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Augmented Reality and Music Education

İsmet ARICI[1]

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Abstract
Since the existence of the world, humanity has created new inventions and tools to make life easier. The computer, which left its mark on the century we are in, is one of the most important inventions and has entered our lives in all areas of life. Computer technology has merged with the internet and mobile technology, which developed later. With these developments, the concept of virtual world has emerged.
The virtual world has introduced new concepts such as augmented reality, virtual reality and mixed reality.
The education sector also aims to make education more effective by taking advantage of the opportunities of developing technology in all these processes.
This study focuses on how augmented reality studies, briefly referred to as AR, can contribute to education and music education.

1. Introduction

Since the existence of the world, humanity has created new inventions and tools to make life easier. The computer, which left its mark on the century we are in, is one of the most important inventions and has entered our lives in all areas of life. Computer technology has merged with the internet and mobile technology, which developed later. With these developments, the concept of virtual world has emerged.

The virtual world has introduced new concepts such as augmented reality, virtual reality and mixed reality.

The phrase “Augmented Reality”, often abbreviated with the abbreviation AR-, It is a computer interface that blends digital information processed by the computer with real-world information in real time (Dhiraj and Sharvari, 2015).

While augmented reality allows people to see the real environment, it includes information generated by a computer, 3D virtual objects, videos and digital texts in the same environment. The coexistence of virtual and real objects in the same place is one of the many advantages of Augmented reality (Ponmalar & Uma, 2022).

[1] Corresponding Author. ORCID: 0000-0002-6295-8906. Associate Professor, Marmara University, Atatürk Faculty of Education, Fine Arts, Department of Music Teacher Education, ismetarici@yahoo.com

When we look at the reasons why augmented reality applications have become widespread, it can be seen that data can be viewed virtually in 3D wherever desired in the real world. Secondly, it provides information and visual presentation in every field that people need in real life (Ugur and Apaydin, 2014).

If a sentence should characterize and define what the AR can do, a very good choice could be:

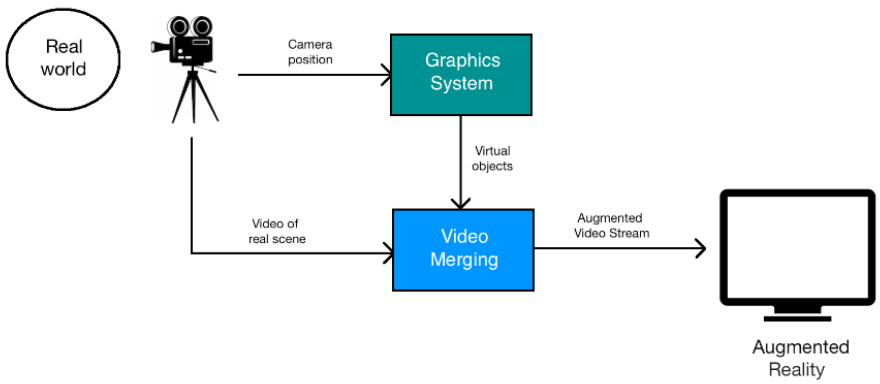
“AR is able to bridge the gap between real and virtual objects”. Therefore, every time it is necessary to represent real and computer-generated elements within the samespace, augmented reality is the best solution (Manuri and Sanna, 2016).

The term reality technology can basically be divided into two: virtual reality and augmented reality. Virtual reality can be described as an environment encountered in computer-based three-dimensional games, where the user's relationship with the world disappears completely when he enters this environment. On the other hand, augmented reality; It can be expressed as an environment that maintains the connection with the real world, where data and images can be added to real world images, and which allows real and virtual objects to be perceived together in the same environment (Icten and Bal, 2017).

Augmented reality is a field of study that involves the combination of real world and computer-generated data such as audio, video, graphics and location information. Augmented reality involves enhancing and supporting reality by providing information that is not detectable by people's senses and cognitive processes under normal conditions. Augmented reality technology provides intuitive information for better perception of the real world. This technology makes it possible to improve the user's perception by embedding virtual objects or information cues in the real World (Somyurek, 2014).

Unlike Virtual Reality, which completely envelops the user's senses in a synthetic environment, Augmented Reality allows the user to perceive the real world through a virtual layer. Virtual objects used in Augmented Reality systems can contain text, still images, video clips, sounds, 3D models and animations (Guclu, 2021).

Figure 1. Augmented Reality



Source: https://subscription.packtpub.com/book/data/9781788396905/10/ch10lvl1sec86/what-does-an-augmented-reality-system-look-like)

Augmented reality technology, which has been used computer-based for years, has recently started to be used on mobile devices with different applications developed. Mobile augmented reality applications are mobile applications that enable the creation of augmented reality through a mobile device and use location, images or pointer icons for this purpose (Demirer and Erbas, 2015).

2. Augmented Reality and Education

Augmented reality (AR) has created revolutionary developments in education in recent years. Offering a more effective and student-centered approach than traditional education methods, AR makes the learning experience more interactive and meaningful. Augmented reality is a technology that adds the virtual world on top of the real world. This technology enriches the real world with live graphics, sounds and videos, providing users with greater interactivity and experience.

In the field of education, augmented reality is used to enable students to better understand abstract concepts. For example, when solving a math problem, students can solve problems using real-life objects.

By using augmented reality, teachers can encourage students to create original projects and offer them a more creative learning environment.

Korucu et al.. (2016) conducted a study with 120 secondary school students and enabled them to use educational AR applications. As a result of the application, it was determined that the students increased their academic success.

Here are some examples of how augmented reality can be used in education:

Medical Education:

Augmented reality can help medical students learn about the human body in more detail. Using augmented reality, students can superimpose detailed images and descriptions on real body parts, allowing them to better understand anatomical structures.

For example, Anatomy 4D is an augmented reality application that offers students the opportunity to explore and learn the internal structure of the human body. Using smartphones or tablets, students can scan a human model and interactively examine organs, muscles, and bones.

Engineering Education:

Augmented reality can help engineering students better understand complex and abstract concepts. For example, by using augmented reality, a student can better understand the working principles of a machine or mechanism by applying it to the real world.

GE's Wind Farm AR, a wind farm augmented reality app, offers engineering students an opportunity to visualize wind energy projects. Students can use augmented reality to control wind turbines and see how they work on a real wind farm.

BricksAR is an application that offers a building experience with building blocks using augmented reality. Students can select the object to build virtually and observe how it is built in real time.

History and Culture Education:

Augmented reality can make history and culture more interactive. For example, students can visit historical sites and recreate past events using augmented reality. They can interact with cultural elements and explore different cultures.

For example, Google Expeditions is an application that offers students the opportunity to explore different parts of the world using augmented reality technology. Students can virtually travel to different places, visit historical sites and examine ecosystems.

Chemistry Education:

Chemistry lessons can be made more interesting by using augmented reality. For example, "AR Chemistry" is an application that teaches students chemical reactions and elements in an easier and interactive way.

3. Augmented Reality and Music Education

Although augmented reality is a technology that combines the real world with virtual objects and offers the user a new experience, music education is a field that traditionally focuses on concrete and physical materials. However, in recent years, AR technology has started to play an important role in music education.

The use of AR technology in music education can provide students with an enjoyable learning experience by offering more interactive lessons. This technology can be very effective in developing basic skills such as learning to use musical instruments, learning to read notes, and understanding musical concepts.

Figüre 2. PianoVision: Augmented Reality Piano

Source: https://www.altlabvr.com/pianovision

AR technology can be used to teach students how to play a real musical instrument. For example, when a student wants to learn to play the piano, the image of a real piano is projected on the screen with AR technology and the student can try playing the piano by pressing the virtual keys. In this way, the student can acquire basic skills before starting to play a real piano.

In their study using augmented reality applications for piano, Tufekci and Ozcelik(2023) concluded that at the end of eight weeks, the participants' awareness of piano techniques increased in the application of augmented reality-based activities, contributed to their understanding and application of the subject, and increased their mastery of the instrument.

AR technology can also be used to learn how to read notes. By scanning a sheet of music with their phones, students can see the note values on a virtual instrument. This method helps students improve their note reading skills and provides them with the opportunity to practice.

AR technology can also be very effective in understanding musical concepts. Students will be introduced to basic music theory concepts such as notes, tones, intervals, etc. can be presented with virtual objects combined with the real world. For example, students can be presented with a virtual object that, when clicked on a note, displays information about that note. This method can help students understand musical concepts more easily.

3.1. AR Application Examples for Music Education:

There are many different software applications for the use of augmented reality in music education. Some examples of these:

SoundForest VR:

This software allows you to play musical instruments in a virtual forest environment using augmented reality technology. Using musical notes, you can create trees, plants, and animals and create an interactive musical ecosystem.

Groove Reality:

This software teaches users how to play drums through augmented reality. Instead of a real drum set, it turns cards placed on a regular table into a drum set with augmented reality support.

SoundStage AR:

This software offers virtual instruments as well as virtual audio editing tools using augmented reality technology. Users can create and edit music by virtually tapping or moving around the instruments.

Chordana Play:

This app helps piano learners practice using augmented reality. By scanning the piano keyboard, it shows the user which keys to play and provides feedback in real time.

Apart from these examples given above, there are many different software applications for the use of augmented reality in music education.

4. Conclusion and Recommendations

Every development in the world of informatics enables the development of new tools that educators can use. Augmented reality, which combines the real world and virtual elements, seems quite interesting in terms of creating very effective materials in the educational environment.

To summarize, augmented reality technology can be an extremely useful tool in music education. Providing students with an interactive and fun learning experience, this technology can play a major role in developing basic skills such as learning to play a musical instrument, learning to read notes, and understanding musical concepts.

With research in this field, it is possible to further understand the impact of AR technology in music education. Research will be able to observe the effects of AR technology on students' motivation, learning experiences, musical skills and understanding in music education.

References

Demirer, V. & Erbas, C. (2015). Demirer, V. & Erbaş, Ç. (2015). Investigation of Mobile Augmented Reality Applications and Evaluation of Educational Perspective . *Mersin University Faculty of Education Journal, 11* (3), 0-Retrieved from https://dergipark.org.tr/en/pub/mersinefd/issue/17398/181953

Dhiraj Amin and Sharvari Govilkar (2015). Comparative study of augmented reality sdk's. *International Journal on Computational Sciences & Applications (IJCSA) 5*,(1), February 2015

Guclu, H. (2021)**.** *Augmented Reality Technology in Music Education and Sampling Application*. Master's thesis, Necmettin Erbakan University Institute of Science and Technology.

Icten, T. & Bal, G. (2017). Review of Recent Developments and Applications in Augmented Reality. *Gazi University Journal of Science Part C: Design and Technology, 5* (2) , 111-136. Retrieved from https://dergipark.org.tr/en/pub/gujsc/issue/49772/638527

Korucu, T. and others..(2016). *Effects of Augmented Reality Applications on Student Achievement and Attitudes Effect.* XVIII. Academic Informatics Conference proceedings. February 2016 Adnan Menderes University, Aydin

Manuri, F. & Sanna,A.(2016). A Survey on Applications of Augmented Reality. ACSIJ Advances in Computer Science: an International Journal, 5(1), (19) ISSN: 2322-5157

Ponmalar, A. & Uma, M. (2022). *Augmented Reality in Education: An Interactive Way to Learn.* 1st International Conference on Computational Science and Technology (ICCST)978-1-6654-7655-3/22 ©2022 IEEE DOI: 10.1109/ICCST55948.2022.10040368

Somyürek S. (2014). Gaining the Attention of Generation Z in Learning Process: Augmented Reality. *Educational Technology Theory and Practice, 4* (1), 63-80. DOI: 10,17943/etku.88319

Tufekci, K. & Ozcelik, S. (2023). Student Opinions on Augmented Reality Applications in Piano Education. *KIRSEHIR Ahi Evran University Faculty of Education journal*. *24* (1)

Ugur, I. & Apaydin, S. (2014). The Role of Augmented Reality Applications in the Levels of Liking advertisements . *Humanities Sciences , 9* (4) , 145-156 . Retrieved from https://dergipark.org.tr/en/pub/nwsahuman/issue/19949/213414