# 6. Internet - Looking forward

> "Free expression is the base of human rights, the root of human nature and the mother of truth. To kill free speech is to insult human rights, to stifle human nature and to suppress truth"
>
> *Liu Xiaobo, Nobel Peace Prize laureate of 2010 and human rights activist*

## CHECKLIST FACT SHEET 23 – INTERNET OF THINGS

In the same manner that you already protect your computer and other devices from security intrusions, be sure to apply those measures to your "Internet of things" devices.

Be aware that it is difficult to protect every individual device, but that you can protect your network and reduce your areas of vulnerability.

Carefully consider any "Internet of toys" items that you plan on introducing into your home and to your child. Check the security and privacy parameters of the toy and ask yourself: "How necessary is this toy?"

## CHECKLIST FACT SHEET 24 – ARTIFICIAL INTELLIGENCE, AUTOMATION AND DISRUPTIVE TECHNOLOGIES

Have you informed yourself about the latest developments in artificial intelligence and automation?

Have you invested in your interpersonal, social and emotional skills?

Have you set up your "smart" devices to ensure appropriate levels of security and user-protection?

## CHECKLIST FACT SHEET 25 – VIRTUAL AND AUGMENTED REALITY

Have you talked with your child/student about key topics such as sexism, sexuality, racism, bullying, stereotypes and other forms of discrimination?

Have you made sure that the devices your child/student uses are set up correctly, with high privacy and security protection?

Have you checked that your child/student maintains a healthy life balance when using virtual or augmented technology?

## CHECKLIST FACT SHEET 26 – ARE YOU THE PRODUCT? BIG DATA, DATA MINING AND PRIVACY

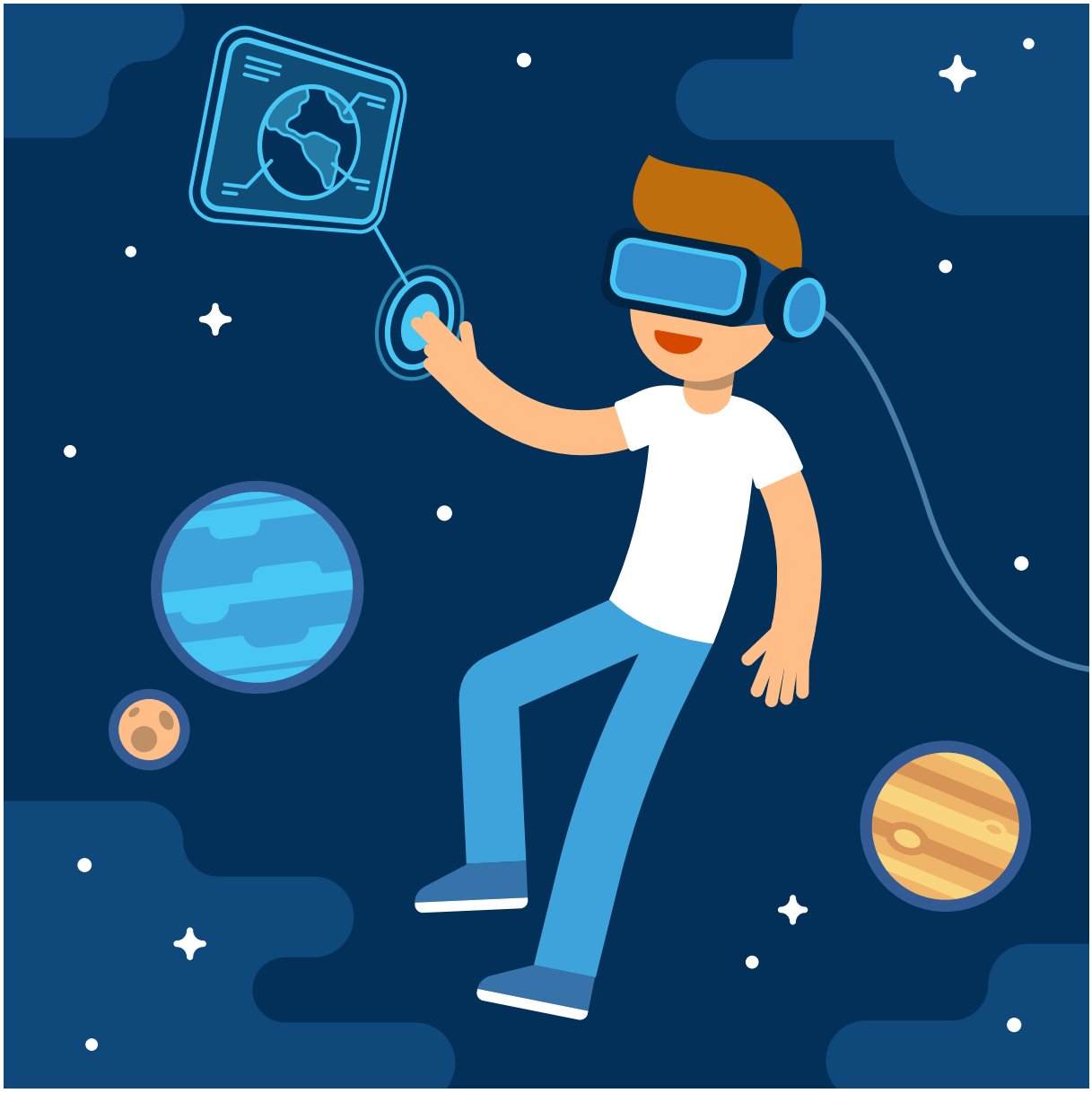
Have you taken the time to review the way your private data is treated by the online services you use, and to set up adequate privacy settings?

Have you recently reviewed the content you have posted online to make sure that it is still accurate and that you are still willing to share it?

Do you stay informed about the latest developments in "big data" to understand how these changes may affect you and what you can do about it?

Fact sheet 25

# Virtual and augmented reality



Virtual reality[1] is an immersive multimedia experience which replicates an environment that simulates physical presence in the real world. The sensory experience created can include sight, hearing, touch, smell and taste, with the first two being most prevalent.

Augmented reality[2] is the addition of computer-generated sensory input such as sound or images to real-world environments.

While the idea of virtual and augmented reality go back several decades, it is only recently that technology has gone far enough to envisage commercialisation of virtual and augmented reality devices, services and software. Augmented reality applications have grown fast through smartphones, mobile Internet and geo-localisation technology.

1. https://en.wikipedia.org/wiki/Virtual_reality
2. https://en.wikipedia.org/wiki/Augmented_reality

Some examples of recent developments in virtual and augmented reality include:

- the increased availability of virtual reality headsets such as Oculus Rift, Samsung Gear VR, HTC Vive or Sony Playstation VR, with a number of games set to launch, notably through the Android and iOS mobile platforms, the PlayStation 4, Xbox One and traditional PC or Mac computer games;
- the increased availability of augmented reality headsets or glasses such as Google Glass and Microsoft HoloLens; Microsoft plans to launch an augmented reality version of Minecraft, playable in your living room;
- the release of mainstream augmented reality games such as Pokemon Go which enables you to catch Pokemons in the real world via your smartphone (iOS and Android).

## EDUCATIONAL BENEFITS

- Virtual reality, by its possibility to simulate a real world experience, presents a great number of opportunities for learning. For instance, learning how to drive a car can be accurately simulated.
- Given the level of immersiveness of virtual reality, experiences have already shown promise in using virtual reality for therapeutic purposes, such as getting rid of arachnophobia or overcoming post-traumatic stress disorders (PTSD). It has also been used successfully to increase the level of empathy and understanding of others by enabling a user to experience what it feels like to be in someone else's shoes: being a person with a disability (a blind person, a person in a wheelchair) or being a minority suffering from discrimination.
- Although nothing can replace reality, not everyone has the opportunity to travel. Virtual reality can simulate visiting a monument or any other place "as if" you were physically there yourself. But it can go further and make you visit places you could never normally go, such as the moon or outer space, or the inside of a volcano, or it can even bring you back in time to simulate being on an 18th century battlefield or walking alongside dinosaurs.
- Augmented reality has too many beneficial applications to be listed. Since it consists in overlaying "extra" information or objects on the real world, possibilities are endless. With augmented reality, no need for a tour guide since, as you look at a monument, statue or anything really, useful information can be superimposed over it. Superimposing information has no real limits. It can be a menu or review for a restaurant, reminders about people's names or information about them when you see them, and so forth. In terms of learning, it also carries limitless possibilities: showing you how to fix/replace a car part by superimposing the steps you need to take, helping a surgeon during an operation, showing you how to prepare a recipe by simulating how you should cut your ingredients and how to mix them. Anything you look at can be "augmented" with extra information. A classroom can thus be turned into a stage where virtual objects can be added, showing a semi-transparent model of a human body, for instance.

## ETHICAL CONSIDERATIONS AND RISKS

### Behavioural risk

A number of studies have looked at the link between playing video games and real-life behaviours such as an increase in violence and aggressiveness. The conclusions, however, are still controversial. Some studies point to "short-term" aggressiveness and violent behaviour after playing a violent video game, other studies underline the "discharging" effect these games have on children. Other details, such as whether the game was multiplayer with an element of co-operation, also affect the results. The truth is that we are still far from understanding the long-lasting effects of video games

on children and young adults. Virtual reality and augmented reality will add a further layer of realism to video games, making it closer and closer to "reality" and little to nothing is known about how this will affect children. Recently, many controversies have surrounded video games such as GTA V where a third-party add-on developed by individuals allowed players to simulate rape on a virtual female character. Sexism in video games is a well-known phenomenon, with female players often pretending to be "male" in order to avoid harassment. And it is not just about the formal content of video games. Live chat through video games has been used for disseminating extremist content, sexism, bullying, hate speech and similar. Video games using virtual and augmented reality will be part of the media that children will consume in the future, and will inevitably contribute to shaping their attitudes and behaviours to a certain extent. Should irresponsible developers feature extremely violent, extremist, sexist, racist, homophobic content inside their games, this could negatively affect users.

### Privacy

Augmented reality relies on the permanent real-time analysis of the physical world to accurately "augment" it with virtual elements. This means that your localisation and what you are looking at needs to be fed to supercomputers, usually online, to accurately calculate what should be displayed. Without proper privacy protection, augmented reality could become a way to spy much more deeply on people, in real time.

### Security

With devices being connected permanently to the Internet, distance live hacking has become easier. As we will start using augmented and virtual reality devices, such as glasses or even contact lenses, new potentially very dangerous hacking situations could arise. For instance, if a driver uses augmented reality display to provide directions, the display could be hacked to distract him/her from the road.

### Manipulation and consumerism

Augmented and virtual reality will also bring with them new advertising strategies. As there is no regulation on what is allowed, the sky is the limit and we can easily assume that techniques such as "augmenting" your home with advertisements will be used. For instance, you could open your fridge and an advertising device would "augment" your fridge's content to display products that you "should" have inside. In the supermarket, while scanning a product with your smartphone, a notification may suggest you buy another product.

### Dependency and addictiveness

Neurosciences have taken a leap in recent years and much has been discovered about our brains. The brain takes much pleasure from fast stimuli such as quick action, movement and similar. This is what makes video games and fast-paced action movies so successful. Unfortunately, the "real" world requires the acquisition and practice of skills such as restraint, self-control, patience, perseverance and pro-activeness. Not everything can be "gamified" or made "pleasant" via technology. Learning the violin is just one example. As children will grow up with virtual and augmented reality, there is a risk that they will not be able to cope with a world which is not "augmented" or not as "rich" and stimulating as their "virtual" reality. MMORPGs (massively multiplayer online role playing games) are a good example of this. While they help develop a great number of skills, such as a sense of organisation, planning, leadership and co-operation, they come with a very "enjoyable" learning curve which is just challenging enough to keep players interested, but not too difficult to discourage them. Augmented and virtual reality will exacerbate this problem and might create addictiveness and dependency towards a world in which it is easier to cope, is less frustrating and much more stimulating than the real world.

### Loss of interpersonal skills and asocial behaviours

While still a limited phenomenon, in some countries, such as Japan, there is a growing

phenomenon whereby adolescents and adults, referred to as "Hikikomori", withdraw from social life. While not directly related to the media, television or the Internet, these mediums make this social withdrawal more bearable as they provide a distraction from the difficulties of "real" life. Virtual and augmented reality may exacerbate the phenomenon even further, as virtual realities might be easier to cope with and more gratifying than "messy" human interactions. Even sex and sexual relationships come with their share of negative emotions, the pressure to perform, the shame of body image, all of which disappear in a virtual world where the user is in full control of everything.

### Physical health

Augmented reality and virtual reality also bring an opportunity to solve physical inactivity problems such as users sitting passively behind screens for hours on end. Location-based games, for example, can take place in the real world with augmented reality, and projects can create special rooms for virtual reality environments. At the same time, immersive experiences pose new problems, such as ignoring signs of pain or overuse due to the power of virtual or augmented content to capture our full attention. Repetitive motions inside a game can lead to tendonitis, as seen with some Wii games. Also, motion sickness and nausea can be a strong side effect of the immersive experience of augmented reality, since the images that are being fed to the brain through a head-mounted display clash with the input from motion sensors in the inner ear. Finally, many beta testers have reported getting hurt through falling or colliding with an object, while immersed in virtual reality or even augmented reality, as they have been staring at smartphone screens while playing augmented reality games in the real world.

### Harassment, cyberbullying and contact related risks

As the boundary between what is real and what is virtual alters, virtual and especially augmented reality could be used as an instantaneous, live way of humiliating someone, for instance by programming the overlay of a rat head upon facial recognition of a person, or sharing a live stream of someone in a humiliating situation.

Augmented reality and, to a lesser degree, virtual reality carry "contact" related risks. Massive augmented reality games rely on playing in the real world against real people who are strangers. Problematic situations can include being mugged or assaulted in real life.

## IDEAS FOR CLASSROOM WORK

- Augmented and virtual reality rely heavily on hardware. If your school or learning institution is not properly equipped with tablets for instance, then you will not be able to take full advantage of these technologies. In some cases, the devices of children and young people themselves can be used (such as their smartphones) but this poses issues with regards to school policy, as some schools forbid the use of smartphones during school hours, and may lead to discrimination, as some students may not have a mobile phone powerful enough to handle an augmented or virtual reality activity, or may not even have a mobile phone at all.
- That being said, there are many resources available online to help you use augmented and virtual reality in the classroom. Augmented reality is easier to use as it does not require "head gear" that provides a fully immersive experience and will work with existing devices such as smartphones and tablets.
- If you are interested in using augmented reality, you can find a list of tutorials, guides and apps at Kathy Schrock's website "A guide to everything"[3] website[4].

3. http://web.archive.org/web/20160318145342/http://www.schrockguide.net/augmented-reality.html; OnlineUniversities.com
4. http://www.onlineuniversities.com/blog/2012/09/20-coolest-augmented-reality-experiments-education-so-far/

## GOOD PRACTICE

- As always, since little is known about the effects of prolonged use or exposure to these new technologies, maintaining a healthy life balance is a must. Make sure that you and/or your child balance your "connected", virtual or augmented activities with "traditional" sports or other hobbies. This also applies to classrooms. Augmented and virtual reality are flourishing businesses and, while many claims about the benefits of using them in education may be true, there is no silver bullet for providing quality education. A healthy balance between traditional and new teaching methods is the way forward.
- Carefully choose the content that you buy for your children should they use virtual or augmented reality devices and keep a check on what they have access to. Read age restrictions and labels, for example PEGI labels (see Fact sheet 20 on labelling and filtering, and Fact sheet 16 on games), and enable parental control tools on devices used by younger children to make sure they cannot access content freely. For younger children, use quality white lists, if they are available in your country/language, as it is the best way to both protect them and ensure that they are exposed to positive content that has been reviewed by professionals.
- It is more important than ever to talk openly about violence, cyberbullying, sexuality, and rights and responsibilities with children and young people. Setting strong ethical standards from the youngest age is the most effective way to neutralise sexist, racist or any other discriminatory or negative message that your children may encounter at some point online or through their virtual and augmented reality devices.
- Set the privacy and security settings at the highest level for younger children. See Fact sheet 9. Remember that these devices are at risk of being hacked.
- Be sure to check the business model behind the content or device that you use for virtual and/or augmented reality, as you or your child might be exposed to intrusive advertising.

## FURTHER INFORMATION

- News about the latest developments in virtual reality is available on Venture Beat: *<http://venturebeat.com/tag/virtual-reality/>*.
- There is an article about virtual reality and education from Stanford University: *<https://teachingcommons.stanford.edu/teaching-talk/virtual-reality-and-education>*.
- News about the latest developments in augmented reality are also available on Venture Beat: *<http://venturebeat.com/tag/augmented-reality/>*.
- General information about augmented reality is available from the Dartmouth College Library Research Guides: *<http://researchguides.dartmouth.edu/AR>*.