



## AUGMENTED REALITY AND TEACHING EXPERIENCE

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### Abstract :

Augmented reality is an interactive experience that enhances the real world with computer-generated perception. AR connects the "real world" and the virtual world. Basically, AR takes the real world and enhances it with computational elements. After the 2020 COVID-19 pandemic, educational institutions suffered the most due to social distancing policies. However, there are many applications where augmented reality can enhance the learning experience of e-learning students. The ability of augmented reality to increase students' attention to course material while at home cannot be underestimated. A new technology called augmented reality (AR), which combines the real world and the world created by an interactive computer system in the form of a single environment, tries to avoid problems as mentioned above by providing students with an AR laboratory which is a combination of real labs augmented by virtual objects.

### IndexTerms – Augmented Reality ,Vuforia, Unity

#### I. INTRODUCTION

One of the main benefits of augmented reality in education is that students can examine students from different angles than their own. By moving virtual objects or changing locations, you can explore and better understand specific topics. Most importantly, students can learn experientially from home. This type of learning is more likely to be remembered and understood by students than other methods. Augmented reality in educational centers will replace paper textbooks. With the help of this app, students don't need to bring study materials to class because they have everything on their smartphone. AR systems combine computer-generated and virtual content and place it directly on real objects. Those days are over when things were presented in lectures using powerpoint . Today's teachers and students are looking for interactive solutions. The old teaching model needs to be changed because students in traditional classes get bored and sometimes don't understand what is being said. This technology also expands visual content for visually impaired students, making it a completely different learning experience at home. With the help of AR students will be engaged in learning more actively.(2020):The long texts and unappealing content make the students lose their interest. To resolve this problem, we suggest changing the conventional method of studying to a new way using Augmented Reality (AR) as a learning tool.[15]

One of the most important advantages of augmented reality in education is the opportunity for the student to look at the model itself from many different perspectives. By moving around a virtual question or turning it in space, they can superiorly look at and get certain concepts. Most vitally, it permits understudies the good thing about at-home experiential learning. Students are more likely to remember and understand this learning than other methods.

Augmented reality in schools is replacing paper textbooks. With this, students don't have to carry study materials to class because they have everything they need on their smartphone. In addition, schools can reduce the cost of teaching materials and supplies such as blackboards, posters, etc. Students communicate with the teacher and access learning resources directly in the app. AR is a new technology that combines real-world assets with real-world assets. Virtual objects enhance our perception and interaction with the world around us. AR is used in entertainment, education, healthcare and technology. Using augmented reality (AR) models students can perform these tests in a virtual lab environment that allows us to use digital tools and simulation of equipment. In recent years, some surgical procedures are performed using augmented reality technology [2]. Augmented reality textbooks can be a solution for blended education of the future[14]. Augmented reality can play an important role in enhancing student learning in engineering education. AR can be applied in the field of education.

The AR-based Laboratory Manual (ARLM) is designed as a 3D visualization of laboratory experiments and allows students to interact with the learning environment. Users simply scan the code placed on the book. The software/application captures the image and combines it into virtual graphics. The use of augmented reality textbooks in electrical engineering can improve academic performance by improving student understanding and performance[9]. The digital and physical environment can be made more engaging for students when they are studying activities by integrating the two. AR can be used to learn the abstract concepts' structures concretely. The real objects in learning and practicing are reproduced for students in AR, making it more effective as a learning medium in general. The use of visualization makes the subject more interesting and easier to understand for students. The digital images or text in a AR application are created to mirror the real world. With the help of this textbook, students are supposed to

imagine visualizations of situations they may never come across. Abstract concepts can be visually represented as realistic 3D figures using AR technology, whereas textbooks cannot. The learning experience is enhanced when using AR technology compared to traditional methods.[6]. A number of students express a desire to incorporate AR in their learning experiences within the classroom.

## II. APPROACH:

User can get AR experience using AR app as shown in figure 1. User get AR experience by interacting using AR app. AR experience get with the help of Unity and Blender. Augmented Reality bridges the gap between theoretical and practical knowledge [7].

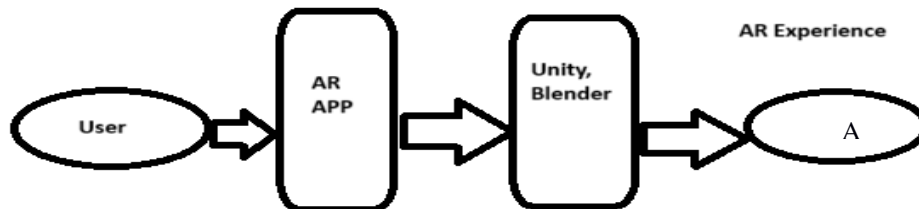


Figure 1: Flow of AR experience

### 2.1 SMART BOOK:

Lots of pictures to help elementary students learn. The pictures will help you visualize the information after reading and help the students to understand the topic more deeply. Color images can add value to the content to get better understanding. However, it is not possible to print many color photos in the book. But smart books can be prepared with 3D images with the help of blender to engage the students in learning so that they can quickly grab the contents.

### 2.2 AR IN LABORATORY:

It is similar to AR in training Here, learning is hands-on and classes are designed to give students the opportunity to experience and gain practical skills. To be effective in your lab classes, you need a good instructor/facilitator to supervise each group of students, guide them to learn from their mistakes every step of the way, and get them to know their skills to the best of their abilities. But the instructor cannot give full attention to all groups at a time. Here AR in the laboratory will help the students to perform lab experiments virtually with the help of instruction provided in the AR lab with safety measures. Active learning can be enhanced through AR with quizzes and tests. In AR 3D animation plays when you point the camera over the instruction manual. Another advantage of AR is that it can give flexibility for experiments with tools. In a traditional laboratory, there is a limit on experiments performed due to the physical availability of equipment. On the other hand, with the help of AR multiple experiments can be performed at time with the help of a virtual environment. With the help of AR students can visualize abstract concepts. These technologies will enhance the enjoyment and engagement factor in education. This advantage resolves the complications in the educational process caused by diverse learning requirements, including students' inability to focus, lack of self-confidence, and insufficient background education. AR bridges the gaps in activities with high immersion requirements, previously unrealized.

## III. AR ADVANTAGES:

AR overcomes the limitations of physical space and equipment availability. Enhanced Safety: AR provides a safe environment for students to take tests without risking accidents or coming into contact with hazardous substances. Virtual items can simulate dangerous situations. Interaction and engagement: AR immerses students in dynamic and interactive learning environments. Manipulate virtual objects, visualize complex concepts, and observe overlays of real-world data to enhance understanding of concepts. There are many beneficial outcomes of using AR in educational settings, such as higher levels of academic performance, motivation to learn, enjoyment, interest in the subject, content engagement, and content retention[1]. During the application development, the authors used software such as Unity 3D and Vuforia. The Augmented Reality content consists of 3D-models, images and animations, which are superimposed on real objects, helping students to study specific tasks[8]. This advancement in technology is changing the way we interact with our surroundings, rather than watching videos or looking at a static diagram in your textbook, Augmented Reality enables you to do more[9]. . Since technological development progresses steadily and keeps producing devices that are increasingly cheaper and easier to handle, it is expected that AR will acquire greater relevance in teaching- learning process [16].

## IV CONCLUSION

Use Android mobile tools to build apps that take advantage of various mobile features. Open source AR SDK tools help you create exciting AR visuals that combine the digital and physical worlds. The field of augmented reality uses the virtual world and places it in the real world in which we live. Applications include the medical field, education, marketing and many others. By integrating

augmented reality into laboratory learning environments, engineering students can overcome the limitations of traditional laboratories, access more comprehensive resources, and enhance their practical skills and understanding of engineering concepts. Thus AR can be used for future blended education. AR encourages students to enhance their learning habits. The learner can engage with 3D virtual objects for a more effective learning experience. The use of AR in the classroom has been found to lead to better learning achievements and increased student enthusiasm. Currently, the cost of Augmented Reality devices has decreased, making them more accessible to the public.

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