

Preparation of Future Teachers for Use of ICT in Primary School

Marija LAVRENOVA¹, Natalia LALAK², Tetiana MOLNAR³

¹PhD (Candidate of Pedagogical Sciences), associate professor, at the Department of Theory and Methodology of Primary Education, Mukachevo State University, Mukachevo, Ukraine, marijalavrenova@ukr.net

²PhD (Candidate of Pedagogical Sciences), associate professor, at the Department of Theory and Methodology of Primary Education, Mukachevo State University, Mukachevo, Ukraine

³PhD (Candidate of Pedagogical Sciences), associate professor, at the Department of Theory and Methodology of Primary Education, Mukachevo State University, Mukachevo, Ukraine

Abstract: The article addresses the problem of preparing future teachers for the use of ICT in primary school lessons. The authors characterize the functionality of information and communication technologies, focus on modern computer aids that can be used in the education and upbringing of younger students and highlight some aspects of preparing future teachers to use ICT in primary school education. It is established that ICT in primary school lessons is today a powerful didactic tool that involves children in active work, develops their cognitive interest, promotes better learning and enhances learning effectiveness. Learning needs to be polysensory and varied in order to meet students' information needs. In this context, information training of future elementary school teachers, which activates their cognitive and creative potential, generates the knowledge and skills needed for future professional activity, is of great importance. In fact, it is about improving the effectiveness of teacher education through the introduction of information and communication technologies, since they change the way scientific information is presented, provide individualization of learning, creating new forms of interaction between teacher and student in the process of solving various cognitive problems. Accordingly, the potential of educational disciplines and pedagogical practices at the Mukachevo State University is aimed at training competitive specialists ready to quickly process a large amount of educational information and original solutions to professional tasks by mastering modern ICT tools.

Keywords: *information and communication technologies; educational environment; junior high school students; elementary school teacher; vocational training.*

How to cite: Lavrenova, M., Lalak, N., & Molnar, T. (2020). Preparation of Future Teachers for Use of ICT in Primary School. *Revista Romaneasca pentru Educatie Multidimensionala*, 12(1Sup1), 185-195.

<https://doi.org/10.18662/rrem/12.1sup1/230>

1 Introduction

Problem formulation. The rapid development of computer facilities in the modern world necessitates corresponding changes in the educational system, modernization of the basic approaches to the implementation of information and communication technologies in the practice of the new Ukrainian school. The use of ICT increases the efficiency of the educational process, is an important component of the formation of key and subject competencies of students, their full self-realization, activity, development of creative abilities.

It is this factor that determines the need to improve the process of training future teachers, in particular elementary school teachers on the basis of innovative approaches, which involve the use of information and communication technologies in various types of educational work with children of primary school age.

Scientists O. Spivakovsky, L. Petukhova, V. Kotkova state that a modern teacher should know the tendencies of informatization of education (in particular elementary), psychological and pedagogical conditions of using ICT in work with children; be able to use new information educational technologies, apply the pedagogical possibilities of ICT in their professional activity; to contribute to the formation of the bases of informational competences and information ethics in pupils, to form an adequate understanding of the role of computer technologies in their lives (this is not a toy, but a means of obtaining useful information, general development and creative activity) (Spivakovsky, 2011, p.32).

2. Analysis of recent studies and publications

The use of ICT in primary school education and their impact on the development of younger students has been the topic of much foreign research. Thus, at the beginning of the 21st century, scientists from different countries of the world substantiated the effectiveness of the use of ICT, in particular for the education of elementary school students (Hal, Higgins, 2005; Lee, 2010; Maher et al. 2012).

Results from a UK study show that ICTs make use of more e-learning resources for learning, the visual aspects of which (colors, movement), audio (music, voice recording, sound effects) and the ability to tap the screen help boost learning motivation. students, focusing their attention on the study of the subject, involving each of the students in the study (Lee, 2010).

Interesting are the studies of scholars of Osadchy et al. (2015) who consider the experience of leading countries of the world in the introduction of information technologies in the educational process: the adoption of ICT competencies as a means of obtaining other competencies, the introduction and financing of state programs for informatization of education, the spread of cloud technologies, e-learning and distance learning, compiling repositories of e-resources, and developing a model for evaluating the state of information in educational institutions.

O. Ovcharuk and N. Soroko studied the analysis of international and domestic experience in the development of information and communication competence of participants in the educational process in institutions of general secondary education (Ovcharuk & Soroko, 2016). Scientists have identified major obstacles for educational institutions and teachers in creating a computer-based learning environment. The relevance of the issue of formation, development and evaluation of ICT competences of participants of the educational process is substantiated.

Modernization of the national higher pedagogical education in the context of European integration actualizes the preparation of future primary school teachers to design the educational environment with the involvement of modern information and communication technologies.

The experience of training teachers in Romania is valuable for our scientific search. The research findings of Romanian scientists Istrate & Găbureanu (2015) present the results of a study of a teacher training program conducted in mid-2015 to provide stakeholders - teachers, coaches, teachers, education experts - the necessary information on the need for teachers to use ICT in their professional pedagogical activities. According to the researchers, higher education institutions have signed a framework agreement with the Ministry of Education aimed at “better preparing young people for professional life, by providing access to technology and training in the use of online tools designed for students and teachers in pre-university education. The teacher training component aimed to train about 15,000 teachers in approximately two years through cascading training started by Junior Achievement Romania, a local program organizer and coordinator (Istrate & Gabureanu, 2015).

3. The article’s goal

Purpose of the article: to outline the functionality of information and communication technologies in the educational process and to highlight

some aspects of the preparation of future teachers for the use of ICT in the educational environment of primary school.

4. Hypothesis of the study:

Comprehensive use of content in educational disciplines and potential pedagogical practice opportunities will facilitate the effective preparation of future teachers for the use of ICT in primary school lessons.

5. Research methods

Theoretical analysis and generalization of psychological-pedagogical and scientific-methodical literature on the problem of research, pedagogical observation, conversation, methods of mathematical statistics.

6. The results and discussion

Introducing main information. Nowadays, a new stage of computerization of the educational process caused by the development of multimedia technologies is being introduced into pedagogical practice. In the interactive mode of work of graphics, animation, photos, videos, sound, text create an integrated information environment in which the teacher finds qualitatively new opportunities that can play the role of a significant means of activating the educational and cognitive activity of younger students.

In the 2014-2015 academic year, the Institute for Innovative Technologies and Content of Education of the Ministry of Education and Science of Ukraine conducted an All-Ukrainian study on the introduction of ICT in education, including its initial link (Decree of the Ministry of Education and Science of Ukraine № 1431 of 14.12.2011). A survey of domestic elementary school teachers (931 from rural and 358 urban) made it possible to determine their opinion on the effectiveness of ICT use in the educational process. The majority of respondents noted a positive effect, in particular: improving the effectiveness of learning (74%), the development of visual thinking (72%) and the activity of students (66%), their motivation for learning activities (74%) (Melnyk, 2015).

O. Pometun's views on brain hemisphere function are valuable for our study. The scientist emphasizes that the effectiveness of perception depends on which analyzer is dominant in obtaining information. In his writings the teacher uses the terms "audio", "visualized", "kinesthetics". It found that few students were "pure" audios, visuals, or kinesthetics. Relevant studies indicate that in each randomly selected group of 30

students, approximately 22 are able to learn effectively if the teacher provides a combination of visual, auditory and kinesthetic activities. However, 8 students are the ones who prefer only one way and can sometimes demonstrate complete inability to absorb the material if their individual needs are not addressed (Pometun, 2007).

In the context of the research problem, students of Mukachevo State University, together with teachers (methodologists), during the course of pedagogical practice in the schools of Transcarpathia, made observations on finding the leading channel of students' perception of the educational material. It should be noted that no ethics committee has been established at Mukachevo State University as a separate body regulating the research procedure. All respondents voluntarily agreed to participate in the study and to publish its findings and were informed of the possibility to withdraw their participation in the study.

The results of the study showed that about 73% of modern schoolchildren - and only 27% were auditioners and kinesthetics. These data prompted educators to seek out such teaching methods and techniques that, when providing younger students with educational information, could combine different means of influence into a single complex. Such an organization of the educational process will contribute not only to the activation of cognitive activity in the lessons and increase the efficiency of the educational process, but also to the development of students' thinking.

We express our deep gratitude to the respondents for their voluntary participation in the study. The results obtained were used solely for scientific purposes.

Therefore, having analyzed the scientific and methodological literature (Dzhurinskaya, undated) Dyshleva, S. (2010, January 27); Spivakovsky (2011) and taking into account our own observations, we can conclude that in order to satisfy students' needs for information perception, teaching must be polysensory and diverse.

In this context, information training of future elementary school teachers, which activates their cognitive and creative potential, generates the knowledge and skills needed for future professional activity, is of great importance. In fact, it is about improving the effectiveness of teacher education through the introduction of information and communication technologies, since they change the way scientific information is presented, provide individualization of learning, creating new forms of interaction between teacher and student in the process of solving various cognitive problems.

Effectiveness of work on the formation of information and communication competence of students and preparation of future specialists to work in the WSS depends on the priorities of higher education and the general ideology of the primary institution. In this aspect, a thorough educational training of students of Mukachevo State University is underway. We analyzed the curricula of the specialty 013 "Elementary education" and found that in the system of disciplines of higher education there is a whole complex of subjects that by their content contribute to the preparation of students for the use of ICT in elementary school, in particular: "Didactics", "Fundamentals" information technologies", " Modern information technologies of teaching", "Methods of teaching computer science", "Pedagogical technologies in elementary school", "Pedagogical skills (pedagogical creativity)"and more.

For example, in the course of study didactics students learn that the structure of the lesson does not change fundamentally if used in any lesson in elementary school information and communication technologies. It still retains all the major stages, possibly changing only their temporal characteristics (Table 1).

Table 1. Possibilities of using information and communication technologies at different stages of the lesson

Stages of the lesson	Content	Purpose	Conditions, results
Being organized for the lesson	Presenting theme and purpose of the lesson	To prepare students for work in the classroom	Friendly atmosphere between teacher and students; rapid involvement in study process, enduring full readiness to work
Update supporting knowledge	Demonstrating the proper solutions of problems that cause difficulties (it may be prepared by students), questions to test knowledge, theory test questionnaire	Identify the level of students' knowledge on homework, fill knowledge gaps, remember necessary basic rules	Determination degree of homework done by the whole class; eliminate common mistakes; identify the reasons why some students do not fulfill homework

Announce lesson theme and objectives	The lesson theme is presented on the slides which summarized the key points of the issue	Demonstrating the lesson theme is presented on the slides	Formation of teaching tasks together with students, using different methods of organization student activity to define the purpose
Perception and awareness of new material	Concepts, charts, tables, pictures, animation, video clips illustrating peculiarities of the new material	Demonstrating the new teaching material	The use of different methods to enhance students' mental activity, involving them in searching, self-learning; systematization of new knowledge
Compile and systematize the acquired knowledge	Questions and tasks requiring mental alertness and creative thinking, error correction	Fulfillment of training exercises	Using different methods of knowledge consolidation; teacher's request to the class to supplement, clarify, correct, look at studying problem from another side; student's ability to learn facts and relate them to the concepts, rules and ideas
Lesson summary (Reflection)	Tasks of various complexity control, the use of gained knowledge in unusual situations	Organization of control and self-control	Using different methods of knowledge control and self-control; reviewing students' work, indicating positive aspects and drawbacks

During the course "Pedagogical skills (pedagogical creativity)" in the course of classroom and extra-curricular work students are emphasized on the components of professional activity of elementary school teachers, in

particular, it is educational, educational, diagnostic, organizational, motivational, developmental. Emphasis is placed on the fact that further professional development of future specialists is facilitated by the acquisition of new knowledge, self-improvement, and self-education, since the role of the teacher in terms of using ICT remains not only leading but even more complicated. In addition, the use of ICT in the work of the teacher provides the opportunity to: obtain the most up-to-date information, update educational and didactic materials; gaining access to the methodological base of development; communication with colleagues in various forums; publication of their materials and participation in discussion of published materials; participation in professional competitions; exchange of experience with colleagues from other regions and countries.

A deeper awareness of the problem is aimed at the course "Pedagogical Technologies in Primary School", which aims to form a willingness for future teachers to introduce modern technologies into primary school practice. The course generalizes all areas of teacher training (general theoretical and methodological knowledge) and aims at equipping students with algorithms for performing the necessary methodological actions, forming methodological skills for implementing ICT in the elementary school educational process.

As practice shows, the specificity of lessons in elementary school determines the need to combine reproductive learning with creative work. Today, much attention is paid to interactive training methods that are implemented using computer training programs that take an action-based approach to learning. It is impossible to imagine this approach without the use of a variety of software, such as a computer, tablet, laptop, multimedia projector and touch board, which allow for effective organization of educational and cognitive activities through interactive learning. Therefore, students of Mukachevo State University use the following computer-aided learning tools in elementary school (Ukrainian, literary reading, mathematics, science, I in the world): electronic textbooks, statistics tables, dynamic tables, literary portraits, test papers, dictations, media works, virtual tours and more. Let's analyze them in more detail.

Dynamic spreadsheets - help students understand the process of "birth" and the functioning of the rule: the necessary elements appear and disappear, move, increase, move; sometimes sound design, animation inserts, etc. are used to create the desired effect. The material is selected with a focus on the associative, imaginative thinking of students, which allows you to quickly memorize and apply the acquired knowledge qualitatively. It is

advisable to use the lessons of "Noun", "Adjective", "Verb", etc. in the Ukrainian language lessons.

A literary portrait - is a multimedia project that contains documents, photographs, tables, illustrations, audio and video fragments, arranged in a sequential manner, which enables the students to fully and clearly tell the writer and poet's life and creative path. It should be written not only in literary reading lessons, but also, for example, in "I in the World" lessons (theme "Famous Ukrainians", 3rd grade).

Virtual Tours - video story about museums, historical sites of Ukraine and other countries; for each video of the plot are developed appropriate tasks that students perform during the lesson. Thus, a virtual excursion introduces students to Ukraine, its history, nature, outstanding people, widens the students' outlook, promotes their development, even in circumstances where a real excursion is impossible for certain reasons. For example, in literary reading lessons you can take a virtual trip on the theme: "The most famous libraries in the world", "Interesting on the planet", "The best museums in the world", "Traveling in Europe". At the lessons "I am in the world", 4th grade (topics "Ukraine is an independent state", "Ukraine on the world map", "Folk crafts of Ukraine").

Media project - each student participant of the project chooses for itself individual means and the optimum pace of activity, shows independence, creativity, perseverance in achieving the goal. In particular, the lessons "I am in the world" offer students the following topics for media projects "History of my school", "How to succeed", "Inventions of mankind".

Test tasks. Extremely well formed on an interactive whiteboard. As you know, there are special programs, but you can do without them by placing each question and answer options on a separate slide. It is convenient to use such test tasks during thematic assessment, listening, etc. in all elementary school lessons.

Self-dictator. The form of knowledge testing has long been known, but it works much more effectively in multimedia. Blackboard with omitted letters and punctuation on the board (preferably each student has the same printed text). In the course of work, students explain the use of letters and punctuation marks, making appropriate notes on the board. Therefore, saving time and the need to write text in a notebook. It will be appropriate to take lessons in the Ukrainian language, mathematics (mathematical dictation).

Media lesson - a set of various information and communication techniques that work over 40 minutes of the lesson and contribute to the full disclosure and awareness of the topic of the lesson. Such a lesson is bright, dynamic, effective (Literary reading - topics "I am in the media space", "How a book is born", "Advertising in the life of a modern person", "Selfie - look at yourself from the side"), ("I am in the world" - topics "National holidays", "Human virtues").

According to scientists and on the basis of our own observations we can conclude that with the help of information and communication technologies the creative teacher has a unique opportunity to independently create the necessary technical support for the lessons, based on his own vision of the topic, taking into account the peculiarities of the class, the school; modify and supplement teaching material on slides; to diversify forms of work in the lesson by simultaneous use of illustrative, statistical, methodical, as well as audio and video material.

Conclusions and prospects for further research

ICT in elementary school lessons today are powerful didactic tools that engage children in active work, develop their cognitive interest, promote better learning, and increase learning effectiveness.

The modernization of the higher education system of Ukraine, the progressive educational realities of the present day intensify the search for new, more effective approaches aimed at enhancing students' scientific knowledge, their ability to operate information, to act actively, to make decisions quickly. Accordingly, the potential of educational disciplines and pedagogical practices at the Mukachevo State University is aimed at training competitive specialists ready to quickly process a large amount of educational information and original solutions to professional tasks by mastering modern ICT tools.

The study does not exhaust all aspects of the problem. For further study, the question of the practical use of interesting audio, video, and multimedia materials in primary school lessons deserves.

References

- Dyshleva, S. (2010, January 27). *Information and communication technologies (ICTs) and their role in the educational process*. <http://osvita.ua/school/technol/6804>.
- Dzhurinskaya, A.P. (undated). *Use of information and communication technology in primary school lessons*. <http://ito.vspu.net/konference15/Djurunska.pdf>.

- Hal, I., Higgins, S. (2005). Primary school students' perceptions of interactive whiteboards. *Journal of Computer Assisted Learning*, 21, pp. 102-107.
- Istrate, O. & Gabureanu, S. (2015). A Fresh Restart? Google for Education in Romania: Effectiveness of Training Teachers in Using Google Tools for Teaching and Learning. *The 10th International Conference on Virtual Learning ICVL*. University of Bucharest and West Timisoara University. (pp. 221-226).
- Lee, M. (2010). Interactive whiteboards and schooling: the context. *Technology, Pedagogy and Education*, 19(2), pp.133-141.
- Maher, D., Phelps, R., Urane, N., Lee, M. (2012). Primary school teachers' use of digital resources with interactive whiteboards: The Australian context. *Australasian Journal of Educational Technology*, 28(1), pp. 138-158.
- Melnyk, O. N. (2015). Analysis of the results of the All-Ukrainian study of issues of application of information and communication technologies in elementary school. *Pedagogical Search*, 4 (27), pp. 95-99.
- Osadchy, V. V., Sharov, S. V., Osadcha, K. P. (2015). Designing an intelligent system of information and cognitive support for the functioning of the National Qualifications Framework. *Artificial Intelligence*, (1-2), pp. 63-69.
- Ovcharuk, O. N. Soroko (2016). Use of tools for assessing teachers' information and communication competence in European countries. *Information Technology and Teaching Aids*, 52 (2), pp. 133-142.
- Pometun, O. (2007). *Interactive teaching methods and systems*. Kiev: The school world.
- Spivakovsky, O.V. (2011). *Information and communication technologies in elementary school*. Kherson: KSU.



МУКАЧІВСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ

89600, м. Мукачево, вул. Ужгородська, 26

тел./факс +380-3131-21109

Веб-сайт університету: www.msu.edu.ua

E-mail: info@msu.edu.ua, pr@mail.msu.edu.ua

Веб-сайт Інституційного репозитарію Наукової бібліотеки МДУ: <http://dspace.msu.edu.ua:8080>

Веб-сайт Наукової бібліотеки МДУ: <http://msu.edu.ua/library/>