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**DEVELOPMENT OF DIDACTIC TOOLS IN THE CONTEXT OF
DIGITAL TRANSFORMATION OF HIGHER EDUCATION**

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Summary. The article attempts to consider issues related to the development of didactic tools at the conceptual and technological levels in the context of the digital transformation of higher education. Modular organization of the digital didactic tools development is considered. Attention is paid to the inclusion of an autonomous learner in the creation of modern interactive didactic tools while learning.

Key words: educational innovation, digital transformation, learning tools, material design, module, autonomous learner

**РАЗРАБОТКА ДИДАКТИЧЕСКИХ СРЕДСТВ
В УСЛОВИЯХ ЦИФРОВОЙ ТРАНСФОРМАЦИИ ВЫСШЕГО
ОБРАЗОВАНИЯ**

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Аннотация. В статье предпринята попытка рассмотреть вопросы, связанные с разработкой дидактических средств в условиях цифровой трансформации высшего образования на концептуальном и технологическом уровнях. Рассматривается возможность модульной организации разрабатываемых цифровых дидактических средств. Акцентируется внимание на включение автономного обучающегося в создание современных интерактивных дидактических средств непосредственно в образовательном процессе.

Ключевые слова: образовательные инновации, цифровая трансформация, дидактические средства, разработка дидактических средств, модуль, автономный обучающийся

The ongoing digital transformation of society in the context of globalization actualizes the task of developing innovative didactic tools in the system of higher education that contribute to the implementation of the competency-based model of training a future specialist based on the inclusion of a student in active educational activities. Innovations in higher

education are associated with the implementation of the new philosophy. Previously professional development of a specialist was influenced by the philosophy of technocratic pragmatism. The system of higher education was aimed at upbringing a specialist who could fit well in the industrial production process and was motivated to favor technological development and progress. Today most of the businesses are within the sphere of the production of services, which in its turn brings about the priority of soft rather than hard skills on behalf of the specialist with a university diploma. Thus, the philosophy of anthropocentric dialogue is coming to the fore. Innovation covers the educational paradigm. Here we can observe a shift from *knowledge extension orientation* to culture building and development. It supposes a new methodology, which in most general way transforms from behaviorism to performance. A qualified specialist today is no longer the one who has mastered a range of professional behavioral patterns, which can be applied in typical professional tasks, but the one who is resourceful enough to come up with original solutions to problems in situations of uncertainty characteristic of the world open to communication. The process of teaching and learning in the system of higher education is gradually substituted for by the educational process associated with learning, (self)development, upbringing and practical activity of the student. Innovation in education as a process is characterized by the introduction of new goals, tasks, content, methods, tools, forms, technology, and new management. Due to the progressing technological development of communications, including telecommunications we can observe the increase in such teaching and learning practices as e-learning, game-based learning, learning through simulations and role-play, case-methodology, research-based methods implementation, and special learning space design.

One of the greatest challenges of the ongoing innovative processes in the system of higher education is related to the development of new learning tools and digital learning materials design. An innovative “course book” is no longer a means of teaching or learning, but a kind of generator of a concrete educational process. It is supposed to teach, and provide learning and practical activity of a student; it favors professional upbringing, and competences building.

The design of didactic tools involves a comprehensive solution of theoretical and practical problems at three levels – namely conceptual, technological and the level of practical implementation (see Fig. 1). The first one supposes the definition of the conceptual framework for designing didactic means, the second is aimed at defining the principles of technical implementation of the idea, and the third one is related to the

implementation of the idea in a concrete didactic development [1]. In this article we will have a closer look at the first and the second aspects.

At the conceptual level the authors of learning materials consider socio-didactical requirements, analyze didactical conditions based on the principle of humanization of educational process which supposes due regard for the learners' needs, interests, abilities realization analysis. Didactic tools in the time of total digitalization and easy access to multimedia information associated with higher education as a system of open education must be designed in a way that makes it possible to bring up an autonomous learner. It means open structure and content. The learner fills it with individual meaning, personal content; and it is the student, not the instructor, who decides which learning material to process. Learning time can be planned only in a very general way, since it is the learner who manages their time and sets the time limits in learning this or that content. Modern learning tools and materials are designed to provide competences development in a learner allowing them to build an individual personal educational trajectory by making one's own choice. Thus, modern materials designing requires amplification of the educational material.

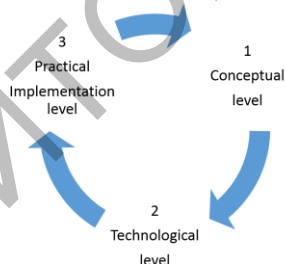


Fig. 1 – Didactic tools designing process

We assume that each individual student has their unique learning style and certain possibilities in connection with the proposed teaching material. Some students learn better from a printed text, while others prefer audiovisual content, and still others would like to hear and take notes, etc. According to our research that covered 431 students, 300 (69.6%) prefer printed texts, whereas 185 (42.9%) like to work with audio materials, while 308 (71.5%) prefer video content, and 211 (49%) would like an image with a text. As can be seen from the answers of those participating in our questionnaire, students watch, listen and read in approximately equal proportions, using the capabilities of modern technologies for multimedia

presentation of material and at the same time relying on their usual channels and ways of perceiving information. Therefore psychological and pedagogical requirements for the content of teaching, along with its scientific nature and topicality, should relate to the individual characteristics of students and be characterized by the variability of the presentation of the material, and the visibility of the presentation.

At the technological level of modern learning materials designing, didactical methods and means are defined. Approaching learning as activity, we design a learning module on a particular topic, taking into account the structure of learning activity. Thus, the first step, reflected in the structure of the module, should motivate the student to learn new material. It can be achieved by introducing assignments for activating background knowledge, defining goals and individual self-set tasks. Based on the idea of multitude of learner's interests within the educational process, we suggest the structure of the learning module is non-linear; it is branched – like the content of educational disciplines, – and includes diversified learning programs. In our opinion, a good learning tool should allow optimization of the learning process. One of the possible means in this respect can be the implementation of cognitive metaphor together with the logicity of information and perception, favoring possible information and knowledge transfer and integration. Open learning environment is associated with student's learning autonomy, learning process self-management. For this end, a good learning tool includes both inductive and deductive presentation of material, a combination of explanation, illustration, reproduction with problem-solving, heuristic, research methods of learning, practical activities such as experiment, exercise lab works. For students to reflect on their progress, a learning tool is supposed to provide testing mechanisms accompanied by correcting activities, as well as competences description for a student to use a model. We must admit that in the open learning environment the structure of the learning module as well as its content and methods of learning implemented is diversified. It usually has an integration of linear and loop input within modular organization. One type of modules can include standardized theoretical material, activities and problems series, control methods and means, self-evaluation and testing of competences. Another type of module is more learner-centered and it includes individual thematic blocks, which are structured and designed by the students themselves. In our material design for the theoretical disciplines we use a combined type of module structure which covers such elements as: 1) activating / lead in, 2) input, 3) production, 4) resources, 5) self-check and reflection. As for the concrete forms of realization, a modern didactic tool can be presented via HTML, in a form of a flash presentation, a PDF-product, or an MS Power

Point product. It can also be developed in special software shells, on education platforms and portals within specialized educational environments.

LITERATURE

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ИСПОЛЬЗОВАНИЕ QR-КОДОВ В ОБРАЗОВАТЕЛЬНОМ ПРОЦЕССЕ

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Аннотация. В статье рассматриваются и приводятся примеры использования QR-кодов в образовательном процессе на различных этапах урока.

Ключевые слова: QR-код, эффективная мотивация.

THE USE OF QR CODES IN THE EDUCATIONAL PROCESS

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Summary. The article discusses and gives examples of the use of QR codes in the educational process at various stages of the lesson.

Keywords: QR code, effective motivation.

Важнейшая задача образования – это формирование у учащихся познавательного интереса, мотивации к обучению, которые, формируясь в средней школе, продолжают свое развитие в высшей. В связи со стремительным развитием технологий необходимо модернизировать методы и средства обучения и воспитания. Поэтому педагогам приходится искать новые средства эффективной мотивации учащихся к познанию окружающего мира.

Одной из новых технологий является технология QR-кодов. QR-код (в переводе с английского «quickresponse» означает «быстрый отклик») – это матричный код, разработанный в 1994 году японской компанией «DensoWave».