Augmented Reality (AR) in the Classroom

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ABSTRACT

Augmented reality (AR) has quickly become one of the most popular trends among software and hardware developers. Augmented reality allows people to interact with their real-world environment in an enhanced way. Using different kinds of technology, the environment is augmented by the technology. This can occur in many ways. On the more complex end, users can get feedback through their sense of touch, their sense of smell, and their sense of sight and sound. The technology being used changes the user's perception of the real world. This is not virtual reality, because virtual reality attempts to replace the real-world environment with a digital one. Depending on how sophisticated the technology, augmented reality can display visuals over the real world, provide artificial audio feedback that's not actually present in the environment, and give various types of feedback through a user's different senses. If this sounds complicated, that's because it can be. Advanced augmented systems include visual headsets and complicated controls for interacting with the enhanced real-world environment. However, there are much simpler ways of implementing augmented reality. This simpler version of augmented reality can be accessed using the same tools that most students use every day – the modern cell phone. Smart phones, specifically, have the ability to create an augmented reality experience. As documented by Forbes, there are multiple ways that augmented reality has been brought to life over mobile phones. The Gatwick app connects terminal beacons to mobile phones to help passengers navigate the area. Meanwhile, IKEA's app lets people scan their rooms and redesign them on their mobile screens using Ikea furniture. Sephora's app lets people scan their faces and try different looks by combining different facial products.

KEYWORDS: augmented, reality, environment, advanced, technology, software, world, smart

INTRODUCTION

In a piece developed for EdTech magazine, author Meghan Cortez noted that augmented reality had the power to transform the classroom. The possibilities, Cortez argued, were vast. Augmented reality was being integrated into medical training to help medical students simulate surgeries. In primary and secondary schools, augment reality was used to help deaf students by delivering interactive flashcards that operated using sign language to interact with the students.[1]

Teachers should be aware that the application of augmented reality has, thus far, leaned heavily toward science, humanities, and the arts. These are topics where augmented reality lends itself most easily toward interactive experiences. On the other hand, the least integrated topics were in areas of health, welfare, agriculture, and teaching training. This divide suggested that augmented reality might not be ideal for teachers of all subjects. However, it can provide an important, hands-on experience that helps to increase the level of engagement students feel with their materials. Augmented reality can promote interactive experiences with coursework, encourage collaboration between students, improve motivation, and increase learning gains. These benefits all rely on effectively implementing augmented reality into the class. When integrated poorly, augmented reality faces several limits, including too much focus on

virtual information and intrusion of the technology   onto actual leering gains.
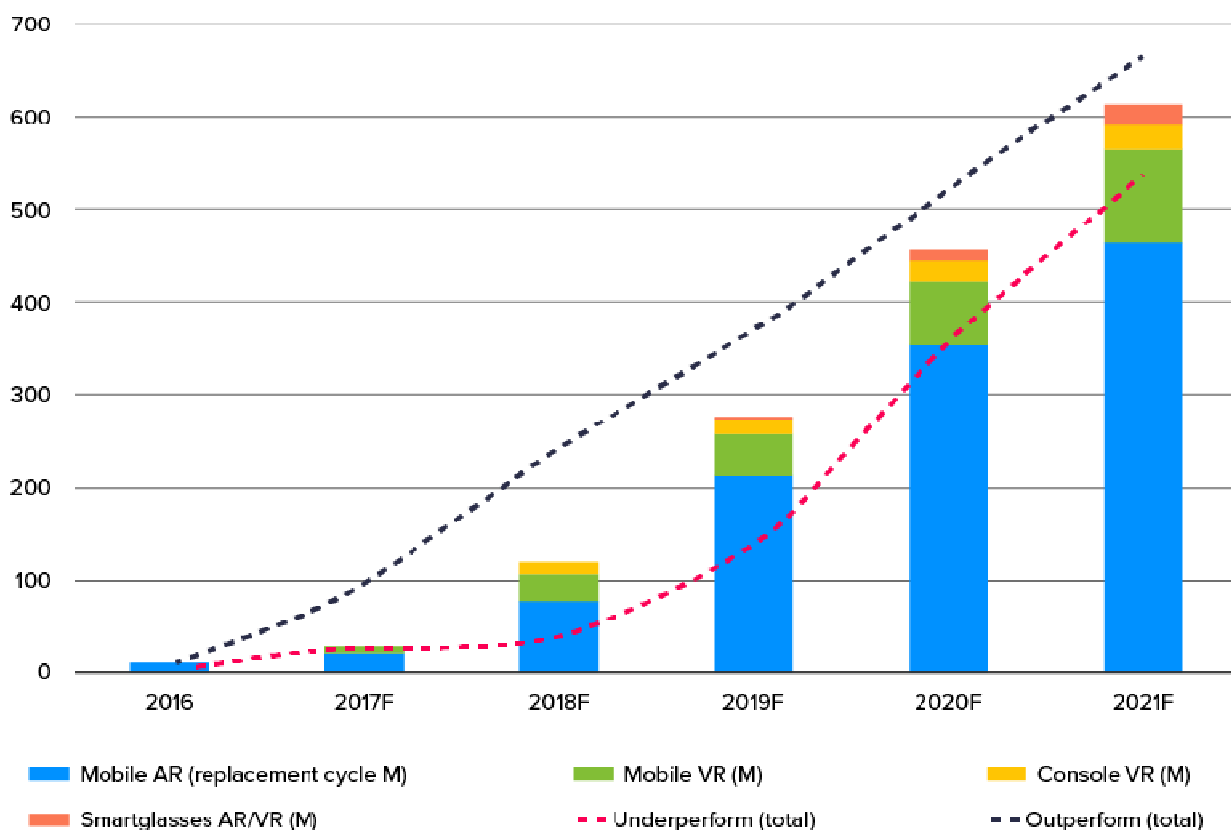

VR/AR installed base (M). Source: Digi-Capital

There are other benefits to adding augmented reality to the classroom as well. For instance, as covered by the Tech Advocate, there are plenty of ready-made resources that teachers can draw upon to more easily integrate the technology. Several books have already been released that are designed to work with augmented reality, and the only thing that students need to bring to the lessons are their smartphones.

Teachers only have to provide the books and students can scan the book pages, bringing them to life on their phones. This means less prep times for teachers. With regard to resources, the availability of resources means that teachers only have to print out enhanced worksheets if they want their students to take the augmented experience home. Pre-made augmented reality sheets can be printed out by the teacher, which makes it easier for teachers to make augmented reality into their preparations.[2]

The staff of Cypher Learning, which develops the NEO learning management system, also reviewed some of the benefits of using augmented reality in the class. When properly integrated, it can increase enthusiasm for the materials among students and increase their motivation. Augmented reality often presents a new way of learning for students that's easy for them to become enthusiastic about. At the heart of what drives this increased motivation is the novelty of augmented reality, but also its interactivity. Students can directly manipulate enhanced elements of their environment, which can contribute to deeper learning among students. It's more likely that students will remember their materials for the long term because they will be able to directly interact with their materials in fun and innovative ways.
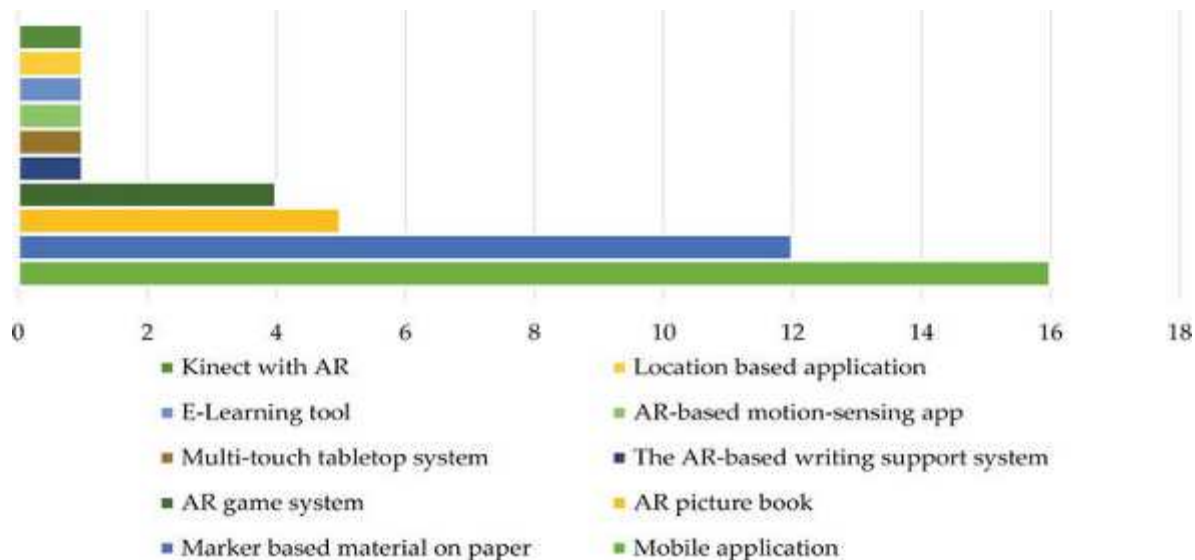
When it comes to implementing augmented reality technology into the classroom, there are a few design principles that instructors should keep in mind. As discussed by researchers Robert Miller and Tonia Dousay, the first duty of a teacher is to ask why. Why are they implementing the technology and how do they intend to use it to support learning goals. Haphazardly introducing a technology just for the sake of using it won't lead to improved outcomes.

The best role for augmented reality is as a supplementary tool, rather than as a primary method of delivering content. So, while teachers can use it to bring lessons to life, they also need to maintain a focus on more traditional ways of delivering content. Augmented reality is best suited to enhancing those traditional lessons rather than acting as stand-alone methods of instruction.

It's also important for teachers to know their classrooms. If their students don't possess a certain level of technological knowhow, they won't be able to work with augmented reality effectively. If teachers are hoping to use such technology, they should probably gauge their classroom at the start of the year first. This is important because Miller and Dousay suggested that trying to use this technology among students who didn't have a certain level of technological competence would only detract from meeting learning goals.[3]
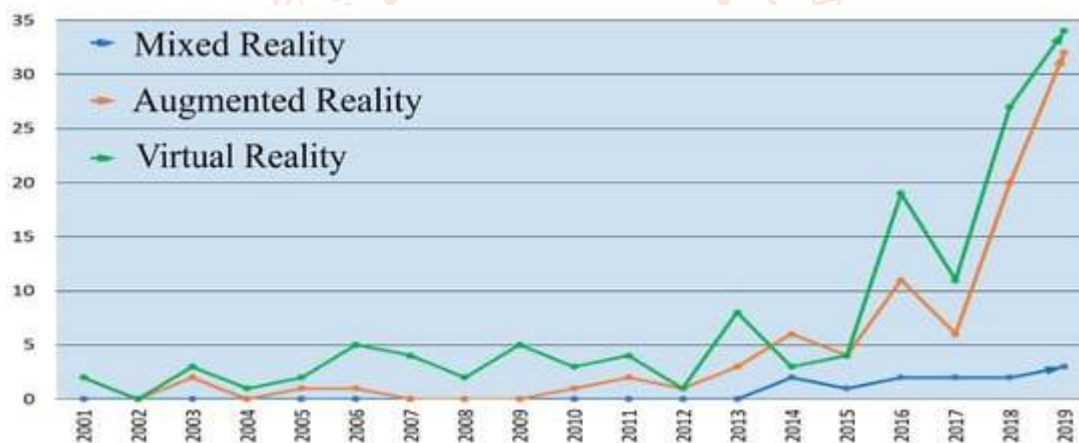
Discussion

One of the difficult aspects of integrating augmented reality into the classroom is settling on the right apps to use. There are more than just a few apps teachers can draw upon to enhance work in the classroom. Here are just some of the most popular for students of all ages.
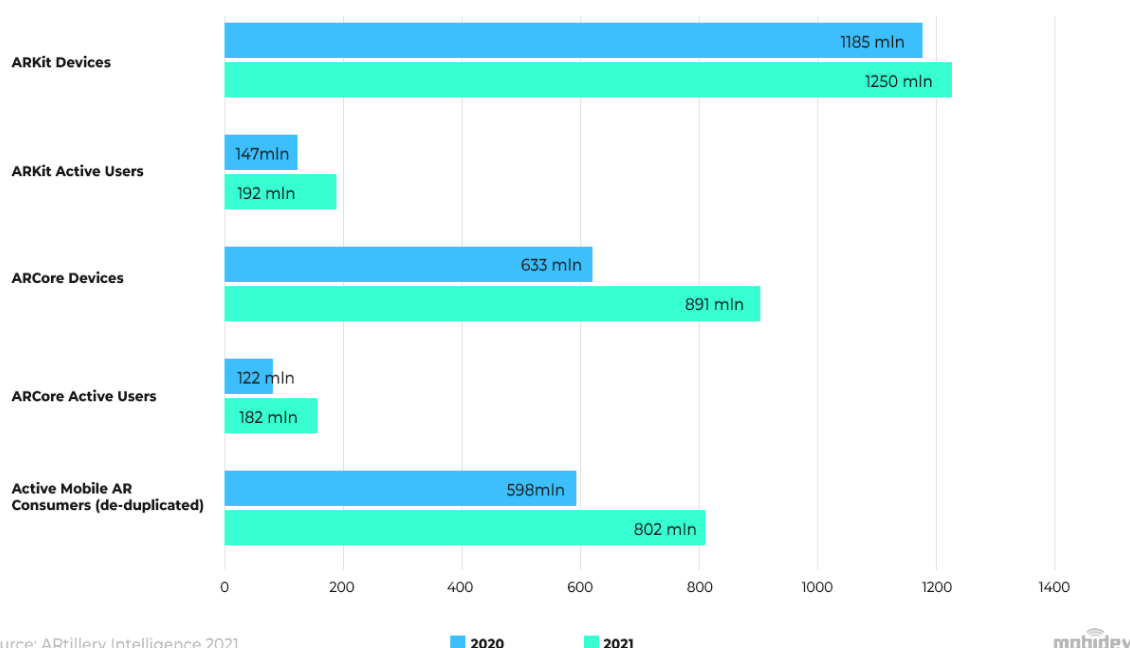
➢ Popar Toys. This app changes the way that students engage with stories and puzzles. The books and puzzles that can be used with the app come to life with animation and readalongs as the children make their way through the stories. This app brings stories to life, which can help children become more interested in a range of topics. They c an even engage with interactive books about the world and the solar system, helping bring science to life.

➢ Augment Education. Augment Education is targeted at an older crowd than Popar Toys and is best used by high schoolers. Students can use this tool to create presentations in augmented reality and create three dimensional designs. The ability to make models in augmented reality can bring lessons to life in classes that range from health to architecture. Teachers can also create lessons in 3D, making Augment Education one of the most innovative and helpful apps for educators.

➢ SkyMap. One of the most interesting augmented reality apps is Google's Sky Map. Specialized specifically for classrooms, this app helps students learn more about the solar system. The interesting part about this app is just how hands-on it is. When students direct their devices upward and to the sky, the app finds planets and stars that are in that direction. The app's ability to find stellar bodies lets students identify different parts of their universe. Besides showing various constellations, the app challenges students to find certain planets and displays high quality images of interesting locations like the Orion Nebula.

➢ Fetch Lunch Rush. Yet another app that has appeal for a younger audience, this PBS produced app used printable cards to aid the augmented reality experience. With this game, kids are asked to feed a movie crew, but they have to solve math problems to do so. Kids spread out their cards across the game board and kids have to move from piece to piece, using the cards to bring to life unique problems for them to solve.[4]

➢ Human Anatomy Atlas. One of the most intriguing augmented reality apps for education is the Human Anatomy Atlas. The atlas bring to life three dimensional representations of the human body that students can interact with. Besides providing models that students can interact with, the app also includes descriptions of different types of disease and injuries and even questions that students can use to test their knowledge. This is yet another app that's fantastic at the high school level and is obviously perfectly suited for health classes.

These apps are just some examples of how educators can put augmented reality to use in a variety of topics. Augmented reality is a powerful tool because of its flexibility. It can be targeted not only at different age groups but at different education fields as well.

With all this discussion about the tools that teachers use and the benefits of augmented reality, how are teachers actually putting the technology to use in the class. Writing for Education Week Teacher, author Kate Stoltzfus listed approaches teachers should use to integrate augmented reality into the classroom. This may help you integrate augmented reality into your classroom more easily.[5]

One of the primary ways that teachers can ease the transition to augmented reality is by adopting tools that can apply to all grade levels and skill levels. A specific example that educators used was Merge Cube. This cube is essentially a hologram that students can manipulate. Depending on the apps that are downloaded, the cube can become many things – a globe students can use to explore the world, a multi sided game that trains students in ways that sharpens their memory, an aquarium that students can use to identify various fish species, or a device for rotating projections of the solar system. Merge Cube is just one example of a single tool that can be adapted for multiple audiences using an abundance of free apps. Tools that can be adapted to multiple audiences can help reduce the amount of resources teachers have to seek out to enhance their classes.

Another way that teachers are integrating augmented reality into their classes is by giving students ownership of the education experience. Teachers often use augmented reality to deliver content through apps. However, students can put together their own projects using apps that can then be shared with the class.[6]

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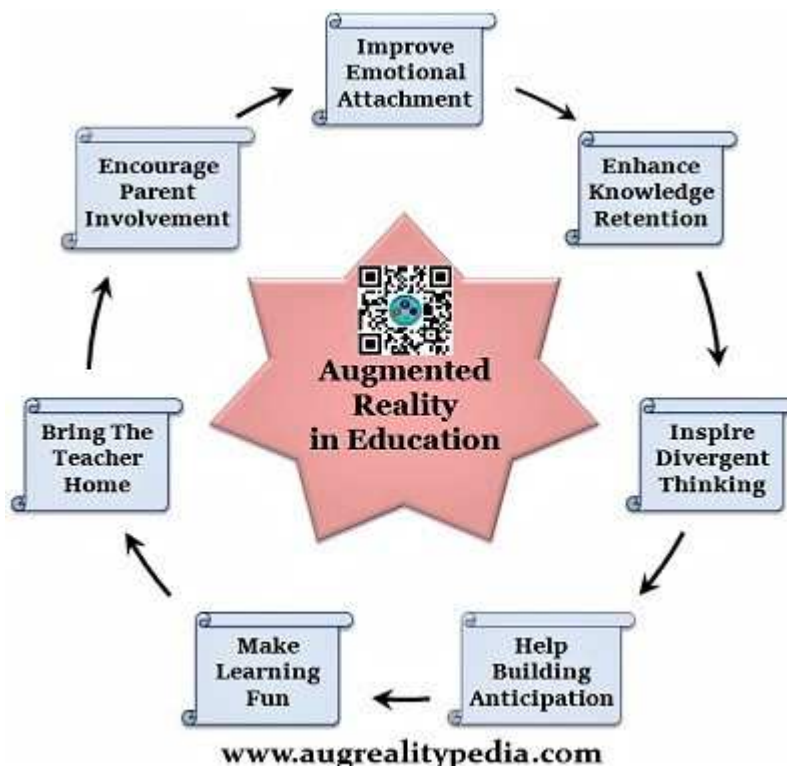
Whereas students used to put together PowerPoint presentations, they can now use augmented reality to bring presentations to life. Just one example that educators provided was the use of Google Street View. By drawing on images from Google Street View, students created images that could be viewed at any angle. This helped them create views of the world that could be manipulated in 360 degrees. Such approaches helped to increase student engagement and get them doing hands on work in augmented reality.

Other ways that teachers have integrated augmented reality was discussed at New Gen Apps, an organization that develops mobile applications for business and education. One interesting way to help get students acquainted with their instructors can be accomplished using augmented reality. Schools can put together a faculty photo wall where students can use their devices to scan each photo. Then, on their screens, the photos will come to life and provide different information about their teachers. This can be especially helpful the first week of school as students are first getting acquainted with their instructors. Using this approach, a novel and fun way of learning about a school's staff may help students transition into the school year.

Science teachers have also used augmented reality to provide students with a more engaging way of learning about lab safety. Using triggers around the classroom, science instructors can bring warning about lab devices to life. As students walk through the lab, their devices can scan these tags and learn about different rules they should adhere to when running different lab experiments and working with different equipment.

It's clear that there are many interesting ways that teachers are using augmented reality in the class. It can be used to teach rules and safety protocols, introduce students to their instructors, empower students to create their own three dimensional presentations, or manipulate adaptable tools that can teach different lessons depending on the app that's downloaded. However, because augmented reality remains a relatively new field in education, researchers and educators are sure to discover new ways of using the technology in the future.[7]

Count of skills taught through AR
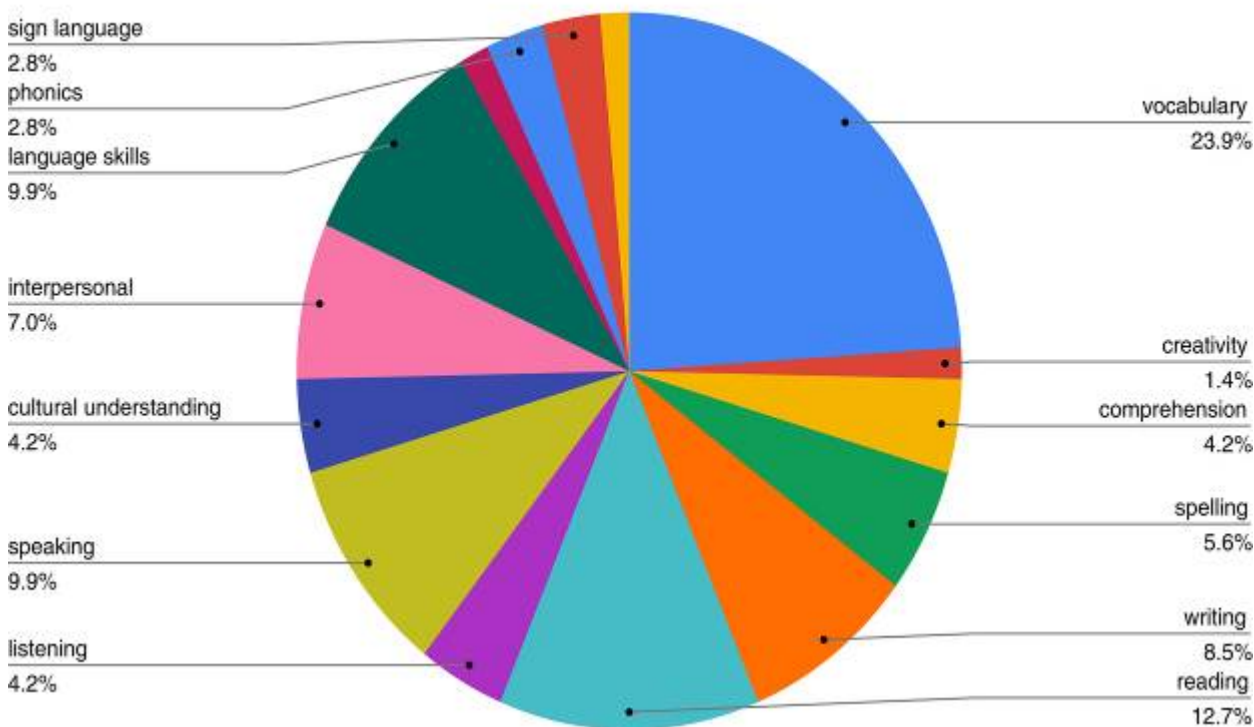
Results

The state of augmented reality in the classroom today is still a little bit fractured. Researchers have made significant strides in understanding some of the best approaches to integrating augmented reality, but it remains one of the newest fields in education. Because of that, educators are still finding new ways of effectively using the technology in the classroom.

Still, like all things in education, augmented reality is a tool that can be best put to practice with a little planning. Creating lessons that use augmented reality to enhance, rather than replace, more traditional instructional approaches seems to be the best approach to using the technology. This can be done by using the many apps that make augmented reality such a flexible and powerful tool for use in the classroom. The technology also presents an exciting way for teachers to refresh their own instructional practices as well.[8]

According to XR Association's "2019 Augmented and Virtual Reality Survey Report," the education market is a top-three promising area of development for AR and VR technology. With the power of augmented reality, the classrooms of the future may not look much like the classrooms of the past. The concept of MR (virtual + existing reality) led by AR can enable astronauts to get real-life training and do tasks, like maintaining a space station. Sidekick is a NASA project that is testing Hololens to provide virtual illustrations and instructions to use in crew training. Altogether, its usage in military training is the main attraction, as it can help train soldiers to use equipment in a virtual environment. This is to refrain soldiers from putting themselves in danger and get trained with ease.

Interest of students in learning through AR
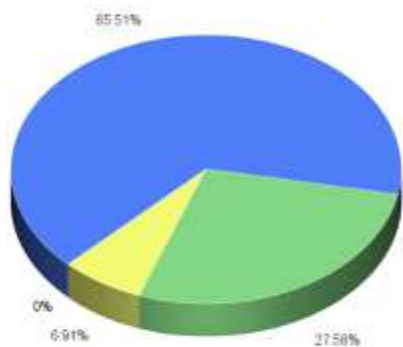
Ease of students to memorize content through AR
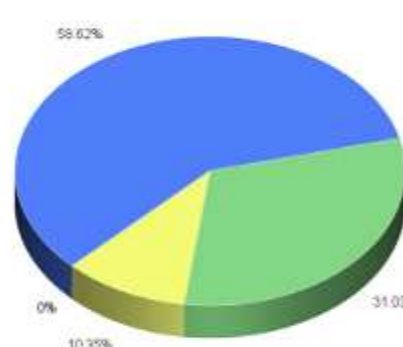
(a)   (b)

Benefits of AR Technology in Education

Augmented Reality in the education sector renders several sought-after perks including:

1. A Swift And Effective Learning System

AR in education allows students to gain knowledge through rich visuals and immersion into the subject matter. Moreover, speech technology also engages students by providing comprehensive details about the topic in a voice format. In short, the concept of eLearning with AR targets a major information-gathering sense in humans.

2. Easy Access To Learning Materials Anytime, Anywhere

Augmented Reality can replace textbooks, physical forms, posters, and printed brochures. This mode of mobile learning also reduces the cost of learning materials and makes it easy for everyone to access.[9]

3. Immersive Practical Learning

It can also help in professional training. Imagine being able to cook food or operate a space shuttle without putting others in danger or spending millions of dollars.[10]

Conclusions
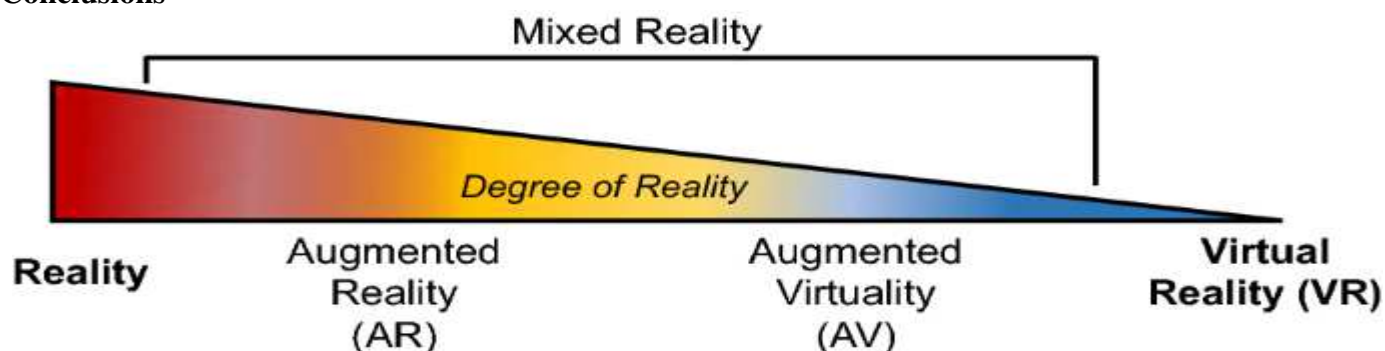
The gamification of AR and the education system can make students' attitudes more positive. It makes learning interesting, fun, and effortless and improves collaboration and capabilities. Moreover, it provides vast opportunities to make classes less tiring by infusing unmatched interactivity through a computer-generated environment. eLearning involves students in an enhanced environment where they can see how concepts happen. For creating such applications, companies hire developers deft in AR development.

Augmented Reality can bring a breakthrough to the traditional education system by transforming the complete learning experience. Altogether, it will also impact the interest of students and make them efficient. Also, this will help students in comprehending concepts in an immersive environment, which will simplify concepts and make learning easy. Moreover, education institutions will also gain colossal attention by offering an excellent learning experience through technology.[11]

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