

ANALYSIS OF DIGITAL CONTENT IN THE DEVELOPMENT OF DIGITAL DIDACTIC MATERIALS BASED ON AUGMENTED REALITY

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Abstract: the article discusses the benefits of using augmented reality technology in the educational process. The authors note the potential of digital didactic materials created using augmented reality. The technology of creating digital didactic materials based on augmented reality is given. It emphasizes the need for analyzing digital content when creating digital didactics based on augmented reality. An algorithm for analyzing digital content for creating digital didactic materials with augmented reality is proposed.

Keywords: augmented reality, digital content, digital educational resource, digital didactic materials, education.

АНАЛИЗ ЦИФРОВОГО КОНТЕНТА ПРИ РАЗРАБОТКЕ ЦИФРОВЫХ ДИДАКТИЧЕСКИХ МАТЕРИАЛОВ НА ОСНОВЕ ДОПОЛНЕННОЙ РЕАЛЬНОСТИ

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Аннотация: в статье рассматриваются преимущества применения технологии дополненной реальности в учебном процессе. Авторы отмечают потенциал цифровых дидактических материалов, созданных с применением дополненной реальности. Приводится технология создания цифровых дидактических материалов на основе дополненной реальности. Подчеркивается необходимость анализа цифрового контента при создании цифровой дидактики на основе дополненной реальности. Предложен алгоритм анализа цифрового контента для создания цифровых дидактических материалов с дополненной реальностью.

Ключевые слова: дополненная реальность, цифровой контент, цифровые образовательные ресурсы, цифровые дидактические материалы, обучение.

The use of digital technologies in education is an important task, which is due to modern requirements and transformations in society. Today, society has entered the digital world. There are digital transformations in the economy, social life, culture. There are new promising technologies that are used in many areas of life. Technologies such as Blockchain, Machine Learning, Big Data, Augmented Reality, 5G, Internet of Things are among the top 10 digital transformation trends for 2019 [1].

Augmented reality is defined as a system that combines the virtual and the real; interacts in real time; located in 3D [2]. Augmented reality (AR) technology imposes virtual objects (augmented components) on the real world, thereby allowing visualization of objects and processes.

The use of augmented reality in the educational process allows to improve the process of learning and teaching. Elements of augmented reality are able to visualize the components of educational material that are impossible or difficult to demonstrate in reality or it requires equipment. Augmented reality can contribute to better assimilation of theoretical material through the visualization of concepts and content of educational material. The use of augmented training environment develops directly practical skills of working with the object of visualization.

It should be noted that digital didactic materials created with the use of augmented reality, can open great opportunities for learning. For example, during developing of digital educational resources (DER), we have developed AR applications and implemented them in the DER. The development was carried out in the framework of the scientific and applied project of the L.N. Gumilyov Eurasian National University. The

inclusion of AR in digital educational resources complements digital content with virtual objects, develops figurative perception, and contributes to increasing of interest in the material under study. In the course of the project implementation, the technology of creating digital didactic materials based on augmented reality was applied during the development of an AR application (Figure 1) [3].

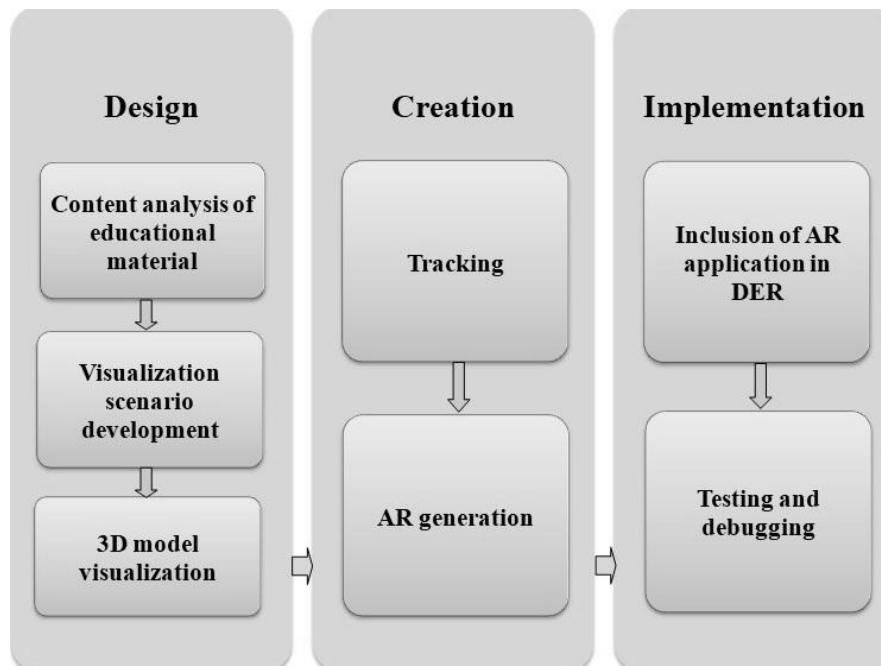


Fig. 1. The architecture of creating digital didactic materials based on AR

The initial stage of this technology is the analysis of educational material for creating digital content. This step is one of the fundamental stages and affects the further stages of development and the effectiveness of the application as a whole. In this case, one should take into account the fundamental orientation of the visualized model being created for didactic goals and objectives. The key to visualization of educational information is the full use of the benefits of augmented reality technology to achieve learning goals. It is necessary to determine which types of visualization are most efficiently used for informativeness of the virtual objects being created. Virtual objects can contain text, images, animation, video, 3D-models.

For example, working on the scientific and applied project to create digital educational resources, an analysis of educational content was conducted. On the topic of "Multimedia technologies" for a detailed study of the structure and components of the device was created the 3D-model of the computer system unit. In order to master the educational material on the topic "Database systems", three-dimensional models were created, and the process of processing a database query was visualized using animation.

Based on the above, the following algorithm is proposed for analyzing digital content of digital didactic materials based on augmented reality:

1. Analysis of educational information.
2. Definition of key objects for visualization.
3. Analysis of key objects.
4. Definition of the components of an object.
5. Definition of relationships between objects and components.

Thus, the proposed algorithm for analyzing digital content of educational material when creating digital didactic materials based on AR allows to combine the didactic goals, the informative part of digital content (informativeness) and the visualization of models and processes using AR.

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