

Programme and Summary of Research Work on ICT Competence Development for Future Elementary School Teachers in the Conditions of Inclusive Education

Programa y Resumen del Trabajo de Investigación sobre Desarrollo de Competencias en TIC para Maestros de Escuela Primaria en las Condiciones de Educación Inclusiva

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ABSTRACT:

This article is dedicated to the programme and content of research work on information and communication competence development for future elementary school teachers in the conditions of inclusive education. Main directions, aim, research methods, stages of research work are described in this article. During the research work the society's social procurement for training elementary school teachers at the contemporary stage was taken into account (analysis of normative legal documents, conversation, observation). Theoretical propositions taken as the basis for ascertaining experiment have also been described in detail. Preparedness of future teachers for work in the conditions of inclusive education includes the following components: motivational-needful, cognitive-educational, practice-oriented. The article describes the

RESUMEN:

Este artículo está dedicado al programa y contenido del trabajo de investigación sobre desarrollo de competencias en información y comunicación para futuros maestros de escuelas primarias en las condiciones de la educación inclusiva. En este artículo se describen las principales orientaciones, objetivos, métodos de investigación, etapas de los trabajos de investigación. Durante el trabajo de investigación se tuvo en cuenta la adquisición social de la sociedad para la formación de maestros de primaria en la etapa contemporánea (análisis de documentos normativos legales, conversación, observación). También se han descrito en detalle las proposiciones teóricas tomadas como base para determinar el experimento. La preparación de los futuros docentes para el trabajo en las condiciones de la educación inclusiva incluye los

use of not only diagnostic methods, but also the method of expert evaluations which influences the content of formative experiment. This method is used to get the broader picture and helps in the development of special course in the definition of educational modules for students.

Keywords: Information and communication technologies, inclusive education, future elementary school teachers.

siguientes componentes: motivacional-necesario, cognitivo-educativo, orientado a la práctica. El artículo describe el uso no sólo de métodos de diagnóstico, sino también el método de evaluaciones de expertos que influye en el contenido del experimento formativo. Este método se utiliza para obtener un panorama más amplio y ayuda en el desarrollo de un curso especial en la definición de módulos educativos para los estudiantes.

Palabras clave: Tecnologías de la información y la comunicación, educación inclusiva, futuros maestros de primaria.

1. Introduction

Education in current conditions requires training of competitive specialists with high standard of knowledge, skills and abilities in the field of inclusive education, as well as practical skills of using information and communication technologies. Future elementary school teacher in the conditions of inclusive education should not only involve the students in creative activity, but also teach them how to develop their creative potential. This ambition of a teacher to find a common language with each student is the key to professional success.

The originator of the idea of inclusive and integrated education in pedagogics and psychology is L.S. Vygotsky. He wrote that “despite all its advantages, our specialised school has one great disadvantage: it locks the student – a blind, deaf or mentally challenged one – in the small circle of school community, creates a closed world where everything is adapted to the child’s defect, makes them focus their attention on their defect and does not introduce them to real life” (Vygotskij 1983).

Implementation of inclusive education in the Republic of Kazakhstan is closely related to such researchers as R.A. Suleymenova (2002), Z.A. Movkebaeva (2013), Baytursynova A.A. (2010). They also developed the idea and issues of training teachers in the conditions of inclusive education.

Constantly learning and practicing new ICT skills, pedagogical staff open the door to new innovation technologies. As a result, level of training of children in elementary schools increases. They begin to acquire knowledge not only from books and words of teacher, but also with the help of new technical means and technologies which would allow them to become more practical and literate, and this applies to disabled children as well.

Increased quality and availability of education for disabled children requires an integrated approach and combined efforts of different experts in order to solve the questions of development and implementation of specialized hardware and software means.

Seymour Papert, an outstanding mathematician and psychologist who created a programming language for children in his work “Mindstorms: Children, Computers, and Powerful Ideas”, created a unique system of education computerization and Logo language (Papert 1989). According to Papert, this programming language is also understandable for special needs children. The key idea of Papert’s approach was that the computer itself should be not the subject matter, but the tool of thinking – active thinking, to be precise. But then, there must be something to direct this activity to. Thus Papert realized that it was necessary to create “an object that could help you think”.

An important factor in the training of future elementary school children for work in the conditions of inclusive education is correspondence of their academic knowledge, practical skills and personal qualities to the requirements of such kind of work with students. For this purpose, we have composed a research programme on ICT competence development for future elementary school teachers in the conditions of inclusive education.

The goal of research work was to test a hypothesis of efficiency of a set of psychological and pedagogical conditions in the development of ICT competence of future elementary school

teachers in the conditions of inclusive education.

The programme and content of the research work included the following directions:

- *Creation of psychological and pedagogical conditions for the development of ICT competence of future elementary school teachers in the conditions of inclusion.*
- *Test of ICT competence development model for future elementary school teachers in the conditions of inclusive education.*
- *Identification of dynamics of criteria of ICT competence formedness for future elementary school teachers in the conditions of inclusive education.*
- *Experimental study and analysis of the results of the introduction of a set of psychological and pedagogical conditions.*

Research work was conducted in three stages from 2014 to 2017. During the first, search and theoretical stage (2014-2015), it was studied to what extent the research topic had been developed: theory and practice of the development of ICT competence of future teachers for the field under consideration were analysed. As a result of the first stage (2014-2015), the programme of research work consisted in the implementation of a set of pedagogical conditions into the training of elementary school teachers for greater efficiency of ICT competence development for future teachers in the conditions of inclusive education.

ICT competence for future teachers in the conditions of inclusive education was developed consecutively: the period before teaching practice, the period of teaching practice itself, the period after teaching practice. Each period had certain content and as a result presupposed full development of ICT competence in the conditions of inclusive education.

During the third stage (2016-2017) of research work its programme included processed and analysed obtained results, specified theoretical and experimental conclusions regarding the results of the whole work.

Research base of the study was the Institute of Pedagogics and Psychology of Kazakh National Pedagogical University named after Abai. The research involved on-campus students of the Institute of Pedagogics and Psychology specializing in Pedagogics and primary education methods (qualification 5B010200: elementary school teacher). The control group consisted of 60 second and fourth year on-campus students, the experimental group included third and fourth year on-campus students (62 people).

The choice of the experimental group is explained by the fact that focused subjects are closely studied in the third and fourth years. Also, the process of theoretical and practical training can be connected with teaching practice.

Practice begins from the fourth semester. Having received theoretical and practical training in the university, students use the acquired experience and get new experience in professional educational work.

2. Methods

When forming a set of diagnostic methods, we focused on multicomponent development of ICT competence development for future teachers in the conditions of inclusive education. Thus, the following types of analysis were used:

Complex – evaluation of the level of formedness of all components of the structure;

Level – diagnostics of formedness of each component of the structure.

Diagnostic package for studying the level of readiness included the following methods and techniques:

The first stage: empirical methods (simulation technique, questionnaires, testing, analysis of activity results, conversation), mathematical and statistical processing methods.

The second stage: empirical research methods: educational observation, educational experiment, analysis of students' professional activity results (computer technology educational

means for solving a professional task).

The third stage: empirical methods: questionnaires, testing, analysis of activity results, conversation. Mathematical and statistical processing methods: T - Wilcoxon test, U - Mann-Whitney test.

Level analysis was used for differentiated choice of diagnostic methods for evaluation of the level of formedness of each criterion of ICT competence for future teachers in the conditions of inclusive education. Choice of diagnostic methods was based on the principle of educational reasonability and validity requirement (correspondence of the method to the measurement of indicators it is intended for).

Components of readiness of future teachers in the conditions of inclusive education are the following:

- motivational-needful – it is a set of form motives for work in the conditions of inclusive education, orientation towards efficient educational process, recognition of each student as a subject of educational activity, formation of inner readiness for positive perception of special needs students;
- cognitive-educational – a system of knowledge and notions of the problem of disability, specifics of mental and physical health of disabled people and specifics of educational process with such students;
- practice-oriented – consists of ways and methods of implementation of professional pedagogical knowledge in the work with disabled people and presupposes formation of corresponding professional competence of future teachers.

To define the formedness of ICT competence of a future teacher in the conditions of inclusive education we selected the following diagnostic methods:

Self-evaluation test (by Stolyarenko)

"Motivation for teaching students of pedagogical university" (S.A. Pakulina, M.V. Ovchinnikova)

Questionnaire for students specialising in Pedagogics and primary education methods

To define the cognitive-educational component, the following diagnostic methods were selected:

Questionnaire for students specialising in Pedagogics and primary education methods

Self-evaluation of formedness of cognitive-educational and practice-oriented criterion

To define the practice-oriented component, the following diagnostic methods were selected:

Inter-analysis and method of expert evaluation

Self-evaluation of formedness of cognitive-educational and practice-oriented criterion

Questionnaire for students specializing in Pedagogics and primary education methods

3. Research results

During the research work the society's social procurement for training elementary school teachers at the contemporary stage was taken into account (analysis of normative legal documents, conversation, observation). Preparing a professional teacher with the required knowledge, skills, abilities defining the formedness of their educational activity, educational communication and personality as a bearer of certain values, ideals, educational awareness are the requirements to the training of elementary school teacher in the system of higher education. Another requirement is the need of general education institutions in pedagogical staff and especially elementary school teachers who are competent in the field of information and communication technologies in the conditions of inclusive education. When organizing experimental work, we also took into account the educational request of future elementary school teachers for the content of professional training.

The educational request was studied with the help of and through questioning and method of expert evaluation.

When planning the research work, we analysed material and technical conditions for the

experiment. Kazakh National Pedagogical University named after Abai has computer classes with local computer networks connected to the Internet. The software was also studied. It is a standard set of Windows office programmes.

We studied object and material environment of practical institutions which became the base for approbation of the results of the experiment. In State general education institutions there was also computer equipment with general functions, but, unfortunately, without any accessibility aids.

As a result of comparing two object and material environments, we selected the following educational means of computer technologies as the object of study and training means: text editors and processors, browsers, video editing systems, educational, development, reference programmes, multimedia software tools.

During the ascertaining experiment we based on the following theoretical propositions:

- Professional direction of training for using information and communication educational technologies is based on general education training;
 - Within general education training students acquire a certain development level of knowledge, skills, abilities of using information and communication technologies as a tool of educational activity; knowledge of the main point, content, informatisation of education;
 - Additions to the content of special course may be made by the students themselves. According to their educational needs in the content of modules, various professional tasks and theoretical and methodological support are introduced at a certain stage.
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4. Discussion of the results

Thus, at the ascertaining stage of the experiment it was important to define the development level of knowledge, skills, abilities of students using computer technologies for various goals; orientation towards using skills and abilities to solve the tasks of professional activity; educational needs of students specializing in this field.

The ascertaining stage of the experiment included a set of methods. Self-evaluation test was calculated as availability of real qualities/desired ideal qualities ratio.

$$R = \frac{RQ}{I} \times 100\%$$

where RQ is the number of real qualities and I is the number of ideal qualities.

The obtained data were compared to a rating scale. Optimal adequate self-evaluation corresponds to the following levels: average, above average and high. Students of both groups were divided by groups expectedly. The peak of those being tested was in the middle of the scale, which is the average level of self-esteem. Most participants of control and experimental groups had optimal self-esteem: students' possibilities correlate with their abilities, they have realistic views of their achievements and failures. That said, they are rather critical of their personality and success. On the basis of mathematical processing one can come to the conclusion that self-acceptance will favour self-analysis of using computer means of education in correction and pedagogical type of professional activity.

While detecting the level of self-esteem, the opinion of the participants on the personal qualities, which are significant for an elementary school teacher, was also studied. This shows the positive attitude to the profession. Only students of the experimental group suggested enough qualities to include them into the rating table. Some students from the experimental group included qualities and features which are significant for an elementary school teacher into the rating.

Formedness of cognitive and practice-oriented criteria was evaluated through questioning and analysis of activity results. The first block was aimed at defining the level of motivational-needful, in other words students' interest in their future professional activity, formedness of personality information culture was also defined, etc. The second was the level of cognitive criterion development. The third was the level of professional readiness of students in using

information and communication technologies.

The questions of the first block were formed on the basis of the questionnaire for detecting the level of motivation and personal interest to information technologies. Also, the questions were aimed at defining the level of computer literacy of the students. It was important for us to find out their total experience of computer work. For the students of the third year it was on average 3-4 years and 4-5 years for the students of the fourth year. The results were different in each year: including school computer course, some students had 12-13 years of experience of using computer, some had only 3-4 years corresponding to the period of their higher education. In general, 65 on-campus students can be divided into groups with little (3-4 years), average (6-10 years) and extensive (11 and more years) experience. Percentage ratio of experience of the students from control and experimental groups is presented in table 1.

Table 1. Total computer work experience

Group	Computer work experience		
	Little	Average	Extensive
EG	22% (14 people)	60% (38 people)	18% (12 people)
CG	55% (33 people)	32% (19 people)	20% (12 people)

After that, the participants of the research work evaluated their skills of working with the educational means of computer technologies which had been selected in beforehand.

We are stating that future elementary school teachers do not have enough skills in working with the most effective means for solving professional tasks (video editing, animation, educational and developing programmes). But it should be noted that they have highly developed skills of working with information: using browsers to find information, presenting it via text editors and processors.

Thus we come to the conclusion that in general computer and software user skills can provide general educational activity with the use of information and communication technologies.

The second block of questionnaire questions detected the initial stage of development of cognitive criterion of preparedness of future elementary school teachers for the use of information and communication technologies in the conditions of inclusive education. Evaluation of the cognitive component showed that most students have no idea of specialised computer products created not only for the system of general but also inclusive education. Only 4 on-campus students (5%) named some educational and developing computer programmes intended for healthy children as well as for special needs children. These were mainly the products produced abroad. As the conversation showed, their awareness was related to additional workload in the form of different competitions and academic contests in their university. Several students of the control group also name one or two computer programmes.

Other 57 students of the experimental group and 56 students of the control group named with confidence only the means of information and communication technologies and entertainment products (cartoons, video clips, songs, animation, pictures, etc.).

The third block of questionnaire questions defined the level of practice-oriented direction. It was suggested to choose what the students use information and communication technologies for. The questions were aimed at practical skills of the students, in other words at: detecting the skills of using interactive technologies in the educational process; ability to use some computer

programmes in the educational activity; ability to present their work using information technologies; practical skills of selecting information; ability to plan and give a lesson using computer technology elements, etc.

Methodology "Learning motivation for students of pedagogical university" developed by researchers S.A. Pakulina and M.V. Ovchinnikova was used in our research work in order to define motivational-needful attitude to educational activity of students. The aim of this method is to evaluate really existing motives of educational activity and professional motives, to define the level of general development and dynamics of learning motivation in the process of teaching students in a pedagogical university. The questions presented in the content of the methodology single out three groups of motives determining the learning activity:

- in the past (dominating motives of entering the university);
- in the present (really existing motives of educational activity);
- in the future (professional motives).

The questions in this methodology were also divided into three blocks:

- What made you choose to specialize in this field?
- What is the most important for you in your studies?
- Obtaining a diploma allows you...

The methodology is related to a pedagogical higher education institution in the singled out leading motives characteristic of the higher education institution of this field: the leading motive of entering the university is enjoying communication with children and the leading professional motive is willingness to work in school (Pakulina and Ketko 2010).

Method of expert evaluations is widely used in modern psychological and pedagogical research. Topicality of the research is conditioned by a number of factors. First, the method allows receiving initial information on phenomena, processes within a relatively short period of time, which can become the basis for their further advanced study. Second, professionally, the method of expert evaluations is easier to organise than other methods. Third, the method is primarily oriented at solving practical tasks. Fourth, the method is used when it is really difficult to evaluate a phenomenon or a process with the help of other methods which may also happen to be not reliable enough. The main idea of the method of expert evaluations is to base the prognosis on the opinion of a group of specialists based on professional, scientific and practical experience. Therefore, thus received evaluations can be considered more objective as compared to subjective opinion of one person. Teachers, teaching practice supervisors and elementary school teachers, experienced elementary education specialists, scientific workers from the field of information and communication technologies, elementary and defectology education are involved as experts. The number of experts in our research is from 3 to 7 people depending on the task performed by students. Final score is calculated as arithmetic average of the scores of all experts (Zajceva 2011).

The questions in the method of expert evaluations were phrased correctly, clearly and briefly, it is based on experts' individual opinion, type - questionnaire survey:

How do you evaluate the need to train elementary school teachers to use information and communication technologies in the conditions of inclusive education?

What problems do you see in the training of elementary school teachers in the conditions of inclusive education?

What can you suggest to increase the quality of the training of elementary school teachers to use information and communication technologies in the conditions of inclusive education?

Questionnaire survey presupposes creating special surveys with a number of questions on the task to be solved. Enough copies are made for the experts and are sent to respective addresses.

During the process of filling up the questionnaire surveys we fulfilled the following requirements: provided mutual independence of experts' opinions; when necessary, made sure

that the experts understood the questions correctly; prevented one questionnaire from being filled in by several experts; the questionnaires were filled in and sent in the prescribed time (Grigan 2009).

Main advantages of the method of expert evaluations are possibility to obtain a body of information in a rather short time and independence of experts' opinions.

On the basis of these answers we made a generalised conclusion for our research work. Answering the third question "*What can you suggest to increase the quality of the training of elementary school teachers to use information and communication technologies in the conditions of inclusive education?*" most experts said that it is necessary to introduce special courses for university students to teach them how to use IC technologies in all the fields of their future professional activity, they also mentioned such ideas as advanced training and retraining of educational workers of general education institutions; another significant factor was the problem of necessary material and technical equipment of educational institutions with inclusive education, availability of necessary education materials and, obviously, computer educational and developing programmes to be used in classes with inclusive education.

5. Conclusion

We come to the following conclusions:

- To evaluate the criteria of preparedness of future elementary school teachers to use information and communication technologies it is necessary to use complex and level analysis.
 - Differentiated choice of diagnostic methods for evaluation of formedness of each criterion allowed forming the methodology of evaluation the level of competence of future elementary school teachers in using information and communication technologies.
 - Level analysis showed the following state of criteria of preparedness at the ascertaining stage:
 - Motivational-needful criterion is rather high: most students of the control and experimental group have optimal self-esteem and their motivation is rather high, which shows that the students are rather interested in the process of education and self-learning, they are willing to acquire knowledge on new information and communication technologies, they are also interested in using new knowledge in practice;
 - Evaluation of cognitive criterion has shown that the knowledge acquired in an educational institution is mainly used by students in their educational activity. They mentioned low level of information technologies use in professional activity or limited number of computer means. Most students have no idea of computer products created for children with special needs.
 - Evaluation of practice-oriented criterion has shown low level of practical use of information and communication technologies by students in their activity or limited use of computer educational products. Future elementary school teachers do not have enough knowledge of the most effective means used to solve professional tasks in the field of teaching (video editing, animation, creating video clips, educational and developing programmes).
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