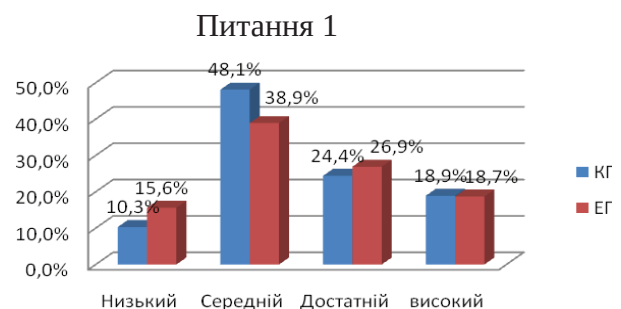
Fig. 1. CG and EG answers to the questions of the entrance questionnaire "What do you think is your level of preparation for the use of computer technologies in classroom and individual work?"

One of the results of the developed computer-oriented methodology for the FLCC development was a workshop on Latin "Workshop on Latin for first-year students majoring in "Medicine" using ICT instruments and tools".

The workshop consisted of 3 modules, which fully covered the Latin course: "Parts of Speech", "Clinical Terminology" and "Formulation". A variety of tasks were developed that students could perform with the help of ICT tools and resources:

– *"Parts of Speech"*: one of the tasks in this module was to recognize an organ, number it according to the numbering of the slide and write down its dictionary form in Latin (Fig. 2).
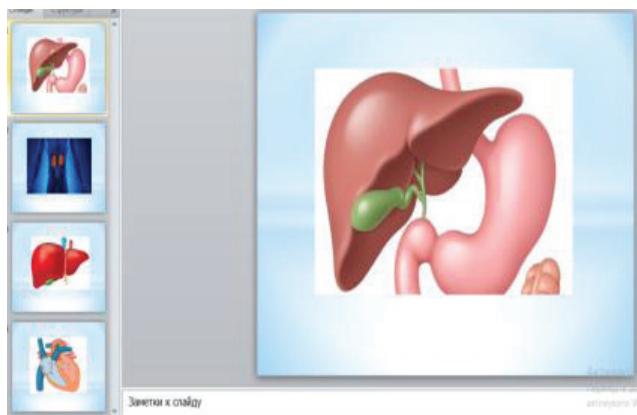

Fig. 2. "Parts of Speech".

– *"Clinical Terminology"*: task – open the site anatom. ua and register; open the Tests tab, find the Graeca/Latina test and take it. The test consists of 88 questions related to Latin and Greek lexical minimums and clinical diagnoses. Pay attention to the examples received after giving the correct answer, they will help you learn vocabulary. At the end of the test you will see the number of correct answers in percent (Fig. 3).
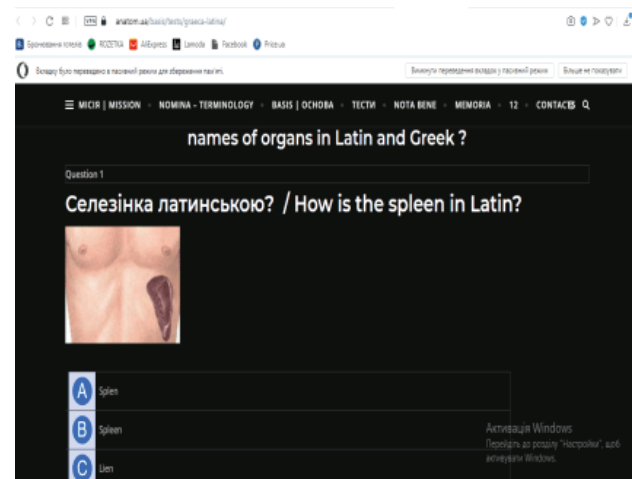

Fig. 3. "Clinical Terminology".

– "Prescriptions": task – in the Google Apps application, look for the Docs tab, where you›ll find the document "Prescription". Your task is to find mistakes, if any correct and write down the prescription in full and abbreviated forms (Fig. 4).

Final testing was performed to check the level of FLCC development in future doctors after taking the Latin language course. The test results are shown in Fig. 5.
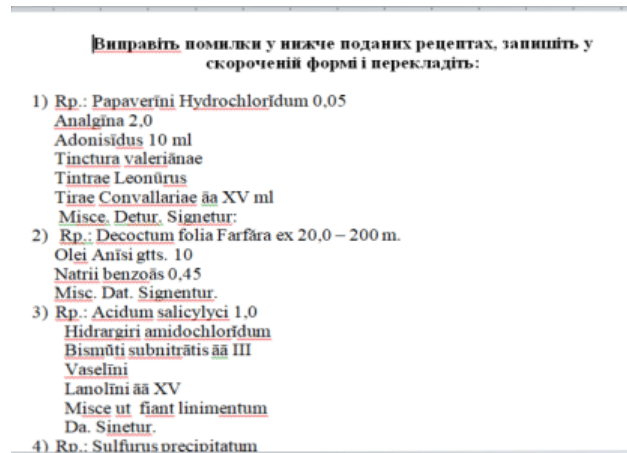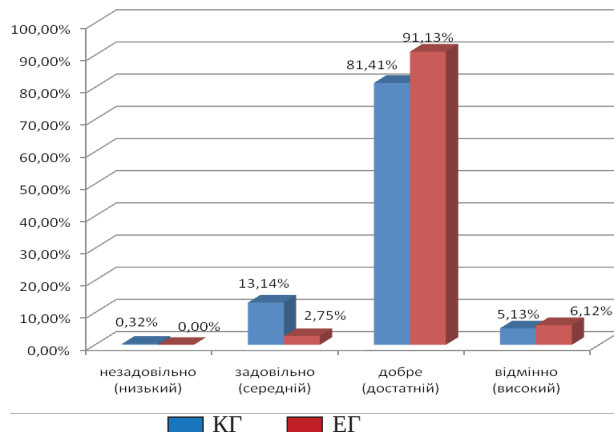

Fig. 4. "Prescriptions".

Fig. 5. Comparison of levels of the ICC development of students in the course "Latin language and Medical Terminology" according to the results of the final control.

It can be seen from the figure that the high level increased from 5.13% in CG and up to 6.12 % in EG; the sufficient level increased from 81.41 % in CG and up to 91.13 % in EG.

EG has a significantly higher sufficient level due to the use of ICT tools and instruments that have been proposed by the teacher for performing the exercises. Students showed better results in performing exercises related to medical and clinical terminology and also better assessment results in the Moodle system. The overall difference between the groups was about 9.72 %. Medium and low levels, on the contrary, decreased from 13.14 % in CG and to 2.75 % in EG. The overall difference between the groups was about 10.39 %. It is worth noting that among the students of EG according to the results of the final

control, everyone passed the test, which indicates the effectiveness of the method.

After analyzing the knowledge levels of students in the course "Latin Language and Medical Terminology" according to the results of final control after the formative stage of the experiment in CG and EG, we can conclude that EG students who used ICT tools and instruments, such as digital literature, dictionaries, various online resources for Latin grammar exercises, tasks of varying difficulty, which are located in Google applications and tests in Moodle, as well as other online resources, showed better results in the final class than those students who studied according to the traditional methodology that indicates an increase in the level of FLCC development.

The main results of the research are reflected in the author's publications [2, 3].

Conclusions and Prospects for Research. The analysis of theoretical approaches to solving the problem of development of foreign language communicative competence in future medical professionals using information and communication technologies revealed that this process is based on international and domestic framework and other regulations of the Council of Europe, European Union, UNESCO, OECD and domestic legislation reflecting competency-based, personality-oriented, activity-based, communicative approaches. It was found that computer technologies have become an integral part of the foreign language learning process, their use has led to the spread of distance and mixed learning in the education system, changing roles of teachers and students, promoting autonomous student learning, widespread introduction of distance learning, use of virtual learning environment, online learning platforms, electronic educational resources and tools.

Analysis of domestic and foreign experience in the use of computer-oriented tools and methods for the development of foreign language communicative competence in future medical professionals revealed that foreign researchers actively use ICTs to solve problems of foreign language communication competence in future medical professionals, in particular for distance and mixed learning. It was found that the most popular are the platforms for distance learning organization, including Moodle, Web 2.0 tools, Microsoft Office 365, Speak Apps, Google Apps and others, online simulators, programs for creating tests, questionnaires and games, as well as cloud services for creating online foreign language learning clubs, etc.

Scientific novelty and theoretical relevance of the research is that *for the first time,* the organizational and pedagogical model of FLCC development in future medical professionals has been substantiated and developed. The model includes four blocks: *target, organizational and semantic, technological, diagnostic and effective*; FLCC *characteristics* have been distinguished and disclosed (gnostic, communicative, emotional) and FLCC *components* of future medical professionals were distinguished: *linguistic* (knowledge of language material for use in the form of speech expressions); *sociolinguistic* (ability to use language units in a certain environment); *discursive* (ability to understand and achieve coherence in the perception and creation of statements in a foreign language, to use them in different discourses); *strategic* (ability to choose a communication strategy); *socio-cultural* (awareness of the socio-cultural context of a foreign language functioning); *social* (ability and willingness to communicate with native speakers); *professional* (knowledge, skills and abilities that provide understanding of professional problems and adequate formulation of conclusions, objectification of special terms, separation of main data, assessment of their significance from the standpoint of professional activity); the criteria were substantiated (cognitive (understanding the essence, content, goals and objectives of academic and research activities, knowledge and skills of listening, reading, writing and speaking in Latin, necessary for the effective implementation of tasks for the FLCC development; knowledge of ICT methods, tools, means and ways to perform tasks), motivational (level of interest and willingness to develop FLCC for learning and improving professional personality traits in future medical professionals (interest in academic and research activities, motivation to succeed (desire to learn Latin, work on their own research using various instruments and ICT tools during practical and individual work for the FLCC development), activity (ability to use knowledge and skills for the FLCC development in the professional activities of future medical professionals (formation of skills; mastering the methods, techniques and experience of independent problem solving (mastering the ICT instruments and tools for the FLCC development and their application in practical classes and during individual work); ability to perform self-monitoring (ability to use testing programs and online applications for knowledge assessment), self-analysis and self-assessment of performance results), and the levels of

FLCC assessment in future medical professionals (low, medium, sufficient, high). The content of the basic concept of FLCC of future medical professionals as a confirmed ability of a person to apply linguistic, socio-cultural, communicative knowledge, abilities, skills and attitudes for foreign language intercultural and interpersonal communication in professional activity of a doctor and in life, to perform professional interaction with speakers of other languages for personal development and lifelong learning was clarified. The theoretical and methodological bases for the creation and use of computer-oriented systems and training tools for the FLCC development in future medical specialists in the system of higher medical education were further developed.

As a result of conducting the research, we identified the following recommendations: structure and content of higher medical education requires change, as well as improving curricula, creating a comprehensive training program for medical students and interns; when preparing study programs, provisions should be made for the use of computer-oriented techniques that allow the FLCC development in a psychologically reliable (immersive) environment; it is advisable to use a virtual learning environment in the process of learning a foreign language. It is necessary to analyze the tools that can be used to create a virtual learning environment and improve computer-based methods of FLCC development in future doctors, to diversify full-time and distance learning, to create virtual participation in conferences involving domestic and European professionals, as well as to promote learning mobility.

List of literature

1. Коваль Т. І. Інтерактивні технології навчання іноземних мов у вищих навчальних закладах / Т. І. Коваль // Інформаційні технології і засоби навчання. – 2011. – Вип. 26, № 6. – Режим доступу : http://www.journal.iitta.gov.ua/index.php/itlt/article/view/546/451.

2. Коцюба Р. Б. Набуття навичок аудіювання за допомогою веб-орієнтованої методики вивчення іноземних мов / Р. Б. Коцюба // Інформаційні технології і засоби навчання. – 2015. – Т. 50, № 6. – С. 120–127.

3. Коцюба Р. Б. Розвиток іншомовної комунікативної компетентності майбутніх спеціалістів лікувальної справи з використанням ІКТ : методичні рекомендації / Р. Б. Коцюба. – Тернопіль : ТДМУ, 2020. – 140 с.

4. Declaration by the European ministers of education on intercultural education in the new European context: Standing Conference of European Ministers of Education "Intercultural education: managing diversity, strengthening democracy". 21st session. Athens, Greece, 10-12 November 2003. – Access mode : https://rm.coe.int/declaration-by-the-european-ministers-of-education-on-intercultural-ed/16807462b5.

5. Definition and Selection of Competencies. Theoretical and Conceptual Foundations (DeSeCo). Background paper. 2001. – Access mode : http://www.oecd.org/education/skills-beyond-school/41529556.pdf.

6. Development of Medical Students' Foreign Language Lexical Competence in the Virtual Learning Environment / N. O. Fedchyshyn, A. V. Vykhrushch, H. V. Bilavych [et al.] // Annals of the University of Craiova. Linguistics and Philology. – 2020. – No. 1–2. – P. 71–79.

7. The Use of Digital Learning Tools in the Teachers' Professional Activities to Ensure Sustainable Development and Democratization of Education in European Countries / O. Ovcharuk, I. Ivaniuk, N. Soroko [et al.] // E3S Web of Conferences. The International Conference on Sustainable Futures: Environmental, Technological, Social and Economic Matters. ICSF. – 2020. – Vol. 166. – Art. 10019. DOI 10.1051/e3sconf/202016610019.

References

1. Koval, T.I. (2011). Interaktivni texnologiji navchannya inozemnyx mov u vyshchyx navchalnyx zakladax [Interactive technologies in teaching foreign languages at higher educational establishments]. Retrieved from: http://www.journal.iitta.gov.ua/index.php/itlt/article/view/546/451 [in Ukrainian].

2. Kotsyuba, R.B. (2015). Nabuttia navychok audijuvannia za dopomogoyu web-orientovanoyi metodyky vyvchennia inozemnyx mov [Listening skills acquisition by using WEB based methodology for foreign languages learning]. I*nformacijni texnologiyi i zasoby navchannia – Information Technologies and Learning Tools*, 50(6), 120-127 [in Ukrainian].

3. Kotsyuba, R.B. (2020). Rozvytok inshomovnoji komunikatyvnoji kompetentnosti majbutnix specialistiv likuvalnoji spravy z vykorystanniam IKT [Development of foreign language communicative competence of future specialists in medical practice using ICT]. Ternopil [in Ukrainian].

4. Declaration by the European ministers of education on intercultural education in the new European context: Standing Conference of European Ministers of Education

"Intercultural education: managing diversity, strengthening democracy". 21st session. Athens, Greece, 10-12 November 2003. Retrieved from: https://rm.coe.int/declaration-by-the-european-ministers-of-education-on-intercultural-ed/16807462b5.

5. Definition and Selection of Competencies. Theoretical and Conceptual Foundations (DeSeCo). Background paper (2001). Retrieved from: http://www.oecd.org/education/skills-beyond-school/41529556.pdf.

6. Fedchyshyn, N.O., Vykhrushch, A.V., Bilavych, H.V., Horpinich, T.I., Yelahina, N.I., & Klishch H.I. (2020). Development of Medical Students' Foreign Language Lexical Competence in the Virtual Learning Environment. *Annals of the University of Craiova. Linguistics and Philology*, 1-2, 71-79.

7. Ovcharuk, O., Ivaniuk, I., Soroko, N., Gritsenchuk, O., & Kravchyna, O. (2020). The Use of Digital Learning Tools in the Teachers' Professional Activities to Ensure Sustainable Development and Democratization of Education in European Countries. E3S Web of Conferences. *The International Conference on Sustainable Futures: Environmental, Technological, Social and Economic Matters. ICSF,* 166, 10019. DOI 10.1051/e3sconf/202016610019.

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