Article

# Augmented Reality and its Application in Learning

## *How AR will define the future of eLearning*

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**Augmented Reality** or AR along with its cousin Virtual Reality is quickly turning into an "Actual" Reality for the content-creators of the world. I believe that while VR is set to sweep the world of entertainment and art, AR is going to change the landscape of elearning, and this is why I'm more interested in exploring AR.

I assume that my readers have already heard of VR and AR, so I'd like to begin by differentiating AR from VR.

## 1. Augmented Reality vs. Virtual Reality

### *First, let us tackle the simpler-to-understand Virtual Reality.*

Virtual Reality is just what the term says: It's virtual but feels real. It does so by replacing our real environment by a virtual environment.

So I could be sitting in my doctor's waiting room, but if I wore my VR headset, I could be in Narnia or Hogwarts; I could be on Krypton or Moon; I may be riding a roller-coaster in a fictional universe or I could be sitting in Shrek's cottage reading John Grisham's newest release, "The Guardians," by the light of a candle made of ogre-earwax.

In other words, in my mind, I could be anywhere, except in the doctor's waiting room, where my body actually is. Thus, my real surrounding have been replaced by virtual ones.

*So, VR replaces Real by Virtual. Period.*

### *Now about Augmented Reality...*

Augmented reality "augments" (enhances, adds to) our real environment. The quantum of augmentation varies though. It could be as little as scanning the QR code to get more information in your mobile, and as much as a 3D hologram of your favorite star sitting in your favorite arm-chair in your own living room.

The point is, AR, augments (adds to, enhances; makes better, richer) but doesn't replace reality.

*Let us review the question that's important to us.*

### *Which one supports Learning better - AR or VR?*

As we can see, VR has a higher immersion than AR, but AR keeps you rooted to reality. This is why, from the learning point of view, AR is the obvious and clear winner for most kinds of knowledge-transfer or skill-practice.

I'll tackle VR and technology in more through another article. In this, I want to stay focused on AR. I'd take a few example of AR so that we can appreciate not just it's potential but also its future ramifications.

*Our reality may be augmented a little, a little more, quite a lot, a whole lot… let me try to illustrate.*

## 2. Some AR Examples that help cover the whole spectrum of Augmentation

Here are some examples of AR that you'll

recognize rather quickly. If you are new to AR, I recommend that you click the links and read the corresponding articles to understand how the augmentation quanta for different AR applications could vary.

- The Ubiquitous QR Code that we scan for making payments or "augmenting" information.
- The Pokemon Go Mobile Game
  -https://pokemongolive.com/en/
  -https://arinsider.co/2019/04/10/the-age-old-question-is-pokemon-go-ar/
- Pepsi's AR Experiment on a London Bus stop
- Snapchat's Filters that let you add funny effects (dog-nose, whiskers, pig-ears) to a video face
- The IKEA Place App that allows you to see how a piece of furniture looks in your living space.
- The Disney 3D coloring book

## 3. Augmented Reality - A Closer Look

Let us review an example of AR in more detail.

You are en-route to Nainital (or your own hometown for that matter.) You AR enabled Travel Companion app could sense your coordinates, the compass could sense the direction of your travel, the app could then use a geo-map to discover which road you were on, and how far Nainital is, and also how long it would take you to reach there (this you have seen in your map apps, haven't you?) And then it could connect to a weather website and give you a weather forecast, tell you how hot or cold it's going to be on your arrival…and of course a rather long list of other things – and display it all on the image that the video camera of your phone is continuously processing.

*So are these apps all AR apps?*
*Absolutely.*

The feed of the cameras recently installed in your homes and outside your houses could augment real-time feed in more constructive and useful ways. For example, it could match the faces of the people who stopped near your house or entered it, and show you the frequency with which this happened should they appear again. This information could be layered over the main feed and help you assess possible threats.

*Will this be AR?*
*Why not?*
*After all, it is reality being augmented to provide you a more holistic picture of your camera-feed.*

Now, let us talk about Learning through AR.

## 4. Augmented Reality and Learning

Learning, as I said before, will be strongly influenced by AR (not so much by VR) and there's a reason for it.

AR augments our reality. Imagine the possibilities.

1. If my reality were a book of history, it would augment it by providing images of the places in those times and now, by showing me a coin that the book mentions and telling me more about it, by showing me sketches or clips from movies to give me an idea of how people dressed up in those times. Thus, I would be reading my

book, but my headset or my tablet camera could view the pages and present additional information.

2. If I were a Chemistry student, my black and white diagram of a reaction could transform into a 3d colored one, when I looked at the diagram through the lens of my mobile device or through a headset.

3. If my reality required me to go through the internals of a human cadaver, I could see the cadaver's entrails through the camera of my tablet or phone, with additional information on each part popping on my screen.

4. If I wanted to understand the entire process of thermal nuclear power generation – I'd be able to walk into the control room, remove the cores to reduce the heat, see its impact, roll it back and go on practicing until I manage to explode the reactor…virtually. And then do it again. (And Chernobyl may never happen again!)

5. Walking into the aisles of a supermarket, if I wanted to get the health information of a particular food item, I could quickly check it out through the lens of my camera.

## 5. AR-Enabled Learning/Just-in-Time Information - A Closer Look

Here are a few of the many ways in which AR is set to enrich our lives.

### *a. Smart Experiences with AR-Assistance*

Travel could become a lot more fun and educational. By letting your phone see a building, you could convey the following to your phone and its resident apps:

- Your coordinates
- The direction you are facing
- The building that you are seeing
- Your distance from the building
- Other details

This information can be processed to augment your reality in one or more of the following ways:

- History, Anecdotes etc. of the building
- History and current politics of the place
- Materials used for construction of the building
- Weather conditions
- Recommendations (whether given your health conditions, you should consider going up the 102 steps of the building or not)
- Nearby restaurants based on your likes and dislikes, transportation availability… and so on!

### *b. Smart Experiences with AR-Assistance*

Apps would allow content creation and AR-assistance side by side. For instance, a doctor conducting a special kind of surgery could have an app working on his mobile device, recording the whole operation on one hand, and showing the doctor additional important (context-sensitive) information about the patient's vitals and also the process parameters, that could help him through the operation. The recorded video along with the doctor's comments could become content for future.

### *c. More Personal and Immersive Experiences with AR*

#### *Example 1: The holographic Doctor pays a home-visit to the sick!*

I still remember the time when I was little and fell sick. I wasn't lugged away to a hospital because I had sneezed and the mercury had been crossing 102F every day. Instead, Doctor Uncle would come around every three days, check me up, have a cup of tea, crack a few jokes, and be on his way. I actually looked forward to his visits.

A home visit by doctors could become a reality once again, except that they'd beam themselves up at your bedside. (Of all the possibilities, this one's my favorite.)

*But it isn't educational, is it?*

Let me try to present it with an educational wrapper.

Reflect on the possibility of studying with two of your best friends' holograms?

*Still not really educational, is it?*

Fine. Here's an example more relevant to learning.

#### *Example 2: A Knowledge-Transfer Spacewalk in your study.*

So let's look at the educational counterpart. Your virtual facilitator could beam up a special 3D hologram of the galaxies in your study. You could move from one galaxy to another, seeing them in close-up, stars labeling themselves up when you came close.

*Could there be a better way to learn?*

I believe not. I've been a hardcore sci-fi fan and I feel blessed to be born in this era when I see so many of possibilities that were once decried as fiction, turn into reality.

## 6. The Heady Mix of Augmented Reality and Instructional Design

I mention only a few instructional benefits of using AR here, (and I'm obviously avoiding a discussion on costs and other such constraining factors, because I don't want to destroy the upbeat mood.)

1. In Dale's Cone, dramatized, contrived, and real-purposeful experiences form the bottom of the cone. I'd classify AR as dramatized experiences, and VR as contrived ones – and I don't see why they won't yield to more concrete and retainable learning experiences for the learner.

2. I'd also like say that for the kinesthetic learner, who traditionally hasn't had much room to play, AR is a boon in disguise.

3. While AR is certainly going to be a blessing for BL 2 and BL 3 learning, I expect it to soon start playing an important part in higher BL learning as well. Apps will allow learners to break machines, even bodies, into components, study them, and put them together in a manner that they either work better (machines,) or work as well as before (bodies.)

## 7. The AR Technology (and the Concluding Note.)

(I can't resist this…)

At the very least, AR requires the following:

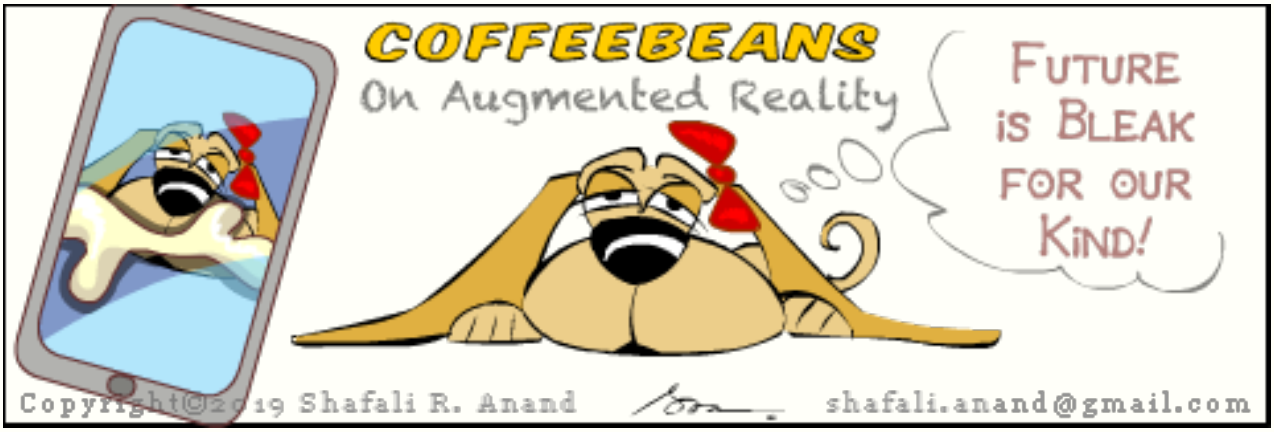
- A camera
- Sensors
- Microprocessors
- A Microphone
- Speakers
- AR Software

And you thought *all* you needed was a mobile phone!

*(Note: If you got the pun, you should register for one of our courses. We'd love to play mindsport with you.)*

Also,

Coffeebeans wants a word in...



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- GoT: Gamification of Trainings (2-Day)
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