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Formation of the Operational Skills of Using Information and Communication Technologies in the Professional Activity of a Future Pedagogue

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Abstract:
This article highlights the issue of forming future preschool teachers' competence in using information and communication technologies in their professional activity, particularly creating their operational skills. This paper presents the results of diagnosing the peculiarities of developing functional skills to use information and communication technologies in the professional activity of the future preschool education teacher. The article aimed to highlight the process and results of the research on the formation of operational skills in the use of information and communication technologies in the professional activity of future preschool education teachers in higher educational institutions. The analysis was carried out before and after classes on the subject "Information and communication technologies in preschool education." The authors described the levels of developing operational skills of using information and communication technologies in professional activity of the future preschool education teacher as sufficient, intermediate, and low. They also offered and introduced the methods of forming operational skills using information and communication technologies in professional activity of the future preschool education teacher. Implementing these methods facilitated the formation of the operational component of future preschool education teachers' competence in using information and communication technologies in the professional activity. A statistical study based on the multifunctional criterion of agreement $\chi2$ - Pearson proved that the indicators of the formation of future preschool education teachers' functional skills of using information and communication technologies in professional activity before and after classes on "Information and communication technologies in preschool education" differ significantly.
Keywords: future preschool education teacher, information and communication technologies, operational skills; preschool teachers' competence, professional activity, Ukraine context

Introduction.

On the way to European integration as the main direction of the Ukrainian state development, rapid changes in the strategy of bringing Ukraine closer to the standards of the European Union led to a quick transition to the informatization of society. The need for widespread use of information and communication technologies in the socio-economic sphere has set new requirements for the modernization of the modern education system, starting with the preschool level as the first component in the continuing education scheme. Reforming preschool education implies the need to significantly adjust the content and organization of the educational process of preschoolers, to move to new priority goals and objectives for providing the necessary level of academic competencies for children of the first six years of life, including information competence, which ensures readiness to study in the New Ukrainian School; to strengthen innovative processes in preschool education institutions, which will primarily meet the contemporary requirements of a dynamic, technological life of society. However, whatever modernization takes place in a modern preschool institution, it is related to the competence and personality of the teacher, who must have an adequate understanding of the peculiarities of using information and communication technologies in professional activity.

In the context of reforming preschool education, this issue was highlighted in a lot of state legal documents: laws of Ukraine "On Preschool Education," "On Information," "On Copyright and Related Rights," orders "On Approval of Sanitary Regulations for Preschool Education Institutions," "On approval of the Rules for the Use of Software in Educational Institutions," "National Strategy for Educational Development of Ukraine until 2021," standards of preschool education recommended by the Ministry of Education and Science of Ukraine (new version of the Basic component of preschool education, programs "Me in the World," "Child"). Remarkably, the "National Strategy for the Development of Education of Ukraine until 2021" states that "the priority of educational development is the introduction of modern information and communication technologies that improve the educational process, facilitate accessibility and effectiveness of education, preparing the younger generation for life in the information society" (p. 15). This requires the appropriate competence of future preschool teachers using information and communication technologies in professional activity and is one of the most critical tasks of professional training. Since the rapid digitalization of young specialists today is becoming one of the factors motivating changes in the educational system of Ukraine, the Ministry of Education and Science of Ukraine, together with Google, has already implemented three large-scale projects: digital literacy training for teachers, an online course on network etiquette and safety, and a guide to online security. According to Bykov, Vernihora, Hurzhii, Novokhatko, Spirin & Shishkina (2019), "the inconsistency of the structure and functions of the educational and scientific environment with the requirements and needs of building pedagogical systems of higher education is one of the modern challenges of development in this sphere" (p. 2). In the organizational aspect, solving this problem requires creating conditions in the institution of higher education for students to obtain not only basic knowledge of information and communication technologies and methods of their implementation in the educational process of preschool education but also to form professional abilities and operational skills of their practical usage in work with preschool children.

Literature Review

The issues of forming the personality of a preschool teacher and the success of his professional activity have been thoroughly studied in the works of Bielienka, 2015; Bohush, 2011; Kniazheva Kniazheva et al., 2015.

Considerable attention in scientific research is paid to the issue of using information and communication technologies in the educational space, namely: applying these technologies in the context of reforming higher education in accordance with European standards (Vernihora, Hurzhii, Novokhatko, Spirin & Shishkina, 2019; Sikorskyi, 1990; Stepko, 2012 et al.); formation of skills in information and communication technologies in the course of distance learning (Karelina, 2005); use of mobile applications in the classroom (Al Fadda, 2020), use of educational opportunities of the Internet (Breskina, 2002; Hurevich & Kademiia, 2016; Osadchyi, 2005 et al.); designing and using an open cloud-oriented educational and scientific environment of a higher education institution (Bykov, Vernihora, Hurzhii, Novokhatko, Spirin & Shishkina, 2019); factors of development and directions of improving the distance form of education in the system of higher education of Ukraine (Romanovskyi, 2017; Reznik, 2015); training future teachers for the use of audiovisual and computer learning technologies (Trofymov, 2002); construction of information and communications technology (ICT) infrastructure in higher education institutions (Spivakovskyi,2001; Vinnyk, 2016) training future teachers of physical education for the use of information and communication technologies in their professional activity (Henseruk & Martyniuk, 2021); training future primary school teachers for the use of information and communication technologies (Sukhovirskyi, 2003); development of information activity of university students in the process of professional training (Averyanova, 2006); preparing students for the use of computer technologies in professional activity (Oleinykov & Mukasheva, 2015); application of multimedia tools in the training future teachers of information and communication technologies (Babenko, 2003): formation of future teacher's information and professional competence by means of information and communication technologies (Bazaieva, 2005); specifics of the development of future teacher's personality in the conditions of applying information and communication technologies (Batienova, Yemelyanova, Ivanova, Filipova & Chumicheva, 2019); pedagogical conditions for optimizing the information training of students in pedagogical universities (Blinova, 2005); principles of accessibility and communication orientation of students' education in the conditions of applying information and communication technologies (Zaitseva, 2002); formation of future teachers' information and computer competence in the process of professional training (Korobkova, 2006); professional training of university students on the basis of information and computer technologies (Smirnova, 2018); formation and development of students' computer education (Maiboroda, 2002); formation of future teachers' readiness to use computer information and communication technologies in professional activity (Razinkina, 2001).

The top place among these studies is occupied by the works devoted to the use of information and communication technologies in the conditions of preschool education establishments (Horvitz, 1998; Zvoryhina, 1990) the issues of training future teachers of preschool education for the use of information and communication technologies in professional activity were studied by the following scientists, namely: training future educators for the formation of the basics of older preschoolers' computer literacy (Diachenko, 2009); preparation of future educators employing information and communication technologies for teaching children foreign languages (Wittenberg, 2010); training students of a pedagogical institution of higher education for the realization of preschool computerization (Gabdulislamova, 1999); forming readiness of

pedagogical faculty students to use new information and communication technologies in professional activity (Dikanskaya, 2000), etc.

Herewith, the formation of the future preschool teachers' competence in using information and communication technologies requires the introduction of a model of professional training in higher education institutions. Currently, there is no holistic concept of their training to form the necessary knowledge and skills of information and communication technologies, which negatively affects both the organization of the educational process in higher education institutions and the effectiveness of training future specialists in general who can not maximize their potential and information environment of higher education institutions. Given the relevance and feasibility of solving the problem of training preschool teachers, their professional self-determination, the growing popularity of multimedia technologies, the Internet, in particular in addressing educational issues in preschool education, there is a question of revising the concepts of the stable and effective education system, development of future teachers' communication competence, in particular the formation of their operational skills.

Theoretical Background of the Research

In general, the term ICT is often used interchangeably with information technologies (IT); however, ICT is a more general term that emphasizes the role of unified technologies and integration of telecommunications (telephone lines and wireless connections), computers, software, storage and audiovisual systems that allow users to create, access, store, transmit and modify data. In other words, ICT consists of IT, as well as telecommunications, media transmissions, all types of audio and video processing of transmitting, network management, and monitoring functions (Information and communication technologies).

As the analysis of the literature sources (Bykov, Vernihora, Hurzhii, Novokhatko, Spirin & Shishkina, 2019; Sikorskyi, 1990; Stepko, 2012) on the issue of using information and communication technologies in the organization of the educational process in higher education institutions demonstrates the use of these technologies is possible in all organizational forms of learning. As Osadchyi, (2005) notes:

> " At the present stage of introducing information and communication technologies into the educational process, an important component is a computer, the need for which is constantly growing at all levels of education. Analyzing the experience of such application, we are convinced that it can facilitate the study of the material by preschoolers who get acquainted with the environment, numbers, letters, master the ability to draw, move rhythmically, etc. " . (p. 26). In her research, Gabdulislamova (1999) claims that:

> " A modern educator of preschool education should be familiar with the basics of preschool computerization," which, according to the scientist, is the basis for children's psychological readiness for further activity with computer technology at school, as well as must be able to use the computer as a means of education and development of creative abilities of the child. Thus, the educator needs knowledge of preschool pedagogy and psychology, as well as knowledge of modern computer technologies and methods of organizing computer classes " (p. 5).

Training students of pedagogical faculties for the use of new information and communication technologies in professional activity is considered in the study of Dikanskaya (2000), who pays significant attention to the formation of operational skills in the use of information and communication technologies and "their testing in the process of the pedagogical internship; search

and preparation of materials for classes with the use of computer tools, accounting for the success or assimilation of materials, conducting various types of diagnostics using NIT tools" (p. 88).

The priority in Diachenko's (2009) research is the idea of:

" Forming in students a theoretical and practical basis of information skills and abilities to transform information in any field of productive human activity, self-organization and self-improvement in future professional activity due to acquired knowledge. Students must have computer literacy as the basis of information culture, as well as have general technological skills (goal setting and formulation of pedagogical tasks, determining their content, selection of implementation means that ensure the development of new forms and methods of training) " (p. 116).

Karelina (2005), analyzing the effectiveness of the organization of students' educational and cognitive activity, maintains that:

" Skills and abilities in information and communication technologies can be tested by students' achievement of the following learning outcomes: modeling practical implementation of actions that make up the skills; sufficient level of automation of activities that are skills; performing a set of activities that make up the skills; self-analysis of results " (p. 161).

The formation of skills in information and communication technologies is measured and evaluated by the researcher according to the following criteria: the construction of the content component: knowledge of the principles of improving the efficiency of professional activity utilizing information and communication technologies, knowledge of fundamental concepts in information and communication technologies, understanding of universal and specialized software for solving professional tasks; knowledge of applying theoretical material; knowledge of technology development trends; formation of the operational component: construction of an algorithm for solving a professional task using information and communication technologies; sufficient level of automation of skills in working with computer devices and software; performing a set of actions that form the basis of the craft; self-analysis of the results (Karelina, 2005, p. 163).

Researchers in the training of future specialists pay considerable attention to the formation of operational skills and abilities to use computer equipment, interface elements of various programs, Internet resources, and the ability to solve educational and professional tasks with their help.

According to Wittenberg (2010), in training future educators for the use of information, and communication technologies, of great importance, is the training of university teachers. The necessary components of this training can be considered as follows: possession of skills in computer work at the level sufficient for the preparation and design of methodological and other materials; skills of work on the Internet, enough for a search of the necessary information, organization of students' interactive communication; acquaintance with a certain number of electronic educational resources and the ability to create academic tasks based on them; ability to organize students' work off based on the use of information and communication technologies; ability to organically combine teaching methods and techniques based on the use of information and communication technologies with traditional methods and techniques; understanding of the field of software discipline; psychological restructuring of consciousness and the nature of perceiving educational process with the use of information and communication technologies and awareness of their role in this process.

It is worth noting that we understand the future preschool teachers' competence in the use of information and communication technologies in professional activity as the presence of ideas about the purpose, forms, and methods of their application in the educational process of preschool education, interest, and need for information and communication technologies, operational skills and skills that ensure their implementation in working with children, parents, sharing experiences, self-education, etc. Such competence of the future preschool education teacher is a component of their general training, an indicator of professional culture and compliance with state standards of training in higher education institutions. The details of the formation of the future preschool teachers' competence in the use of information and communication technologies in professional activity are currently: cognitive, motivational, and operational with the relevant indicators. In the study, more attention is given to the description of the functional component. Thus, it is necessary to "operational skills." In the psychological and pedagogical literature, the idea of "skills" is understood as "abilities acquired by experience, habit" (Davydova, 1983, p. 385).

Honcharenko considers the concept of "skills" as actions whose components in the formation process become automatic. With skills, human activity becomes faster and more productive. According to the types of activities, there are corresponding skills: motor, mental, speech, intellectual, sensory, perceptual, etc. Skills are needed in all tkinds of activities: training, games, work, etc. They are formed based on applying knowledge about the appropriate course of action through targeted systematic corrections. Skills are necessary components of abilities (Honcharenko, 1997).

Malafiik (2009) claims that skill is a readiness for conscious and precise actions; skills are an automated link to this activity. Thus, skills are mechanical abilities; they act without the participation of consciousness but under its control. The process of skill formation occurs in several stages, the last of which becomes a dynamic stereotype.

Thus, we interpret the concept of "operational skills of using ICT" as mechanic skills that help future preschool teachers to use ICT in their professional activities.

Thus, the operational component is characterized by the formation of future preschool education teachers' skills and abilities that ensure the introduction of information and communication technologies in the educational process of preschool education establishment. We determined its indicators as follows: skills and abilities to work on a personal computer, to apply information and communication technologies in solving cognitive and practical tasks in educational and future professional activity; ability and skills to use modern information and communication technologies for the purpose to organize academic, mental and search activity of preschoolers carrying out work with parents, providing the exchange of experience; ability to create didactic material for working with children and adults employing information and communication technologies.

Method

To solve the tasks of the study, we used the following methods: theoretical – for the research and analysis of psychological and pedagogical, methodological literature, educational programs, manuals, and generalization of information to determine the theoretical and methodological foundations of the study; empirical – used during the experimental study; statistical – to test the effectiveness of the proposed program for the formation of operational skills of using information and communication technologies in the professional activity of future preschool education teachers.

Diagnosing the peculiarities of forming the operational skills of using ICT in the professional activity of future preschool education teachers was conducted based on the Faculty of Preschool Pedagogy and Psychology of the State Institution "South Ukrainian National Pedagogical University named after K. D. Ushynsky." The diagnosis, which occured during 2018-2019, covered 77 first-year bachelor students majoring in specialty 012 "Preschool Education." The diagnosing took place before and after classes on the discipline "Information and communication technologies in preschool education."

To study the formation of the operational component, students were asked to answer questions on the questionnaire to identify the level of students' self-esteem regarding computer skills (Wittenberg, 2010). When answering the questions, the students had to choose one correct option: Can you work on a personal computer? (Yes, I work at the level of an administrator; I work at the level of an experienced user; I can, but from time to time, I need help; I'm just starting to get acquainted with the computer; I can't at all); Do you know how to work on the Internet (Yes, I have excellent skills of navigation, surfing, information retrieval, working with browsers and downloading managers, I can create a mailbox, I can work in ICQ, chat, teleconferencing; I can work with e-mail, I have skills of information retrieval; I'm just starting to get acquainted with the Internet; never worked on the Internet); Do students need to be taught computer literacy? (This is very necessary for any specialist, as it facilitates the work and opens access to sources of information; it is needed only by specialists whose activities are related to the computer; I do not know); Are you able to work on the computer? (Yes, I have my computer at home; my friends have a computer, I can work when I need to; I can work at a university; I don't have that opportunity); Do you work at a computer: (daily; 2-3 times a week; once a week; once a month; very rarely; do not work); Do you consider your computer literacy sufficient? (Yes / No); Do you think it is necessary to increase your level of computer literacy? (I want to improve it; I don't need it; I don't know if I need it).

When diagnosing the formation of operational component in students, they performed the following tasks on the computer: turn on the personal computer on the desktop, create a folder, rename it in Latin, create additional folders (avtorski_prava, Internet_resursy_vykhovatelyu, dydaktychni_materialy, prezentatsiya_uchnivska, publikatsiya_uchnivska, video_rolyk_uchnivsky; open the Microsoft Word, create a document, draw up a synopsis of educational and cognitive lessons for preschool children, type the text in Times New Roman font, size - 14, spacing - 1.5, set the page parameters top, bottom 2 cm, left - 3 cm ., right - 1.5 cm., insert drawings, figures, number the pages at the top of the page on the right side, save the document in the folder dydaktychni_materialy; run Microsoft Office PowerPoint, create five slides of different formats, name the presentation, choose a template (design), type a text, insert a picture into the presentation, attach a text hyperlink, attach audio, video, insert the animation, image to the text, change slides, start slide show, save the presentation in the folder prezentatsiya_uchnivska; launch Microsoft Office Publisher, select the type of publication "newsletter", choose a classic layout, give a name, insert a picture, type the text in Times New Roman font, size - 12, space - 1, start viewing the page, save the publication in the folder publikatsiya_uchnivska; run Windows Movie Maker, import pictures, music, videos, design slideshows, add captions, create various transitions and save in the video_rolyk_uchnivskyy folder; launch KMPlayer, adjust the sound, watch videos on the wide screen; launch the Opera browser, create an e-mail in the Google search engine, send an email; find sites for preschool teachers, save articles, pictures, music, video files in the folder Internet_resursy_vykhovatelyu,

make links to Internet resources in accordance with the requirements for copyright protection, save the document in the folder autorski_prava); open Skype, create an account, make a video call, make an audio call, chat, create a group; develop an educational and cognitive presentation for preschool children on a certain topic; during pedagogical practice organize and conduct classes, organize search activity and leisure with preschoolers using computer support; develop a web-site of a preschool institution; prepare an e-mail for a pedagogical meeting, model and solve a problem situation in accordance with the chosen topic; carry out electronic correspondence with educators, teachers of preschool education on the outlined problems; take part in electronic counseling of parents of preschool children on the problems of development, education, upbringing, develop an information booklet for parents. The main task is to perform practical tasks to identify the formation of skills in working with computer software. Based on the content of indicators, three levels of operational skills of using ICT in the professional activity of the future preschool teacher are distinguished: sufficient, intermediate, and low, which made it possible to trace the dynamics of the studied operational component for each indicator.

A sufficient level was found in students who demonstrated the skills and abilities to work on a personal computer, to use information and communication technologies in solving cognitive and practical tasks in educational and future professional activities, knowledge and skills to apply modern information and communication technologies to organize the educational, mental and exploratory activity of preschoolers, to carry out work with parents, to exchange experience; ability to create didactic material for working with children and adults using information and communication technologies.

An intermediate level was found in students who demonstrated skills and abilities to work on a personal computer; still difficulties arose with the use of information and communication technologies in solving mental and practical problems in academic and future professional activity. They showed skills in using modern information and communication technologies to organize educational, mental, and exploratory training of preschool children, to work with parents, to exchange experiences, but needed help in developing didactic material for working with children and adults using information and communication technologies.

Low levels were found in students who demonstrated skills and abilities to work on a personal computer; still, they needed algorithmic, step-by-step assistance in the use of information and communication technology to organize educational, cognitive, and exploratory activities of preschool children, to work with parents, and to exchange experiences; in the development of didactic material for work with children and adults when solving cognitive and practical problems in educational and future professional activity.

Results
The diagnosis of how well the operational skills of using ICT in the professional activity of the future preschool education teacher are formed was carried out before and after classes on the subject "Information and communication technologies in preschool education." The results of checking the formation of future preschool education teachers' operational skills of using information and communication technologies in professional activity before classes on the subject "Information and communication technologies in preschool education" showed a sufficient level in 22.08% of students, an average level in 36.36% of students, a low level – in 41.56% of students.

The formation of operational skills of using ICT in the professional activity of future preschool education teachers has been carried out within the discipline "Information and

communication technologies in preschool education." The course description is as follows: the number of credits - 4, the total number of hours - 120 (including lectures - 14 hours, practical - 24 hours, laboratory - 26 hours, independent/individual work - 36/20 hours), weekly hours for full-time study are classroom - 4 hours, independent students' work - 4 hours, type of control - exam.

The purpose of the discipline is to train future preschool educators using information and communication technologies in their professional activities. The objectives of the field are the formation of ideas about the nature and peculiarities of using information and communication technologies in the educational process of preschool education establishment as a means of organizing play and educational activities of children; mastering the practical skills of using information and communication technologies in the methodological support and pedagogical support of the educational process of preschool education establishment.

As a result of mastering the discipline by students, the following competencies determined by the educational and professional program of the first (bachelor's) level of higher education in the specialty 012 "Preschool education," the field of knowledge 01 Education / Pedagogy, approved by the Ministry of Education and Science of Ukraine should be formed:

Basic competencies (BC):

BC-1. The ability to productive (abstract, figurative, discursive, creative) thinking.

BC-2. Ability to independently search, process, and analyze information from various sources.

BC-3. Ability to identify, formulate and solve problems.

BC-5. Ability to plan and predict the consequences of one's actions.

BC-6. Ability to cooperate and interact in a team.

BC-7. The ability to self-criticism and perception of constructive criticism.

BC-8. Ability to freely communicate and cooperate in the state language (orally and in writing).

BC-9. Ability to freely use the means of modern information and communication technologies.

BC-10. Ability to ensure the safety of one's own and other participants' activity in the educational process.

BC-13. Ability to design activities.

BC-15. Ability to transform theoretical knowledge into practical action

Professional competencies (PC)

PC-2. Ability to develop curiosity, and cognitive activity, cognitive actions in normal children and children with special needs of early, and preschool age

PC-4. Ability to form in children of early and preschool age primary ideas about the subject, natural, social environment, properties and relations of objects; development of self-awareness (self of a child and his place in the environment).

PC-10. Ability to develop in children of early and preschool age skills of safe behavior and activity in everyday life, nature, and the environment.

PC-15. Ability to develop children of early and preschool age physically, to correct and strengthen their health using physical exercises and motor activity (children in norm and with special needs)

PC-16. Ability to organize and lead play (leading), artistic-speech, and artistic-productive (visual, musical, theatrical) activities of children of early and preschool age (in norm and with special needs).

Discipline status. The discipline is a mandatory component of the educational and professional program of training students for a bachelor's degree in specialty 012 "Preschool education." The discipline's content provides special training for future educators in line with modern requirements for the professional profile of educators of early and preschool-age children.

Prerequisites for studying the discipline: the content of the domain is based on knowledge and skills that students have acquired in the study of fields: "Introduction to the specialty and basics of general pedagogy," "General and child psychology," "Preschool pedagogy," "Life Safety," "Fundamentals of medical knowledge," "Pedagogical creativity," professional methods.

Planned results of mastering the educational and professional program of the first (bachelor's) level of higher education in the specialty 012 "Preschool education" (PRS – Program Results of the Study), the field of knowledge 01 Education / Pedagogy, approved by the Ministry of Education and Science of Ukraine, are:

• PRS-1 (student) identifies and determines phenomena and processes in the development, education, and upbringing of children of early and preschool age by pedagogical and psychological categories and concepts; establishes links between them. Explains (describes/interprets) and presents information about the phenomena of education and upbringing of children of early and preschool age in the relevant psychological and pedagogical categories. Independently chooses the method of organizing and demonstrating information about phenomena in education and upbringing of children of early and preschool age.

• PRS-2 Finds sources of information in the field of preschool education and processes them. Uses the information obtained to organize the development, education, and upbringing of children of early and preschool age and to organize the areas for improvement. Explains and argues certain transformations in development, education, and upbringing of children of early and preschool age and the directions of their progress.

• PRS-3 Identifies and discusses the issues of development and education of children of early and preschool age. Determines the purpose and method of solving the problem of development, education of children of early and preschool age, and ways and means of their solution. Explains, discusses the essence of the development issue, teaches children of early and preschool age, and organizes its solution.

• PRS-5 Understands the purpose of pedagogical forecasting and action plan in the organization of work with children. Has an algorithm for forecasting and planning actions in working with children; can select and process material for forecasting. Explains and presents results on drawing up pedagogical forecasts and action plans, convinces of their practicality and realism.

• PRS-7 Substantiates the requirements for the development, education, and upbringing of children of early and preschool age and their results. Analyzes the effects of development, education, and upbringing of children of early and preschool age from the standpoint of their compliance with current requirements. Compares and evaluates the submission of the results of development, education, and upbringing of children of early and preschool age to the current conditions.

• PRS-8 Is fluent in the state language in communication and solving problems of professional activity in teaching and educating children of early and preschool age.

• PRS-9 Understands the essence and methods of using modern information and communication technologies in the development, teaching, and upbringing of children of early and preschool age. Uses current information and communication technologies in education and upbringing of children of early and preschool age. Interacts with participants in the educational process in the field of preschool education using modern information and communication technologies. Independently selects and responsibly uses current information and communication technologies in the development, education, and upbringing of children of early and preschool age.

- PRS-10 Explains and demonstrates the basics of safe activity to participants of the educational process in the system of preschool education. Initiates the safety of activities in the interaction of participants in the educational process of the system of preschool education.

- PRS-13 Knows the ways of developing educational projects and their implementation in the practice of working with children of early and preschool age. Explains and presents the developed projects to the participants of the educational process and involves them in their implementation.

- PRS-15 Reproduces theoretical knowledge in organizing educational and upbringing work with children of early and preschool age in the system of preschool education.

- PRS-25 Understands the nature and psychological patterns of formation of early and preschool children's skills of safe behavior and activity in everyday life; understands the appropriate concepts to denote them. Knows teaching methods, pedagogical support, and support in forming the skills of safe behavior and activity in life in children of early and preschool age; detects and evaluates their effectiveness. Explains to the participants of the educational process the sequence of selected actions for the formation of early and preschool children's skills of safe behavior and activities in everyday life; convinces of their practicality and efficiency. Organizes situations that encourage children of early and preschool age to safe behavior and training at home.

- PRS-30 Practices and implements various methods of correction, pedagogical support, and maintenance of the health of early and preschool-age children using physical exercises and motor activity.

As a result of studying the discipline, the student must:

Know forms and methods of organizing play and educational activity of preschoolers using information and communication technologies; principles of building classes with computer support; criteria for evaluating the effectiveness of developed electronic games and educational materials for children; opportunities and methods of applying information and communication technologies in the process of organizing play and educational activity of preschoolers; medical, hygienic and psychological requirements for the safe use of computer equipment in working with preschoolers; ways to use information and communication technologies in facilitating the professional activity of educators (organization of the pedagogical process and its planning, preparing the child for school, working with parents, improving professional skills, using the Internet to search for educational and methodological information).

Be able to apply modern information and communication technologies to organize play and scholarly activity of children and educational training in preschool education establishment; use computer software (Microsoft Office (Word, PowerPoint, Publisher), Windows Movie Maker, Skype, KMPlayer, Opera or Internet Explorer, Google services) in educator's professional activity; create didactic electronic material for work with preschoolers employing information and communication technologies; apply information and communication technologies in solving pedagogical and methodological tasks in the professional activity of an educator.

Communication: be able to interact with participants of the educational process in the field of preschool education using information and communication technologies.

Autonomy and responsibility: responsibly use information and communication technologies in the development, education, and upbringing of children of early and preschool age; to organize situations that encourage preschool children to safe behavior using information and communication technologies.

Based on Ushynsky University, an information environment was created; it "included organizational and methodological tools, a set of technical and software means of storage, processing, the transmission of information, providing rapid access to information and providing educational scientific communications" (Kislova, Semerikov & Slovak, 2014, p. 5). The methods of forming operational skills of using information and communication technologies in professional activity of future preschool education teachers were introduced into work with students. The primary forms of organizing students' educational activity with the use of information and communication technologies were: lectures organized with computer support; practicals, seminar, and laboratory classes (for example, "Information and communication technologies in the living space of a modern preschool child," "Requirements for the safe use of information and communication technologies in preschool education," "Use of information and communication technologies in teaching and development of preschool children age: domestic and foreign experience," "Peculiarities of using information and communication technologies in the creation of electronic learning materials for preschoolers," "Interaction of preschool and family with information and communication technologies," etc.), which were based on the use of special software of Microsoft Office (Word, PowerPoint, Publisher), Windows Movie Maker, Skype, KMPlayer, Opera or Internet Explorer, Google services); colloquia and module-certification practical classes based on testing the skills and abilities to use computer equipment.

Based on the research of Spirin, Yatsyshyn, Ivanova, Kilchenko & Luparenko (2016), students were offered to use electronic open-access systems for information and analytical support in creating projects, in particular: scientific electronic libraries and their information-analytical services, available journal systems, Google Scholar and Google Analytics services, anti-plagiarism systems, open-access systems for webinars and conferences.

We should note that organizational forms of students' learning mainly require computer equipment, appropriate software, and additional hardware (video projector, interactive whiteboard, electronic pointer), the opportunity to be connected to the World Wide Web or the local network of the faculty, and the university. The following teaching methods and technologies were used in working with students, namely: discussion "Basic problems of computerization of the educational process of preschool education," debate "Possibilities of using information and communication technologies in children's lives: advantages and disadvantages," brainstorming "Informatization and computerization of preschool education in Ukraine," project method, method "Pirates' Meeting," method "Dialogue of Don Quixote and Sancho Panza," method "Monologue of the Inventor," "Collective Notebook" by J. W. Hayfil, technology "Mind Map" (for example, "Computer as a tool for educators," "Computer literacy of preschoolers," "Computer Game Complex (KGC) in Preschool Education," "Internet in the Work of an Educator," "Use of ICT in Self-Educational Activities of an Educator," etc.), Google cloud services (for example, creating calendars on "Pedagogical meeting in pre-school education establishments," "Internet conference;" in the Google service on the use of ICT in working with children; in Google Books creating a shelf "Computer literacy of preschoolers," etc.), training exercises on the computer. Independent and educational research activities of students (individual, classroom, and extracurricular) were organized. Students performed an individual educational and research task, "Information and communication technologies in the professional activity of educators" (project), which consisted of:

1. Creation by students of a portfolio, a complex of presentations, and didactic materials for preschoolers based on the current programs on preschool education and requirements of the Basic component of preschool education on educational lines:

- According to the educational line "Personality of the child": "The main parts of the body (head, neck, torso, limbs, etc.), their functions and actions," "Body organs (heart, liver, lungs), blood and skin, conditions of their normal functioning," "Sense organs (eye - sight, ear - hearing, nose - smell, tongue - taste, skin - touch and temperature),","Stages of life (childhood, adolescence, maturity, old age)," "Useful, useless and harmful "Food," "Rules of culture at the table," "Rules of care for body parts and organs," "Basic hygienic procedures," "Influence of basic natural factors (sun, air, water, soil) on the health of the body,","Value of health, its importance for a happy life," "The main factors of health," "Rules of healthy behavior," "Rules of safe staying at home and in preschool establishments," "Rules of safe staying in the street," "Rules of traffic," "Rules of using transport," "Basic road signs," "Rules of safe staying on water and ice," "Rules of safe staying on playgrounds and sports grounds,"etc .;

- According to the educational line "Child in society": "Why does a person need a family?", "The concept of family," "Family traditions," "Generation," "Family and family traditions," "Parents are the dearest people," "Respectful attitude to grandparents, "How to act so as not to upset loved ones?", "What is sensitivity and attention to loved ones?", "Compilation of family history, family tree," "How to show care and love for family and close family members? " "Politeness towards adults," "What does it mean to treat the elderly seriously," "Friendship should be valued, and a friend should be cherished," "Clothes don't make the man, but good deeds do," "Elementary rules of self-preservation," "Rules of conduct in the game and a conflict situation," etc .;

- According to the educational line "Child in the natural environment": "Space travel," "What is the universe?", "Our planet Earth!", "The sun is a source of light and heat," "Solar system," "Moon as a satellite of Earth," "Man as a part of the great world of nature," "Water cycle in nature," "Water states (liquid, solid, gases - steam)," "Minerals (coal, gas, oil, etc.)," "Changes in nature happening each season (weather, plants, animal behavior)," "What is a thunderstorm? Safe behavior during a thunderstorm," "Skills of correct handling of fire," "Where does the rainbow come from?", "Importance of snow cover for plants and animals," "Nature of the native land," "Who was met in the forest?", "Medical herbs," "Skills of proper fire handling," "Edible and poisonous mushrooms and berries," "Animals of our region," "Excursion to the zoo," etc .;

- According to the educational line "Child in the world of culture": "Our home is Ukraine!", "Kyiv is the capital of Ukraine," "My hometown," "Comfort and order in the house depend on its inhabitants," "Tools and goods used in the household," "Types of transport," "Traffic rules," "Sounds as our helpers," "Where does the book come from?" "Ukrainian artistic traditions and folklore," "Ukrainian arts and crafts (Petrykivska, Vasylkivska, Kyivska, Opishnianska, Kosivska, Uzhhorodska)," "Ukrainian song genres (lullabies, carols, Christmas carols, calls)," "Ukrainian folk dances (hopak, hutsulka, polka, kolomyika, round dance)," "Musical genres (song, march), dance)," etc .;

- According to the educational line "Child's play": "Etiquette of communication in the game," "Ukrainian folk games (animals, birds, dolls, utensils, Easter eggs, wooden story toys, fistulas, etc.)," "Places of making Ukrainian folk toys (Opyshnia, Kosiv, Yavoriv, etc.)," "Let's play!" etc.;

• According to the educational line "Child in the sensory and cognitive space": "Colours and their shades," "Why should we be able to count?", "Temporal concepts (at dawn, dusk, noon, midnight, day, week, month, year)," "The order of numbers within 10 (20)," "Elementary mathematical problems," "Geometric figures - plane (triangle, square, rectangle, polygon, circle, oval)," "Geometric figures - three-dimensional (cube, sphere, cylinder)," "Methods of arranging objects," "Units of length (centimeter, meter)," "Units of volume (liter)," "Units of mass (grams, kilograms)," "Units of time (hour, minute, second)," "Placement of objects, objects in space (closer, further, left, right, inside, from, above, over, below, first, last, etc.)," "Children's economics," etc.;

• According to the educational line "Speech of the child": "Syllable and sound analysis of words," "Hard, soft, vowels, consonants, sounds," "Words denoting basic moral concepts," "Children's speech etiquette (greetings, requests, apology, gratitude, compliment)," "Forms of addressing adults and peers," etc.

2. "Internet resources for educator" – the selection and creation of pictures, sounds, music, books, articles, computer games, and e-mail files to help the educator (on the selected topic).

3. "Educator's documentation" – preparation of examples of educator's documentation (educator's journal, group list, group menu, child's portfolio, thematic planning, consultations for parents, summaries of holidays and entertainment, etc.).

4. Exchange of experience: development of a video for a speech at a pedagogical meeting or parent meeting, development of a website of a preschool institution, design of an information bulletin and booklet for parents, creation of e-mail, e-mail correspondence with parents, preschool teachers, group creation and communication in Skype.

Criteria for evaluating an individual research task in the discipline "Information and communication technologies in preschool education":

–   Twenty-five points – students show an apparent deepening and understanding of the topic; the project attracts the audience's attention. The project has clear goals relevant to the research topic; emphasizing essential issues. The included information is obtained from various information sources. Completion of all project tasks: development of a presentation on the educational line (Microsoft PowerPoint, Microsoft Word), a newsletter, a leaflet for parents and children, a website of preschool education establishment (Microsoft Publisher program), video for a speech at a pedagogical meeting or parent meeting (software Windows Movie Maker), watching videos (KMPlayer), Internet resources for an educator (Opera or Internet Explorer browsers, Google services), preparation of examples of professional documentation of the teacher (Microsoft Word, Microsoft Publisher), communication in Skype. Students effectively and creatively use the power of those multimedia effects that are acceptable for this type of work; all the elements are used. Students thoroughly defended the project and answered all the questions from experts. The project can be helpful not only for the students who created it.

–   Twenty points – the project has clear goals corresponding to the theme. The information is obtained from various sources. The project tasks are not fully solved. When using the project, there is a sufficient number of multimedia effects in a balanced, attractive, and accessible form. The created elements of the project show the originality of the work. With a few exceptions, most effects contribute to a proper disclosure of the project theme. There may be several technical, not very serious, problems when running electronic materials. Students defended the project and answered all the questions from experts. The project is beneficial not only for the students who created it.

   –   Fifteen points – information is presented in a structured way, clear to the audience. However, not all project tasks are fully solved; 1-2 jobs are missing. Specific technical issues make it challenging to review the project, but the review is still possible. When defending the project, students could not always give a complete, straightforward answer to the questions from experts.

   –   Ten points – the project focuses on the topic but does not fully highlight it. There is a specific organizational structure in the project, but it is not traced during the review. Not all the project tasks are entirely solved; 3-4 assignments are missing. Technical problems do not allow to demonstrate media effects, hear or understand the content effectively. There are factual errors or ambiguities in the information part of the project, but they are insignificant. While defending the project, students could not provide complete, clear answers to most of the experts' questions.

   –   Five points – the project focuses on the topic but does not highlight it. There is no organizational structure for the project. Either all project assignments are not solved, or most tasks are missing. There are significant errors or ambiguities in the content of the project. During the project's development, there were technical problems that did not allow us to demonstrate, hear or understand the content effectively. When defending the project, students could not give complete, clear answers to most of the experts' questions or could not answer the questions at all.

   –   Zero points – the project has not been completed.

Thus, students' performance of an individual educational and research task in the discipline "Information and Communication Technologies in Preschool Education" provided an opportunity to: develop operational skills and abilities while working with software (Microsoft Office (Word, PowerPoint, Publisher), Windows Movie Maker, Skype, KMPlayer, Opera or Internet Explorer), skills in developing e-learning materials for children, the ability to organize work with parents and colleagues using media technology, as well as to obtain and analyze information, hypothesize, create a project and simulate artificial situations according to the topic, to develop skills of social interaction (organizational, communicative), to express own point of view, to influence the result in the decision of a research problem, to take part in communication in chats and on forums.

The obtained results of re-diagnosis of the formation of future preschool education teachers' operational skills of using information and communication technologies in professional activity at a sufficient level demonstrated 38.47% of students, an average level was found in 45.26% of students, a low level showed 16.27% of students.

To determine the reliability of the difference between the levels of re-diagnosis of future preschool teachers' operational skills of using information and communication technologies in professional activity before and after classes on "Information and communication technologies in preschool education," we used a multifunctional agreement criterion χ2 - Pearson. Hypothesis (H0) was chosen for the idea that the indicators of the formation of future preschool education teachers' operational skills of using information and communication technologies in professional activity before and after classes on the subject "Information and communication technologies in preschool education" do not differ significantly. In the case of the unconfirmed null hypothesis (H0), an alternative hypothesis (H1) was used – indicators of the formation of future preschool education teachers' operational skills of using information and communication technologies in professional activity before and after classes on "Information and communication technologies in preschool education" significantly differ. The calculation of the empirical values of the multifunctional agreement criterion χ2 Pearson is demonstrated in table 1.

Table 1. *Calculation of the criterion χ2 when comparing the distributions of the formation of operational skills in future preschool teachers before and after classes*

№	Empirical frequency	Theoretical frequency	$(f_E - f_T)$	$(f_E - f_T)^2$	$(f_E - f_T)^2/f_T$
1	22,08	30,28	-8,2	67,24	2,221
2	38,47	30,28	8,19	67,08	2,215
3	36.36	40,81	-4,45	19,8	0,485
4	45,26	40,81	4,45	19,8	0,485
5	41,56	28,91	12,64	159,77	5,525
6	16,27	28,91	-12,65	160,02	5,533
Total	200	200	-	-	16,464

From table 1, the empirical value of the criterion χ2Emp = 16,464. Critical values of χ2 are at v = 2. Critical values for the multifunctional criterion of agreement χ2 - Pearson for the found number of degrees of freedom are 5.991 (ρ≤0.05) 9.21 (ρ≤0.01). The obtained value is more than a critical one, which means that (H0) the null hypothesis was rejected and the (H1) alternative view was accepted. Indicators of the formation of future preschool education teachers' operational skills of using information and communication technologies in professional activity before and after classes on the subject "Information and communication technologies in preschool education» differ significantly.

Conclusions

The results of the study on the formation of operational skills in the use of ICT in the professional activity of future preschool education teachers became the basis for the formulation of the following conclusions:

1. In general, the competence of future preschool education teachers in using information and communication technologies in professional education means that they have ideas about the purpose, forms, and methods of their application in the educational process of preschool education, interest and needs of information and communication technologies, operational skills, ensuring their introduction into work with children, parents, exchange of experience, self-education, etc. This competence of the future preschool teacher is a component of his general training, an indicator of professional culture and compliance with state standards of training in higher education institutions. The members of forming the competence of future preschool education teachers in using information and communication technologies in professional education are: cognitive, motivational, and operational with the relevant indicators.

2. The article presents the results of the research on forming operational skills by using information and communication technologies in the professional activity of future preschool education teachers in the conditions of higher education.

3. The operational component is determined by the formation in preschool education teachers of skills and abilities that ensure the implementation of information and communication technologies in the educational process of preschool education establishments. Selected indicators of the operational component are the ability and skills to work on a personal computer, to apply information and communication technologies in solving cognitive and practical problems in educational and future professional activity, knowledge and skills to use modern information and communication technologies to organize educational and mental, search activity of children of

preschool age, carry out work with parents, exchanging experience; ability to create didactic material for working with children and adults using information and communication technologies. 4. The authors introduce the method of forming operational skills by using information and communication technologies in the professional activity of the future preschool education teacher. The primary forms of organizing students' educational activities with the use of information and communication technologies were chosen: lectures organized with computer support; practical, seminar, and laboratory classes, which were based on the use of special software (Microsoft Office (Word, PowerPoint, Publisher), Windows Movie Maker, Skype, KMPlayer, Opera or Internet Explorer, Google services); colloquia and module-certification practical classes based on testing the skills and abilities to use computer technology. The following teaching methods and technologies were used in working with students: discussion, debate, brainstorming, project method, "Pirates Meeting" method, "Dialogue of Don Quixote and Sancho Panza" method, "Inventor's Monologue" method, "Collective Notebook" method by J. W. Hayfield, "mind map" technology, computer training exercises. Self-guided and research activities of students (individual, classroom, and extracurricular) were organized.

5. According to the results of experimental research, it is proved that the implementation of such a technique has provided an increase in the formation of the operational component of the competence of future preschool teachers in using information and communication technologies in professional activity. Thus, the number of students who have reached a sufficient level of formation of the operational component in using information and communication technologies in professional training after the introduction of the method increased by 16.39%, with average - of 8.9%. At a low level, their number decreased by 25.29%. A statistical study based on the $\chi2$ - Pearson multifunctional criterion of agreement proved that the indicators of the formation of operational skills in future preschool education teachers in using information and communication technologies in professional activity before and after classes on "Information and communication technologies in preschool education" differ significantly.

6. The prospect for further research is seen in the theoretical justification of the method of forming competence in future preschool education teachers in using information and communication technologies in various activities of preschoolers in preschool institutions, development of didactic and technological bases of information and pedagogical, didactic support of this process.

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