

AUGMENTED REALITY BOOK AS A MEANS OF TRAINING
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Abstract: the article deals with the issues of teaching technologies of augmented reality, as a pedagogical process of organizing and stimulating learning and cognitive activity of students. Augmented reality content is described, such as augmented reality applications, augmented reality translators, augmented reality games, augmented reality labs, augmented reality books, etc.

The augmented reality book is considered as augmented reality content, the advantages of using augmented reality books in the educational process are described.

The scientific literature of augmented reality books has been analyzed, ways of creating books have been determined, and an algorithm for creating books of augmented reality has been proposed.

Keywords: augmented reality, learning, augmented reality content, augmented reality book.

КНИГА ДОПОЛНЕННОЙ РЕАЛЬНОСТИ КАК СРЕДСТВО ОБУЧЕНИЯ
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Аннотация: в статье рассмотрены вопросы обучения технологиям дополненной реальности, в качестве педагогического процесса организации и стимулирования учебно-познавательной деятельности обучающихся. Описан контент дополненной реальности, такие как приложения дополненной реальности, переводчики дополненной реальности, игры дополненной реальности, лаборатории дополненной реальности, книги дополненной реальности и т.д.

Рассмотрена книга дополненной реальности как контент дополненной реальности, описаны преимущества использования книг дополненной реальности в учебном процессе.

Проанализирована научная литература книг дополненной реальности, определены пути создания книг и предложены алгоритм создания книг дополненной реальности.

Ключевые слова: дополненная реальность, обучение, контент дополненной реальности, книга дополненной реальности.

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Teaching augmented reality(AR) technologies is a pedagogical process of organizing and stimulating students' learning and cognitive activities in mastering knowledge, skills and abilities, and creative abilities in the field of augmented reality.

When teaching future computer science teachers, augmented reality technologies need to study augmented reality technologies as an object of study, learning tools and learning environment. To do this, consider the following components of learning augmented reality technology: augmented reality browsers, recognition systems, augmented reality hardware, augmented reality content.

There are a lot of augmented reality content, including AR (augmented reality) applications, AR translators, AR games, AR labs, AR books, etc.

AR application is a special program and functionality of mobile devices that allows the imposition of any digital data on the real-time image from the device's built-in camera, i.e. overlaying virtual 3D objects and graphics over real ones in the display [1].

AR translator. Google Augmented Reality Translator is used to translate indexes, signs or text from any other written sources.

AR games, one of the varieties of AR applications. In AR games, the real world and virtual objects are touching. Depending on the objectives of the game depends on their purpose.

AR laboratories are laboratories with 3D objects, processes, tools, and a research environment in augmented reality mode.

AR books - books using visual 3D objects, audio and video information, etc.

Let us focus on augmented reality books (AR book). One of the products of augmented reality are AR books. In educational institutions, books are the main tool for learning and one of the essential components of the learning process. There are many types of books, such as audio books, video books, multimedia books, online books, e-books, etc. At the present stage used augmented reality books (AR book).

AR books include multi-touch, visual, auditory and tactile sensations. AR Books are used with the help of special devices such as smartphones, tablets, glasses, desktops, laptops, etc.

In their work, H. Altınpulluk, M. Kesim [2] analyzed AR books of an academic nature in the field of education. All data were tabulated and analyzed. According to the analysis of authors, 46 studies with augmented reality books are classified as AR book, augmented desk/paper augmentation approach, 3D pop-up book, tangible AR approach and MR book. It is assumed that 8 studies were determined as MR books and 38 studies – as AR books. AR Books make it possible to animate simple books, making the learning process more fun and interesting. Applied visualization methods in AR Books help to assimilate the material better.

Grasseth, Dunzer, and Billinghamurst [3] defined the Physicality continuum of augmented reality books (Fig. 1) [3]. The authors studied the technology of AR books, the semantics of AR books of reality, space design and user experience. According to this Physicality continuum, there are three more types of books, besides the Real Book: Virtual Book, Augmented Book, Mixed-Reality Book.

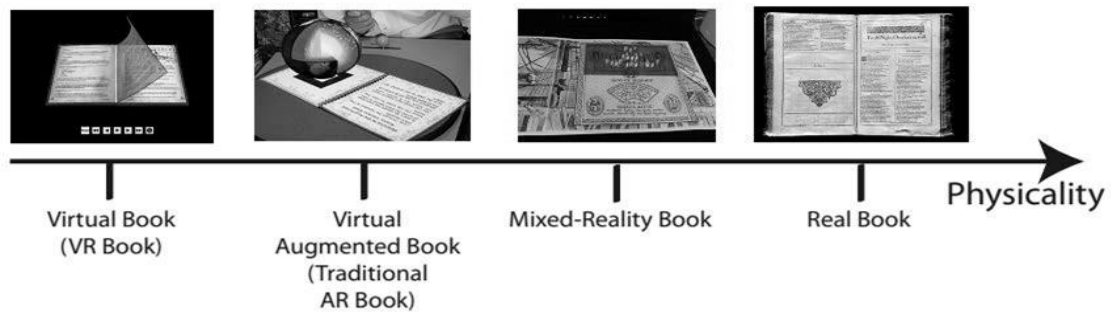


Fig. 1. The Physicality continuum [3]

I.G.M. Darmawiguna, I.M.G. Sunarya, M.W.A. Kesiman, K.R. Arthana, and P.N. Crisnepat [4] described an experiment in creating a historical book using augmented reality technology. The application reads the marker of the book, there are animated 3D scenes in combination with the narration of history and music. The augmented reality application was developed using Unity3D with additional Vuforia libraries for Android mobile devices [4]. In addition, the paper presented the algorithm for creating an AR Book (Figure 2).

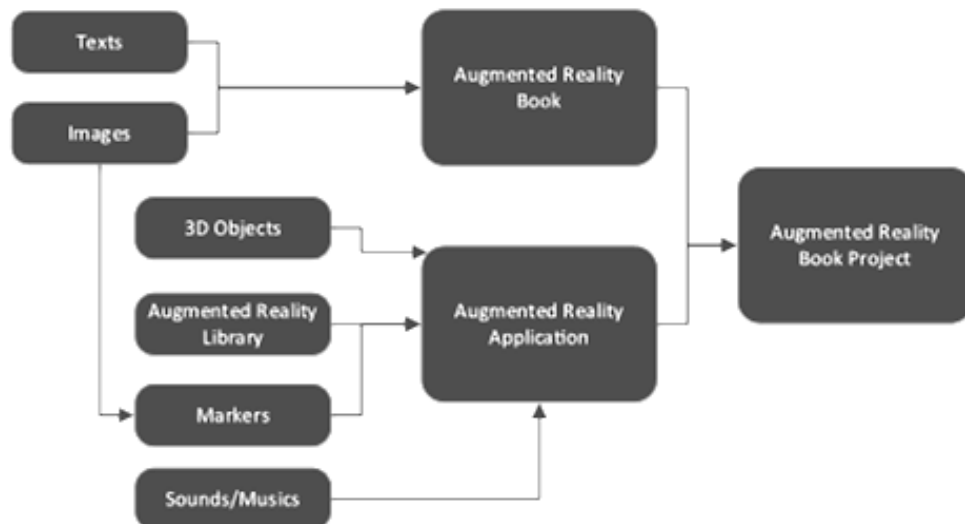


Fig. 2. Algorithm for creating an augmented reality book [4]

AR Books can be created in different ways using various tools and programs. There are many ways to create AR Book. One of which are:

- using Unity3D, Blender, Vuforia, Autodesk Maya, Autodesk 3D Max, etc;
- using special sites.

Based on the above algorithm and using the simplest way to create an AR Book, it is possible to create an AR Book with minimal ICT knowledge.

One of the convenient tools for creating AR Book is <http://www.mymultimediaworld.com> (Figure 3). It allows you to create not only AR books, but also AR quiz, AR maps, etc.

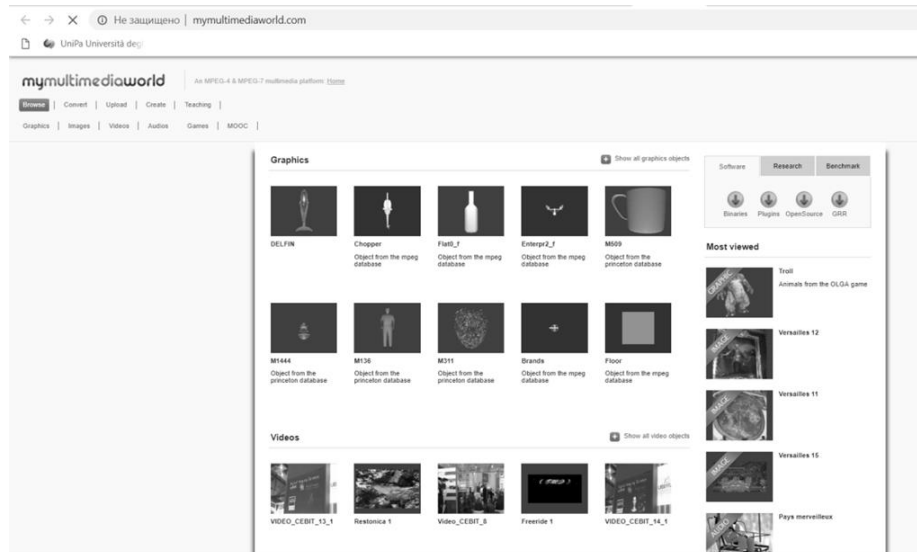


Fig. 3. Website page <http://www.mymultimediaworld.com>

To create an Augmented reality book, you can use the following algorithm:

1. Choose the direction and idea of creating an ARBook.
2. Execute the structure of the AR Book.
3. Choose the appropriate material.
4. Select and create visual material.
5. Create an account on the site
6. Start working with the site
7. Choose book title
8. Choose a book cover
9. Start creating sheets of your book in accordance with the purpose of the book.
10. After you finish creating the book, export it by creating a label to use your book.
11. Use the book by appointment.

Creating AR Books using this site does not require special knowledge, which will allow any teacher to create an AR Book in a short time, thereby improving the learning process of his discipline.

Based on the studies performed, it can be noted that AR-books are an important content of augmented reality, allowing it to be used in any place and at any time. AR-books provide an opportunity to better understand the material being studied and make the learning process more exciting and interesting.

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