

## FORMATION OF ICT COMPETENCE OF FUTURE PRIMARY SCHOOL TEACHERS IN THE PROCESS OF STUDYING THE DISCIPLINE ‘INFORMATION TECHNOLOGIES IN PRIMARY SCHOOL’

**Fatima Toyirovna Ergasheva**

Senior Lecturer of the Department of Primary Education

Navoi State Pedagogical Institute, Uzbekistan

[faergasheva@gmail.com](mailto:faergasheva@gmail.com)

### ABSRTACT

This paper discusses the problems of developing ICT competence for future primary school teachers. In the context of global mass communication, the most valuable resource today is the ability to analyze, systematize and interpret information. In the course of the study, an analysis of approaches to the creation of educational models was carried out, ways of developing the ICT competence of future primary school teachers by means of the discipline “Information technologies in primary classes” were identified. And also developed a model for the development of ICT competence of future primary school teachers. The main conceptual idea of the model that contributes to the solution of didactic problems (epistemological, axiological, praxeological, professional-personal, communicative) is the reflection of mathematics in the information field as a tool for the humanization of the modern information society and personality.

**Keywords:** primary school teacher, ICT competence, learning process, didactic tasks, model, digital technologies, Information technologies in primary classes.

### INTRODUCTION

In connection with the rapid development of Internet technologies, there is a steady trend towards the fact that the predominant actions with information as the main resource are not its production, but distribution and replication, that is, communication. At the same time, communication is understood by us in the broadest sense - not only in terms of direct interpersonal communication, but also in terms of human interaction with the information environment surrounding him. If earlier separate, almost autonomous concepts of “information technologies” and “communication technologies” were used, then at present it is more expedient to talk about their integrative unity, and the

designation of this concept by the single term “Information and Communication Technologies” (ICT).

Of particular importance among all levels of the educational system is primary education, which lays the adaptive information and communication base for the natural entry of the child into the information society. The State Law of the Republic of Uzbekistan “On Education” [1] reflects the basic principles of state educational standards and state educational requirements. The new state educational standard of general secondary education [2] notes that the main professional task of a primary school teacher is to teach a student to learn, that is, to organize work for the student to assign universal learning activities and effective ways of working with information that allow him to navigate in the information communication educational environment and purposefully solve the set educational problems. At the same time, the means of information and communication technologies are the tools for the formation of universal learning activities among students.

The trend of digitalization of the educational process observed in recent years, provoked by the transition to a digital economy and a digital society, requires a new understanding of the process of training future teachers.

In addition, the learning process of modern schoolchildren should also take into account the features of the new “digital” generation, among which one can note both the ability to process information flows in parallel, the high speed of its processing and decision-making, the constant desire for novelty of cognitive sensations, and clip-like thinking, poverty of sensory experience, low ability for systematic, intense and monotonous activity, the need for a quick change of impressions and immediate reward.

The professional standard of a teacher [2] states that a modern teacher should have ICT competencies, including:

- general user ICT competence, which implies skills in using the Internet, wireless communication systems, video, etc.;
- general pedagogical ICT competence, determined by the ability to rebuild the content and methodology;
- subject-pedagogical ICT competence, reflecting professional ICT competence, including independent preparation of didactic materials in the relevant field.

The foregoing determines the need for purposeful and systematic formation of digital competence of future teachers in the process of studying pedagogical disciplines. Mastering this ability will make it

possible to make an informed choice and consciously apply ICT technologies in the process of solving pedagogical problems.

In education, the term “information and communication competence” is more often used, which also means the readiness and ability to independently use modern information and communication technologies in pedagogical activity to solve a wide range of educational problems [3, 4].

The works of researchers emphasize that the success of pedagogical activity based on ICT technologies at the present stage of the development of society “is due to an understanding of the specifics of the organization of such work, possession of its methodology, technology, knowledge of the psychological characteristics of children that significantly affect the organization of distance learning, the ability to create adequate sanitary-epidemiological conditions for successful distance learning” [5].

Obviously, these competencies should be consistently formed among students of pedagogical universities in the process of studying, first of all, methodological disciplines. It should be noted that the professionalism of a future teacher is determined not just by knowledge of digital resources and technologies, awareness of their importance for teaching schoolchildren, but by the ability to use them correctly in an appropriate educational context, putting in the first place precisely the planned results of teaching, educating and developing schoolchildren [4, 6].

In this sense, a fairly large role in the formation of the digital competence of the future primary school teacher is given to the discipline “Information technologies in primary grades”, studied in the third year of undergraduate studies in the direction 5111700 – “Primary education” in pedagogical universities of the Republic of Uzbekistan.

## LITERATURE REVIEW

Most researchers are working on the formation of ICT competence by means of disciplines of specialized courses “Informatics”, “Information technologies in education”, etc.

Research aimed at developing the ICT competence of future primary school teachers is reflected, for example, in the works of S.A. Zaitseva, N.A. Ershova, S.A. Bykov, I.V. Abramova, L.D. Sitnikova, O.P. Osipova. In a similar way, researchers solve the problem of the formation of ICT competence in future primary school teachers, however, according to the results of studies obtained at the Laboratory of Informatics Didactics, “information models

create the basis for the transition of a general education course in informatics to the rank of a “meta-subject” [7].

But do not forget that “information modeling” begins outside the specialized courses “Informatics”, etc., namely, in disciplines from various fields of knowledge, both natural sciences and the humanities. In our opinion, the remark of Yu.V. Viktorova: “The formation of ICT competence should be carried out in the study of each subject, including mathematics” [8]. Her study proved that information-cognitive tasks contribute to the formation of individual coding styles, which has a positive impact on the formation of ICT competence. The author demonstrates a positive experience in the formation of ICT competence in the process of teaching mathematics. Note that to date, we have a small amount of research in this area.

## MATERIAL AND METHODS

In order to form ICT competence in future primary school teachers, we have developed an educational and methodological complex of the discipline “Information Technology in Primary School”.

We assume that the emphasis on sign-symbolic and algorithmic activities in solving pedagogical problems contributes to the formation of the ability to analyze, synthesize and visualize information, which has a positive effect on the formation of ICT competence.

The process of forming the ICT competence of a future primary school teacher is multi-component and is a multi-level model. Based on the works of G.V. Sukhodolsky, A.N. Dakhina, V.M. Mikheev [9–11], devoted to the modeling method in pedagogical science, having studied the experience of existing educational models, such as modern education technologies – “System of educational information”, “System of creative tasks”, “Modeling”, “Educational research”, “Scientific research”, “Designing the environment”, “Construction” (V.A. Bukhvalov), S. Papert’s system “The use of computers in the educational process”, full assimilation technology (B. Bloom, J. Carroll), methodical system of intensive training (V. F. Shatalov) [12, 13], we can state that one of the main principles of pedagogical modeling is consistency, the essence of which is the introduction of additional submodels into the system.

During the last three academic years, the curriculum for the discipline “Information Technology in Primary School” has undergone some adjustments. One of the tasks facing the authors was the formation of students' ideas about end-to-end technologies.

It should be noted that the concept of “Digital Technologies” is new not only for education, but for other branches of science and production. The term “end-to-end digital technologies” was first introduced in the “Digital Economy of the Republic of Uzbekistan” program. At the moment, the concept is at the stage of reflection and requires clarification. The roadmaps of the state project “Digital Technologies” list wireless communication technologies, cognitive technologies, augmented and virtual reality technology, digital design, distributed registry technology, and artificial intelligence technology among the end-to-end ones.

The process of forming ICT competence in the context of end-to-end digital technologies within the framework of the discipline “Information technologies in primary school” was based on understanding it as a triune integral structure and was based on the need to form ideas about end-to-end digital technologies (cognitive component), to form an attitude to the need for their use in professional activities (motivational component), mastering some ways of using technologies in solving specific pedagogical problems (activity component).

The list of end-to-end digital technologies used in the discipline program was as follows: wireless communication technologies, cognitive technologies, augmented and virtual reality technology, digital design, distributed registry technology, artificial intelligence technology.

## RESULTS

The purpose of the discipline “Information Technology in Primary School” has a conceptual basis, which implies the formation of students' readiness to perform labor functions. The pragmatic goal is determined by the common philosophical origins of scientific knowledge, in particular mathematics and computer science.

According to Yu.V. Viktorova, pedagogical tasks contribute to the development of certain coding styles (verbal-speech, visual, sensory-emotional, subject-practical) [8], which imply the ability to process, visualize information, implement information models, transmit information of associative meaning, which is a sufficient basis for the formation of the components of ICT competence of the future primary school teacher that we have identified [6].

As a result of pedagogical design, we have developed a model of the ICT competence development system for a future primary school teacher (**Scheme**).

The presented model solves the following didactic tasks:

- epistemological, consisting in the process of cognition, the formation of a stable conceptual and semantic apparatus, a cognitive component based on the facts of computer science,



relationships, concepts formed by the object of cognitive activity (the future primary school teacher) and positively affecting the deepening of ideas about the symbolic language, methods information modeling, sign-symbolic ways of presenting information;

- axiological, aimed at understanding the connection of computer science with the system of value priorities of the information society, deepening ideas about the role of symbolic language, information modeling in the knowledge of the world, intellectual and socio-cultural development;

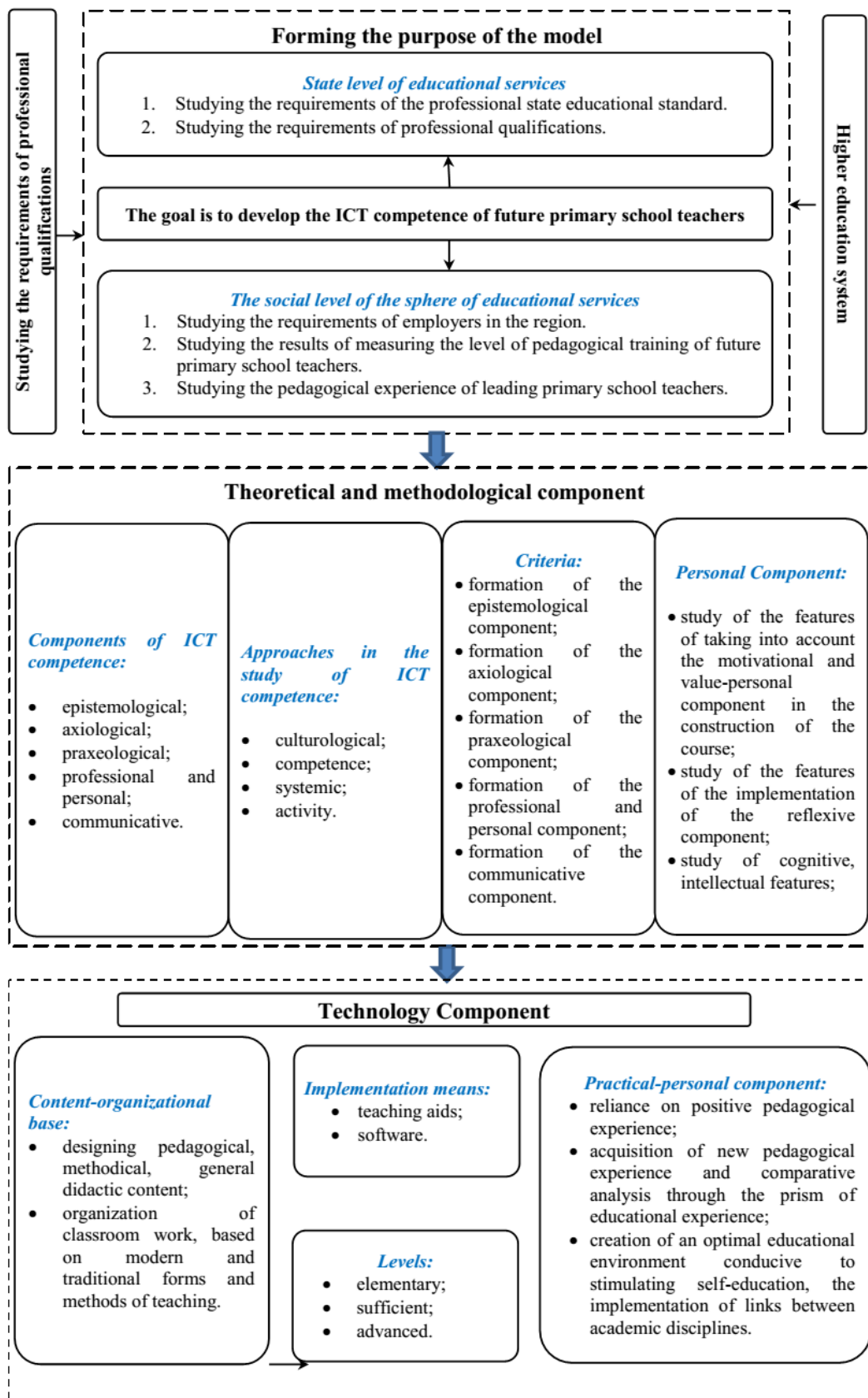
- praxeological, aimed at the formation of a system of educational and methodological skills, skills for solving various methodological and pedagogical problems that meet the requirements of society for mathematical and informational training at school;

- professional and personal, focused on the ability to form a comfort zone in the implementation of professional activities, use, develop and correct such psychological components as professional memory, attention, thinking, ability to work, emotionality, a set of moral qualities;

- communicative, focused on the ability to use elements of information technology as a means of scientific, technical, professional and pedagogical communication, the necessary socio-cultural characteristics.

Traditionally, the content of the course “Information technologies in primary grades” for future teachers of primary general education includes a system of actually necessary knowledge in the discipline. This, of course, is the basis of a high level of qualification. However, in our opinion, the modern course should reflect informatics not just as a system of knowledge, but as a research tool, a sociocultural phenomenon, a tool for the humanization of the information society and the individual.

The implementation of the project is reflected in the technological block and is based on the creation of an educational environment based on the principles of humanization in education. Working on the theoretical and methodological basis of the model, we relied on cultural, competency-based, systemic and activity-based approaches in education. The creation of a pedagogical concept is a creative and abstract process, since in pedagogical science there are no clear rules for working on a fundamental idea. As is known, in practice the author's conceptual idea cannot be repeated.



Scheme. Model of the system for the development of ICT competence of the future primary school teacher.

When implementing the course “Information Technology in Primary School”, we draw parallels between mathematics and computer science. For example, when studying number systems, we encode information (we encrypt letters using a binary code), when studying relationships in mathematics, we must build a graph, familiarity with this concept helps in decoding information [14, 15].

## CONCLUSION

The article deals with current issues related to the development of ICT competence of future primary school teachers by means of disciplines “Information Technology in Primary School”. A model for the development of ICT competence based on information literacy and the basic principles of information interaction is presented. The levels of ICT competence that we have identified are determined by a set of competencies that characterize a qualitative, justified transition to a higher level of readiness in the implementation of professional activities. The model justifies itself in practice, but needs further research and statistical verification.

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