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DESIGN - A NEW SOLUTION IN EDUCATION

ПРОЕКТИРОВАНИЕ - НОВОЕ РЕШЕНИЕ В ОБРАЗОВАНИИ

Abstract:

With the rapid development of society and IT, tangible changes are taking place in the educational system and programs; it becomes possible to explore cause-and-effect relationships and relationships between them, to find solutions in a non-standard way. Technologies, as a kind of mechanism, are capable of using new means and ways of working in the education system, embodied in a real mode. Any technologies should contribute to inadequate solutions, demonstrate their effectiveness, help to find the correct answer to the questions and problems posed, and solve them in a non-standard way. Considering design as an effective product for future education, it is necessary to learn how to identify connections between phenomena, objects, observe changes, finds interesting connections, pose an original question: how to change, combine, transform, turn over,

replace, align, find analogy, to solve in an original way - all this leads to the formation of hard-soft-vital skills, independent and creative, search work and the successful implementation of innovative technologies in the design process bring good results.

The article discusses three groups of technologies developed and revised by us for design according to certain characteristics and in the direction of performing functions: technologies that provided non-standard, original solutions; technologies related to rethinking and transformation; creative design technologies, principles of working with these technologies. Evaluation criteria for these technologies are proposed. It is noted that monitoring (Evolution) and adjustment (Statement) determine the effectiveness of the application of the noted technologies in design.

Keywords: *design, technology, product efficiency, connections between phenomena, skills formation, rethinking, non-standard solutions, evaluation and assignment*

Introduction

The society has been developing rapidly over the past decade. A person as a person strives for self-education, self-development and self-realization. The faster there are changes in society and the development of information technology (IT), the more interest appears in various environmental phenomena and its changes, and the more difficult are the problems of education, upbringing, and personality formation.

Educational systems are changing, where the set of interacting elements differs from the properties of its constituent parts. The emergence of new elements in the education system is considered in the order of things, there is interest in changes and the establishment of relationships and relationships between them, they become an object of search and research. Educational systems and programs are in crisis.

In this regard, the system must foresee and implement changes in the field of education, which are transformed, combined with the goals of education, and the educational program must proceed from the requirements of society. The educational system and educational programs must be considered in conjunction. It is in educational systems in the broadest sense of the word that the formation of the individual takes place, the acquisition by the individual of one or another image that corresponds to the needs of the individual and society.

Naturally, with the development of society and IT, there is a need for new professions - education manager, coaching (coach) of virtual education, copywriting, underwriter, supervisor, promoter, trader, etc.). With the emergence of new professions, the question arises of the development of new technologies and the formation of innovative skills, meta-skills that would meet the requirements of the labor market.

Technologies in education are a kind of mechanism through which new means and methods of the educational system are implemented, embodied in the real world: "intelligent technologies", "interactive technologies and methods", "innovations", "multimedia educational materials" and many others. When we talk about innovation, we have to think about how to make the development of technologies non-standard and in demand, and in order to do this we need to know how to do it correctly and how it is applied in practice.

Technological activity in its most complete development presupposes a system of interrelated types of work, the totality of which ensures the emergence of natural innovations, namely:

- ✓ research activities aimed at obtaining new knowledge about how something can be ("discovery"), and how something can be done ("invention");
- ✓ project activities aimed at developing special, instrumental and technological knowledge about how, on the basis of scientific knowledge in giving conditions and situations, it is necessary to act in order to get what can or should be ("innovative project") [7, 8],

- ✓ educational activities aimed at the professional development of subjects of a certain practice, at the formation of each personal knowledge (experience) of what and how they should do so that the innovative project is embodied in the reality of practical activity (“implementation”).

What is “educational technology” in the new era of education? This is a complex of three interconnected components and this component must be very flexible and constantly change, combine, transform.

First, the content programs should consider not only the development of subject knowledge, but also the development of competencies, hard, soft, vital, meta skills in practice, developing creative thinking. This content should be well structured and presented in the form of multimedia educational materials that are transmitted using modern means of communication.

Secondly, innovative teaching technologies form competencies, skills and abilities based on the interaction of students and their involvement in the educational process, with the help of independent, search and research activities. The modern training infrastructure, which includes information, technological, organizational and communication components, makes it possible to effectively use the advantages of distance learning.

Thirdly, various pedagogical technologies. It depends, first of all, on the traditions and status of the institution. Nevertheless, the following are the most characteristic innovative pedagogical technologies that will be used in the future.

- ✓ Information and communication technologies (ICT) in subject learning. It is the introduction of ICT into the content of the educational process that implies the integration of various subject areas with informatics, which leads to the virtual version of the consciousness of students and their understanding of electronic processes in modern society (in its professional aspect).
- ✓ Personally - oriented technologies in teaching a subject. Here it is necessary to pay attention to the educational system, which should provide comfort, conflict-free and safe conditions for the development, realization of the natural potentials of students. The human personality in this technology is not just a subject of study, but a priority subject; it is the goal of the educational system, not a means to achieve any abstract goal. A person's personality manifests itself in actions, in development - on the basis of educational programs in accordance with their capabilities and needs.
- ✓ Information and analytical support of the educational process and quality management of education. The use of information - analytical technology will allow us to objectively track the development over time. Here knowledge of Time management is needed, namely: when, where, for what purpose, to prepare control in the studied subject in accordance with the subject-curriculum.
- ✓ Monitoring of intellectual development. Analysis and diagnostics of the quality of learning of each student by testing and building graphical dynamics of progress.
- ✓ Educational technologies as a leading mechanism for the formation of a modern person with the necessary values is an integral factor in learning conditions both in the present and in the future.
- ✓ Didactic technologies as a condition for the development of the educational process of an educational institution (EI). Here, both already well-known and proven methods and techniques can be implemented, as well as new technologies presented in pilot projects. Usually, various combinations of methods and techniques are used in practice, on the basis of which new technologies can be identified.
- ✓ Psychological and pedagogical support for the introduction of innovative technologies into the educational process involves the use of analysis and reporting on methodological councils, seminars, consultations with leading experts in a specific area, in specific disciplines.

The portfolio technology implements the following functions in the educational process:

- ✓ diagnostic (changes and growth (dynamics) of indicators for a certain period of time are recorded);
- ✓ goal setting (supports educational goals formulated by the standard);
- ✓ motivational (encourages students, lecturers and parents to interact and achieve positive results);
- ✓ meaningful (maximally reveals the entire range of achievements and work performed);
- ✓ developing (ensures the continuity of the process of development, training and education at a specific level);
- ✓ rating (shows the range and level of skills and abilities).

Portfolio technology is the result of monitoring and evaluation [7, p.253]

The most demanded technology at this stage and in the future is design, the importance of which must be taken into account both in real and in virtual mode. It acquires particular relevance in the context of the development of variable, specialized, multilevel education.

With regard to design technology in education, we need to consider this technology in a new period of time. The design technology itself is a process that includes those components that are necessary for the implementation of the project itself in the given conditions and in this situation.

At present and in the future, in order to design any educational process, one needs to have academic knowledge, a situation, professional intuition, be able to think creatively, generate ideas, and be well-versed in the application of innovative teaching methods and technologies, including advanced learning.

Considering design as an effective product for future education, it is necessary to learn how to identify connections between phenomena, objects, observe changes, find interesting connections, in order to then pose the question: how to change, combine, transform, turn over, replace, bring into line, find an analogy, solve in a non-standard, original way - all this leads to the formation of hard-soft-vital skills, and independent and creative search work gives good knowledge.

Thus, we move on to project education, which requires some training from the educational institution (EI) and some knowledge of design. Learning platforms are important. Open education systems such as Classroom, Campus, E-Study, Moodle, MOOC (Massive Open Online Courses), M-Learning, iSpring Online, universities, webcasts and so on, have gained particular popularity. The most suitable platform for project management is Moodle, which aims to use the principle of individualization of activities, to establish quick feedback, visibility, quick provision of material and organize the activity of the listener [5, p.67; 6].

Pedagogical design, as we have already noted, is a process, the preliminary development of the main details of the upcoming activities of students and lecturers. To develop the main parts, components, to identify the connections between them, to establish a certain system of work between them at the organizational, gnostic (search for content, methods, means and interaction between them) and communicative levels are necessary for the development of technologies.

Pedagogical technology is a sequential and continuous movement of interconnected components, stages, states of the pedagogical process and the actions of its participants.

Based on the foregoing, we have developed and revised technologies for design and are presented by groups according to certain characteristics and in the direction of performing their functions:

- ✓ Technologies that provide non-standard, original solutions.
- ✓ Technologies related to rethinking and transformation.
- ✓ Creative design technologies [1-2].

Any design begins with an attempt to embody the born thoughts, ideas into form and essence, try to solve the problem in a non-standard and original way and translate it into reality. When and how to start - it depends on how ready you are in difficulties, how well prepared you are theoretically and how clearly you represent yourself in this project. Your style of work, your development skills, and the ability to form your point of view will lead to a quick solution to this goal, and this takes a lot of time.

Our proposed classification of design technologies will help students navigate the process of working on a project. The experience of working with undergraduates has shown that this classification is a good guideline for independent, creative work, especially since they go through such new disciplines as the design of educational programs, design in the linguistic education, etc.

We have developed and are presenting three groups of technologies according to certain characteristics and in the direction of performing their functions:

The first group of innovative design technologies includes "brainstorming", "inversion", "idea generation", "search and research".

Brainstorming technology is, in fact, a method of generating ideas and involves the following stages:

- ✓ Spontaneous presentation of their ideas to each participant at a fast pace without preliminary criticism and discussion.
- ✓ A record of "issued" ideas.
- ✓ Sequential discussion and evaluation for each idea, different interpretations.
- ✓ Selection of 2-3 ideas that can become the subject of discussion of the project.

The "inversion" technology means that when considering ways to solve a problem, such a transformation or rearrangement is made that allows you to get fundamentally new, sometimes non-standard, original solutions.

In its structure, the "idea generation" technology is similar to the "brainstorming" technology and includes the following stages:

- ✓ Proposal of an idea and description of its structure and implementation mechanism.
- ✓ Fixation of ideas and transformation of ideas.
- ✓ Analysis and evaluation of each idea.
- ✓ Selection of the most interesting and non-standard ideas corresponding to the set goal in the project, stage-by-stage implementation.

"Search and research" technology in the design performs certain functions that determine priorities. These include:

- function of discovering new knowledge based on identifying patterns, evidence;
- the function of deepening the studied knowledge in the proposed discipline;
- the function of systematizing the knowledge learned (that is, establishing relationships between concepts; identifying relationships between topics; structuring educational material, etc.);
- the function of the student's development, his transformation from an object of learning in a subject of management, the formation of his independence towards self-government (self-education, self-realization);
- the function of teaching students the methods of activity, techniques and methods of scientific methods of cognition.

"Search and research" technology involve the implementation of the following stages in the design process:

- motivation for learning activities;
- statement of the research problem; the formulation of the final and intermediate goals of the research assignment.

Analysis of available information on the issue under consideration:

- ✓ planning the activities to carry out the experiment (measurements, tests, samples, etc.) in order to obtain the factual material;
- ✓ self-conduct of the experiment;
- ✓ systematization and analysis of the received factual material;
- ✓ putting forward a hypothesis;
- ✓ confirmation or refutation of the hypothesis;
- ✓ conclusions;
- ✓ registration of the progress of the assignment and the results obtained;
- ✓ discussion of results.

The second group of design technologies related to the rethinking of the presented goal, task, function includes the technology "leading analogue task" based on borrowing experience through a search, careful analysis of advantages and disadvantages and "improvement" of other people's ideas in science and methodological literature.

The technology of "changing the formulation of tasks" is to expand the boundaries of the search for a solution to an urgent problem. Thus, for example, changing the formulation of the structural components of a finished and implemented project, you can identify interesting solutions to a known problem and define new areas of activity.

The technology of "leading questions" allows you to streamline the search for solutions to the problem. Such questions might be:

- ✓ Why does this problem need to be addressed?
- ✓ What needs to be done to resolve the problem?
- ✓ What means are needed for this?
- ✓ Who could participate in the project, etc.

The technology of "correcting and accounting for deficiencies" can be used to describe a problem situation when it is necessary to collect information and draw up a complete detailed list of deficiencies to be corrected.

The technology of "free expression of function" is aimed at describing all the functions that should contribute to the development of the intended project product and the search for the "ideal" result in the form of a layout or model.

The third group includes technologies that solve problems with a creative approach. These include "associations", "transformations", "permutations", "anticipatory thoughts and learning", "analogies", "modeling", "social-practical", "heuristic modeling, design".

The technology of "association" is associated with the extraction of associations from different ideas to change social reality. The use of this technology contributes to the development of figurative and associative thinking of students.

The technology of "transformation" allows you to use other people's ideas, but subject to changes in the structure, content, design, presentation.

The technology of "transformation" allows you to transform from more complex structures to simpler ones.

The technology of "rearrangement" has been widely used in design practice as the simplest and gives unexpected results. In the process of permutation, the original object can be brought to the point of absurdity and then an unusual or even rational solution can be found.

The "modeling" technology takes into account the design process of an object and its model, indicating a method for assessing the design result. The "modeling" technology allows you to develop an algorithm for synthesizing the organizational structure of the object itself.

The technology of "advance learning" allows the lecturer to present a short background before starting to study a new topic in the presented program. Brief basics can be given both as abstracts when considering related topics, or as unobtrusive mentions, examples, associations, analogies, models. It is assumed that anticipatory learning is effective in learning a topic that is difficult to understand. Advanced learning implies the development of students' thinking ahead of their age capabilities. (S. N. Lysenkova, S. M. Minasyan A. M. Tsaturyan) [3, 4, 9-11].

The essence of the technology to work by analogy is to use existing solutions in other areas of life. When using this technology, an analogue of the original borrowed idea is interpreted and gradually brought to a design concept.

The "modeling" technology takes into account the design process of an object and its model, modeling indicates a way to assess the design result.

"Socio-practical technology" (the term of the author S.M. Minasyan) [4, p.97] is one of the key technologies of an experimental nature in design. With the help of approbation of the information obtained in the process of experimental work and done in the pre-stage design period, they allow us to make sure of the relevance of the problem being solved, the object. Interviews, tests, questions and answers, observations make it possible to reveal the relevance of the studied topic, changes in mechanisms, needs and attitudes of social society, namely: what, where, when, under what circumstances? With the help of approbation of the information obtained in the process of experimental work, the stage-by-stage design work done, they make it possible to verify the relevance of the problem being solved. The right platform allows you to work online in the design development process. It provides feedback to the whole group, which allows discussing ideas, solutions, and design implementation. Socio-pedagogical technology includes all the elemental structures of the joint process of project work on different platforms [6, p.48].

Identifying certain needs of society in education, we begin to research and identify the reasons and approaches to eliminate the shortcomings and difficulties in educational programs.

The essence of the technology "Heuristic modeling and design" is to consider the initial idea of the project from the end, bring it to the point of absurdity, and then find a rational grain in this chaos and model or design.

Criteria for evaluating the presented technologies for the design of educational programs

"Evaluation" is a bit more quantitative and rating-oriented (like scores or grades) while "assessment" (related to "learning") is more holistic and qualitative. All too often, from an operational perspective, we equate our evaluative scores with our assessment of learning. This only serves to confuse matters further.

However, many of our assignments are activities during which learning may take place. Evaluation scores may merely indicate level of performance, not whether or to what degree learning has occurred. By contrast, one's summative assessment strategy may involve numerous evaluations and formative assessments of one sort or another. It may also be helpful to consider that we evaluate an individual's performance, educational programs' effectiveness, a technology's suitability, etc.

By contrast, assessments of learning, depending upon the level of sophistication involved, may require an educator to monitor the progress of a learner from a starting point to an ending point relative to some standard and then to use her professional judgment to conclude whether learning has taken place [10, 12-15].

You will be able to:

- ✓ Identify sources for evaluating different types of educational technology.
- ✓ List and explain the key criteria used to evaluate Web and software resources.
- ✓ Describe ways to integrate technology into specific curriculum subject areas.
- ✓ Locate Internet resources for evaluating resources found on the Web.

- ✓ Critically evaluate current research and professional practice literature.
- ✓ Contribute to professional development of other educators.
- ✓ Demonstrate use of current technologies for participation in the extended education community.

Alternative Assessment

Effective classroom assessments integrate classroom teaching and learning, going beyond tests at the end of a lesson, and such assessments provide immediate feedback to lecturers and students on performance. Project-based assessments, for example, feature such characteristics as real-life contexts, everyday problems, the application of content to solve problems and the use of appropriate technologies.

Rubrics may be used to evaluate student work and they can be a form of alternative assessment of learning. They are a terrific tool for assisting students in taking more ownership for their learning. By using rubrics, a lecturer is really planning and informing the students how their performance will be evaluated prior to implementing the learning activity. Talk about feeling organized and prepared! Furthermore, the second standard is: Design and Develop Digital-Age Learning Experiences and Assessments. Using rubrics to assess your students' learning helps you master this standard.

Explore some of these great Web resources for learning more about using rubrics with your students [11].

Evaluating Software, Digital Media, and Technology

Rubrics can also be used to evaluate software and technology based upon specified criteria (e.g., cost effectiveness, age appropriateness, curricular relevance, etc.). The rubrics presented for evaluating software and Web sites are very useful and are appropriate for both you and your students to use. As noted, most universities and/or districts have a group of people who evaluate software prior to making a purchase. Lecturers also need to evaluate software before attempting to integrate it in the curriculum. It is always important to evaluate software for content and age appropriateness. This follows with the idea of not letting the technology drive the curriculum, but letting your curriculum and learning objectives drive the technology. By evaluating software you will be able to make better decisions about what and how to effectively integrate a particular piece of software.

Evaluation of educational technology is important before, during, and after instruction takes place. Again, recall the instructional design models discussed last week. Evaluation after instruction is a crucial component of a lesson that effectively utilizes technology and digital media. Lecturers can rely on a variety of resources to help evaluate the appropriateness of educational technologies.

Digital Media in the Classroom

As you have learned, digital media is everything from videos to graphic design software applications. With so much information and technology out there, it can be intimidating when it comes to choosing the appropriate form of digital media to integrate in your curriculum. Evaluating digital media for appropriateness and usability is just like evaluating software, Web sites, and other technologies.

Thus, students need to be able to "locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media." Students need to understand these same concepts of evaluation to determine the quality and appropriateness of a Web resource [11].

Conclusion

All these technologies can be changed and improved during the design process. It all depends on the purpose of the project, tasks and functions, situations, envy of what kind of educational product we want to present and how effective it will be.

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