

## Informatization of the Educational Process

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**Abstract.** *The article reveals promising directions for the development of teacher education in Uzbekistan in the context of reforming higher education. The content of specialist training is also structured in accordance with the requirements of systemic, integrative-differentiated approaches, the principles of consistency and continuity of the learning process.*

**Keywords:** *Education system, information content, technology, experiment.*

The education system is a holistic but open system, one of the essential characteristics of which is its information content. This does not mean at all that the information system in the education system involves only the assimilation of information. Informatization of the educational process is a set of measures related to the saturation of the educational system with information means, information technologies and information products. New pedagogical technologies are unthinkable without the widespread use of information and communication technologies; they will make it possible to fully reveal the pedagogical and didactic functions of methods and realize the potential inherent in them.

**The main task of** information and communication technologies is to ensure modern quality of education based on maintaining its fundamentality and compliance with the current and future needs of the individual, society, and state.

➤ The main task of the teacher is to organize active work with information, which is based on independent critical and creative thinking of students.

A teacher who uses information and communication technologies must learn the golden rule: “the use of information and communication technologies in the classroom should not be an end in itself, but for the benefit of the learning process itself and students.” Such work requires a different didactic system, different teaching methods and technologies, adequate to the personality - oriented approach in education.

The use of information and communication technologies in various lessons allows:

➤ intensify the cognitive activity of students.

Therefore, the teacher sets himself the goal of maintaining students’ interest in learning. In addition, each of us faces certain pedagogical tasks, in particular, the search for effective methods and technologies.

Using a computer makes it possible to conduct lessons at a high aesthetic and emotional level; Slides displayed on a large screen are an excellent visual material that is used to enliven the lesson.

This material may vary.

- regular illustration;
- use of animation in slides;
- use of multimedia.

Ensure a high degree of differentiation of training (almost individualization).

The computer allows you to perform work quickly and load all students with work. Thus, diagnostics of assimilation of program material is carried out very clearly. It is advisable to create assignments and tests of different levels of difficulty. Some will be able to complete everything, some will get to the middle, some will only work with simple ones. But the most important thing is that all students are engaged, and the teacher sees at what level each student is.

The computer allows you to increase the amount of work performed in the lesson by 1.5-2 times; improve knowledge control. The peculiarity of programmed and computer training is that all educational material is divided into separate portions and each portion ends with a control, be it a question, task, exercise or test. If the test tasks are completed correctly, students receive a new portion of material and complete the next step of learning. If the task is completed incorrectly, then the next page of the program simply will not open.

The computer allows for feedback. As the work progresses, the students themselves and the teacher can immediately see the result. Students discuss where they made a mistake, what they did wrong, i.e. We are witnessing the formation of self-control and self-esteem skills. If a student experiences serious difficulties, a teacher comes to the rescue and provides an individual approach to the student.

4. Develop skills in genuine research activities. Visual representation tools can be used not only for illustration, but also as an independent source of knowledge for creating problem situations.

5. Provide access to various reference systems, electronic libraries, and other information resources.

Before starting work, the teacher must find out for himself:

1. What topics should be supported using information and communication technologies? Practice shows that it is advisable to take on complex topics.

2. What software is appropriate to use when performing computer tasks?

3. What preliminary computer skills should students develop? This could be: drawing up comparative tables, identifying similarities and differences, diagrams, sociological diagrams, drawing graphs. Filling out historical maps, creating presentations, websites, etc.

4. What types of lessons are advisable to use computers? Practice shows that these can be lecture lessons, explanations of new material, repetition and generalization of what has been learned, preparation for a test, test, correction lesson, etc.

5. How to organize a lesson and rationally use the time allocated for the lesson? The teacher needs to think through and plan the organization of the entire lesson in such a way as to prevent turmoil, chaos, loss of time and concentration of students' attention, and for this one must remember the psychological requirements for the lesson.

Stages of organizing a lesson using information and communication technologies:

1. Organizational stage. At this stage, it is important that students do not "take up" lesson time by entering a password, do not wait for the educational site to load, or do not install programs, but study exactly the subject, but on the computer. And the teacher can be helped in this by the system administrator on duty, who is selected from among students who are quite well versed in computer tricks. It is he who prepares the computer class for the lesson: downloads, installs, installs...

2. Stage of assimilation of new knowledge. Thematic and subject-specific Internet resources can act as one of the ways to increase student interest. Visual aids, teleconferences, videos and animations - all this can show a new topic to students in a way that is more understandable and interesting for each of them. It is important to collect such resources and form a "Teacher Library on CD". Students can help the teacher with this. The presentation may show the most advantageous moments of the topic: spectacular transformations, a selection of electronic geographical or historical maps, portraits, quotes, diagrams, tables, charts, graphs, excerpts from films, photographs, animation, etc. Definitions may also appear on the screen which the children copy into their notebooks, while the teacher, without wasting time on repetition, manages to tell more.

3. Stage of generalization and systematization of knowledge . The created school data bank of educational and methodological support for school disciplines - a “resource library” helps the teacher to systematize the knowledge, skills and abilities of students. To do this, throughout the entire educational process, students are invited to create their own project on a given problem or topic. Or, at the discretion of the teacher, a test or test is prepared. The work is carried out in a differentiated manner.

4. Stage of control and self-test of knowledge. Testing, puzzles, crosswords, filling out tables. This work is performed by students either individually or in a group form of work. It is recommended to carry out this work in a differentiated manner.

5. Stage of informing students about homework, instructions for its implementation. A mandatory minimum of implementation must be defined and space allocated for initiative :

- time frames,
- number of information sources (addresses of certain “reference” sites),
- task implementation program (this can be MS Word , PowerPoint ),
- volume of the reporting document (number of pages, files, slides, etc.),
- additional task, the location of the completed work is specified.

The effectiveness of any lesson is determined not by what the teacher gives the children, but by what they took from the learning process. The ability to rationally use ICT with traditional teaching aids allows the teacher to create the palette of colors with which to create a unique masterpiece - a modern lesson.

Objects of research in any area of dissertation research are usually complex and associated with a significant number of both controllable and uncontrollable (independent) factors. The parameters of their state can be significantly influenced by elements of chance that have a complex nature of origin. To establish the patterns of functioning of these objects in real conditions, theoretical research alone is not enough, since it is not always possible to analytically describe the object being studied with sufficient accuracy. Such objects are characteristic of almost all areas of applied research, both in technology and in engineering and in the field of natural sciences. Experimental data can be used to test and refine working hypotheses, as well as substantiate the direction of research in the relevant area. The effectiveness of research generally increases if theoretical premises are clarified experimentally, and experimental data are analyzed and generalized on the basis of the theoretical principles of the relevant branches of science.

An experiment is a research method consisting of a targeted influence on an object under specified controlled conditions, allowing one to monitor the progress of its implementation with precise recording of the values of pre-planned parameters of the object under study with the required reliability and accuracy and to recreate it each time as necessary when repeating the same conditions its implementation. In this case, both the conditions and parameters of the object under study (parameters of the working parts of machines and equipment, individual operations of technological processes, characteristics of phenomena, etc.) can change within predetermined variation intervals.

When conducting an experiment, the researcher resorts to other (simpler) methods of empirical research:

- observation based on purposeful perception of phenomena (and the researcher, based on his knowledge, knows what and how to observe);
- description based on recording information obtained from observation;
- measurement, which consists in comparing objects according to any similar properties, characteristics with a standard and establishing quantitative characteristics.

The main task of any experiment is not only to obtain previously unknown information about the object of study, but also to reliably establish the patterns of its behavior in changing conditions that

coincide with the conditions of its functioning in nature, technology, social life, etc. With the help of an experiment, data can be obtained, the processing of which will make it possible to obtain mathematical models that reliably describe the object being studied, to reveal the patterns of its behavior in changing conditions, i.e. solve the identification problem.

Depending on the characteristics of the object and the goals set, experimental studies can be carried out under different conditions. In this case, a distinction is made between laboratory, laboratory-field, factory, etc.

To obtain reliable and reliable results of experimental studies, it is necessary to carry out:

- analysis of the characteristics of the object under study in all the variety of properties provided for by the purpose of the dissertation research, based on available information obtained by other researchers and published in information sources;
- development of an experimental research program;
- justification for the choice of quantitative parameters (criteria or measured values) for assessing the properties of an object, choosing their dimensions and methods of measurement during the experiment;
- Determination of all factors influencing the parameters of the object in question selected on the basis of exploratory research (if necessary) for observation under the conditions of the phenomena and processes being studied;
- consideration of cause-and-effect relationships between the parameters for assessing the properties of an object and the identified factors;
- ranking factors according to the degree of their influence on the parameters (criteria) for assessing the properties of an object and identifying the main (dominant) ones from them;
- determination of rational intervals of variation of the selected factors to establish the corresponding patterns provided for by the dissertation research program;
- fixation of other factors at certain (possibly better) levels of variation;
- development of design and technological diagrams of experimental installations or stands that ensure the implementation of the planned research program;
- studying the possibilities of object modeling;
- Selection of appropriate existing or development of new measuring equipment that records measured values during experiments through executive bodies (sensors, amplifiers, computers, etc.);
- development of a methodology for calibrating selected measuring instruments, their installation for reliable measurement or recording of controlled quantities;
- development of methods for processing primary documentation, including observation logs, protocols or research reports, ensuring the requirements for reliability, accuracy and reliability of the experimental results.

As a rule, the answer to these questions should be presented in the form of a separate chapter of the dissertation, which is usually called "Description of the experimental part, the equipment used and the experimental technique." Almost all dissertations of applied significance have this section.

The results of experimental observations are presented in the form of a separate chapter (or several chapters, if the goals of the dissertation included setting up a generalization of several disparate groups of experiments). Analysis (discussion) and generalization of the experimental results can be described both in the same chapter (chapters) and in separate chapters. The composition, volume and content of individual sections and subsections of these chapters is the author's decision. This chapter(s) should fully disclose the purpose and objectives of the experimental research provided for in the original program.

In the course of processing the experimental results, patterns of the studied phenomena and processes occurring with the participation of the object under study are established, which make it possible to obtain a reliable answer to the tasks and questions of interest to the researcher. To illustrate established patterns, it is customary to use tables, diagrams, graphs, mathematical models, etc.

When studying complex systems, situations often arise when it is impossible to clearly identify and study individual phenomena or processes in isolation. In this case, in the experimental study of an object, the construction of mathematical models is used, which describe the real object under study with an appropriate degree of reliability. In this case, the precise concept of "law" or "regularity" is replaced by a more approximate and abstract concept of "model", which has an element of ambiguity and some uncertainty, but is practically more understandable and convenient to use. Of course, there are no contradictions here if this model describes the object of research with the required reliability and accuracy of the estimated parameters. As in the case of theoretical studies, when constructing models in experiments, the same systems and processes can be described by different models and with varying accuracy, depending on specific conditions.

Sometimes, when processing experimental data, the task is to optimize the parameters of an object according to some quantitative or qualitative criteria. For this purpose, well-known techniques, appropriate programs and technical means of data processing are used. The certainty that the optimization parameters really allow optimizing the property of the object must be confirmed by direct experiment, the conditions of which correspond to the optimized parameters. Only in this case can we talk about the reliability of the practical conclusions and recommendations obtained.

In applied dissertations, especially technical ones, the final stage is testing the object under study under production conditions. Testing is a type of scientific experimental research in which the object under study is evaluated under production conditions for which it is actually intended. During testing, the parameters of its operation are not changed, except for those provided for by the relevant requirements of the operating and maintenance instructions in the form of separate adjustments of mechanisms. The purpose of such tests is to determine the compliance of a given dissertation research object with the production requirements that were initially set before the researchers (developers).

State regulatory documents today provide for almost 40 different types of tests. The main ones are the following:

- Preliminary factory or field testing of a prototype;
- Acceptance tests of modified samples or pilot batches (installation series);
- Control tests during mass production of machines;
- Testing samples after major repairs.

The first two types of tests are used at the stage of design, scientific research and refinement of new designs of machines and equipment to their operating condition. With their help, the effectiveness of ideas, technological and technical solutions, the validity of the choice of values of individual parameters, design, technological and layout diagrams embedded in such machines and equipment, the degree of validity and optimality of the basic (main) parameter values are assessed. At the same time, errors made during the design are identified, the parameters of the main elements of the object under study, possible deviations, reliability of operation in production conditions are clarified, and a conclusion is drawn about the prospects for its further use for its main purpose. The presence of such protocols in the annex to the dissertation is evidence of the high practical significance of the dissertation research, which simplifies the examination of the dissertation .

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