

# BUSINESS & INFORMATION TECHNOLOGY (BIT) CLUB NEWSLETTER

## VIRTUAL REALITY



### What is Virtual reality?

Virtual reality (VR) means experiencing things through our computers that don't really exist. From that simple definition, the idea doesn't sound especially new. For example, you're experiencing the sites and sounds of Italy as it was about 250 years ago—so that's a kind of virtual reality. In the same way, if you listen to ambient instrumental or classical music with your eyes closed, and start dreaming about things, that's an example of virtual reality—so it's an experience of a world that doesn't really exist. If we're going to understand why books, movies, paintings, and pieces of music aren't the same thing as virtual reality, we need to define VR fairly clearly. Virtual reality (VR) is a believable, interactive 3D computer-created world that you can explore so you feel you really are there, both mentally and physically.



So, VR is essentially :

1. **Believable:** You really need to feel like you're in your virtual world (on Mars, or wherever) and you have to keep believing that, or the illusion of VR will disappear.
2. **Interactive:** As you move around, the VR world needs to move with you. You can watch a 3D movie and be transported up to the Moon or down to the seabed—but it's not interactive in any sense.
3. **Computer-generated:** Why is it important? Because only powerful machines, with realistic 3D computer graphics, are fast enough to make believable, interactive, alternative worlds that change in real-time as we move around them.
4. **Explorable:** A VR world needs to be big and detailed enough for you to explore. However realistic a painting is, it shows only one scene, from one perspective. A book can describe a vast and complex "virtual world," but you can only really explore it in a linear way, exactly as the author describes it.
5. **Immersive:** To be both believable and interactive, VR needs to engage both your body and your mind.

Paintings by war artists can give us glimpses of conflict, but they can never fully convey the sight, sound, smell, taste, and feel of battle. You can play a flight simulator game on your home PC and be lost in a very realistic, interactive experience for hours, but it's not like using a real flight simulator, and even less like flying a plane.

VR is quite different. It makes you think you are actually living inside a completely believable virtual world. It is two-way interactive: as you respond to what you see, what you see responds to you, if you turn your head around, what you see or hear in VR changes to match your new perspective.

## Types of Virtual reality

"Virtual reality" has often been used for compelling, interactive video games or even 3D movies and television programs, none of which really count as VR because they don't immerse you either fully or partially in a virtual world. Here are a few of the bigger variations:

### Augmented reality

For example, you point your smartphone at a landmark or a striking building and interesting information about it pops up automatically. Augmented reality (AR) is all about connecting the real world we experience to the vast virtual world of information that we've collectively created on the Web. Neither of these worlds is virtual, but the idea of exploring and navigating the two simultaneously does, nevertheless, have things in common with VR. For example, how do the things you see on the screen of your tablet change as you wander around a city? Technically, these problems are similar to the ones developers of VR systems have to solve—so there are close links between AR and VR.



### Collaborative

A few "virtual world" games like Second Life and Minecraft don't really count as VR. But they do offer that cutting-edge collaboration which VR doesn't. The idea of sharing an experience in a virtual world with other people, often in real time or something very close to it. Collaboration and sharing are likely to become increasingly important features of VR in future.



### Fully immersive

For the complete VR experience, we need three things. First, a plausible, and richly detailed virtual world to explore; a computer model or simulation, in other words. Second, a powerful computer that can detect what we're going and adjust our experience accordingly, in real time. Third, hardware linked to the computer that fully immerses us in the virtual world as we roam around. Usually, we'd need to put on what's called a head-mounted display (HMD) with two screens and stereo sound, and wear one or more sensory gloves.

### Non-immersive

A highly realistic flight simulator on a home PC might qualify as non-immersive VR, especially if it uses a very wide screen, with headphones or surround sound, and a realistic joystick and other controls. Computer archaeologists often create engaging 3D reconstructions of long-lost settlements that you can move around and explore. They don't take you back hundreds or thousands of years or create the sounds, smells, and tastes of prehistory, but they give a much richer experience than a few pastel drawings or even an animated movie.

# Applications of Virtual reality

## Education

VR has been adopted in education too. It improves teaching and learning. With VR, a large group of students can interact with one another within a 3-dimensional environment. Instead of going on excursion to witness certain industrial processes, it can be simulated on VR platforms. This enhances understanding and also makes learning fun for students.

## Business

VR has also been adopted in business. It is now being used for virtual tours of a business environment, training of new employees and this also gives new employees a 360 degree view of every product.

## Medical field

Surgeons now make use of VR to figure out all the positions of unwanted tumours in the body of their patients. This will enable them to determine the best incision positions to be able to remove the tumours without any form of complications. VR has also been adopted in the treatment of phobia by exposing the patient to relevant simulated phobia. Take acrophobia (fear of heights) for instance. Heights are being simulated for acrophobic patients. The more they are exposed to height the more the fear reduces gradually.

VR is now used for robotic surgery, where robots perform surgeries under the control of surgeons. This increases speed, accuracy and effectiveness of surgery.

Another kind of surgery is telesurgery. This is a groundbreaking innovation where a surgeon performs surgery on a patient in another location. VR is also used for training process. The effect of the application of different drugs can be simulated.

## Aviation

VR is being used to simulate a flying experience to train and test trainee pilots. Every pilot has to pass the simulation tests several times before he can fly a real plane. The simulation feels like flying a plane in the air. This is one of the oldest applications of VR.

## Military

VR has been adopted by all the three military services – air force, navy and army. VR is being put to different uses in the military. It is used to train soldiers in a simulated battlefield. This gives soldiers the opportunity to learn without the risk of being killed or injured.

They can simulate many kinds of battle field scenarios. All the scenarios include flight simulation, medical administration in the battlefield, virtual boot camps and several other scenarios. VR can also be used to treat post-traumatic stress. The triggers of the crisis will be simulated for the purpose of the treatment. When the patients are exposed to the triggers often, they will gradually get over the trauma.

## Automobile manufacturing

Ford, a popular automobile giant has already embraced VR in the process of manufacturing vehicles. Prototypes of any proposed vehicle will be uploaded on the VR platform where several engineers can view and make necessary recommendations before the actual vehicle is manufactured. This saves a lot of money, time and effort. The vehicle is only produced when all the engineers are satisfied with the virtual prototype. Plans are already in top gear to incorporate VR technology into Toyota's manufacturing process.

## Cinemas

A lot of cinemas have adopted VR technology now. They distribute head mounted display units to all viewers for each movie. When the effect of this unit is combined with powerful speakers that have been scattered all over the hall or theatre, it gives serious immersion. You will be engaged and fully immersed in the movie. In fact, you will feel like you are a part of the movie.

This is why movies are six times as interesting when viewed through VR head mounted display units. And horror movies are twenty times more real and scarier when watched on virtual reality platform.

In conclusion, the applications of virtual reality technology are infinite as more applications are being developed every day. Besides, the technology is very far from being fully utilized.