Figure 1 Woman using AR Tech (www.skoda-storyboard.com)

USER ISOLATION & SOCIAL EFFECTS OF AUGMENTED REALITY

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Courses: Creative Computing & Multimedia Applications Development

Module: Professional Practice

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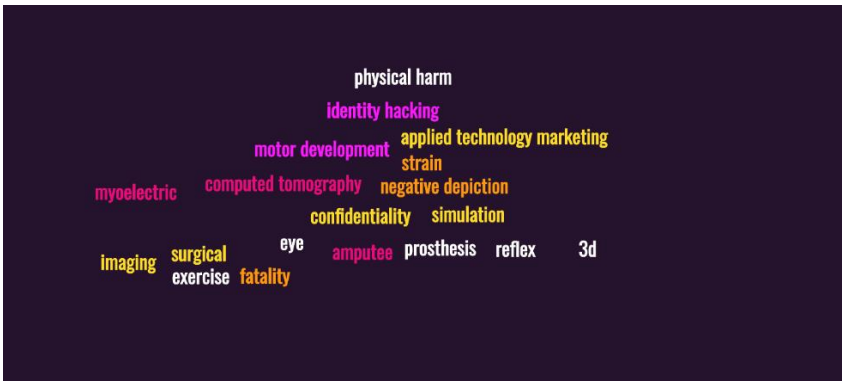

Figure 2 Using a word cloud generator for our research topic (www.monkeylearn.com)

We choose a website called “monkeylearn.com” to generate our word cloud. When deciding on what keywords to use, we discuss our own knowledge of augmented reality. Such as **what** it is, **how** it is use, the **positive** and **negative** effects.

We wrote down a few words on paper to help with our word cloud research. The next step was to find websites, articles or reports that related to our topic. Using the google chrome feature, the “**Find**” (keyboard shortcut CTRL + f). We can insert a keyword, if there is a match it will be **highlighted** on the page with the number of quantities.

Some articles even **included keywords** which help with our word generator. We were glad we did the word generator as we also learn more about augmented reality along the way, which benefit our group research document we believe.

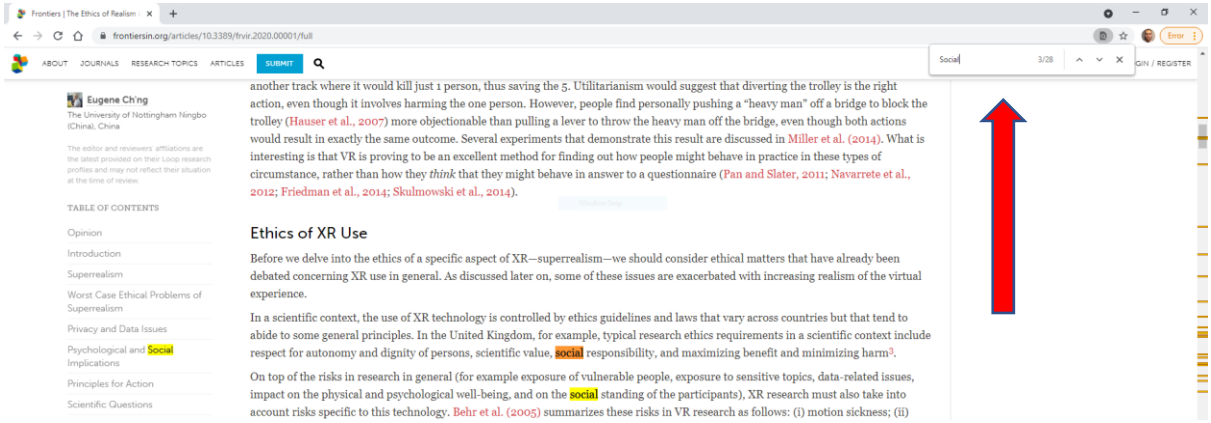

Figure 3 Using the find tool on Chrome

2. Introduction

In this report we will go through the various benefits and harms that are caused by the usage of Augmented Reality (AR). The use of AR has benefitted the world of science by aiding in both physical recovery and mental training but has also led to private information been taking away and the hijacking of the device potentially being used could lead to death via necessary real time being lost. There is also a bad stigma surrounding AR that many people have already suffered from and could still suffer today if in commercial use.

We chose to investigate Augmented Reality as we both felt that we use it in our day to day lives but don't truly know what it is. We wanted to learn and understand the full potential of this technological advancement and decide for ourselves if we should be using it in our day to day lives

Figure 4 AR being used for Interior Design (www.istockphoto.com)

3. Simulation

Virtual reality is used to create virtual environments for the viewer, often wearing a headset to see it. However, **AR** allows to the viewer to see virtual objects mixing with the real-world environment, using a smart phone camera. Simulation is the biggest draw here.

Figure 5 Using Virtual Reality Headset

Figure 6 Using Augmented Reality

One positive example for AR simulation is companies like Harvey Norman allows users to use AR on products. The person can use their camera and place the virtual sofa in their room to get an idea how it may look before purchasing. AR may impact social media, it may **reduce communicating** face-to-face with a stranger in public. Making a person feel **isolated** outside of technology. This is because "you can now use AR to search them online and message them" (Mileva, 2021)

However, I believe that simulation can be used for the wrong reasons. AR technology could allow people to act immoral and treat virtual characters with disrespect. As "we should treat virtual characters with respect because if not we may end up treating people badly too" (Slater Mel, 2020).

This could lead to violence, as certain video games could use AR technology, an example would be gun-shooting. Although there are shooting games where the games' camera is in the first-person view. The AR technology could it more real, which I hope won't be happening in the future.

Figure 7 Playing a shooting video game using an AR app (www.techstory.com)

4. Exercise

As AR technology evolves, new opportunities and goals arise. What if you could do exercises from the comfort of your home? In 2020, a Samsung representative demonstrated the Samsung AR Glasses at the **consumer electronics show (CES)**. The AR glasses use Samsung's GEMS (**Gait Enhancing & Motivating System**) technology.

There is another representative who walks on stage wearing an exoskeleton, which is a frame worn by the body and has sensors for the AR glasses. By using their hand, a person can select an exercise and choose their **virtual trainer** when they put on the AR Glasses.

The virtual trainer talks to the person wearing the glasses and shows them what to do. You can count the number of "lunges" with each lunge. One interesting comment is the person telling the virtual trainer that the exercise was “more intense today”.

Figure 8 Video Demo of Samsung AR Glasses (www.youtube/uploadvr.com)

Trainer replies, "I increased the intensity by one level today" (UploadVR, 2020). As I watched the demo, I began to think of how this might be useful in the future. Especially if there were special programs for the elderly or children with special needs.

People would also have to travel less to the gym since they could use the glasses at home. It could be helpful for people with **social anxiety** to communicate with the virtual trainer as it is one-to-one. A negative side of the technology is that it could be **expensive**.

5. Identity Hacking

The term identity hacking is where someone has taken information that identifies you and pretends to be you on the internet. This could lead hackers to use your bank account without your permission. "A user's privacy is at risk because AR technologies can see what the user is doing" (Kaspersky, 2022).

Figure 9 Hacker stealing information (www.pixabay.com)

Figure 10 Virus Alert Message (www.askleo.com)

There several ways a hacker can attack, such as **malware** if a user selects a fake ad. Resulting in the possibility of virus onto their AR system. I think the hacker doing the **denial of service (DOS)** attack is the most dangerous.

During an important surgery in the hospital, "a surgeon suddenly losing access to vital real-time information on their AR glasses" (Kaspersky, 2022). Unfortunately leading the patient to death. Another example would be a "driver suddenly losing sight of the road because their AR windshield turns into a black screen." (Kaspersky, 2022).

This tech is still new, so there is not a lot of AR troubleshoot services stores in towns and cities. Adding more to the user isolation as there is not a lot help available from this.

6. Autism Cognition

An argument for Augmented Reality (AR) is the positive motive that it has been proven useful in **increasing** Joint Attention skill for children that have Autism. It was introduced as a way to increase the Sociability of Children and to allow them to grow at va rate that can understand different aspects of life from **social cues**. The use of AR was utilised by an exercise that was made in a Pictogram Room that the children had to carry out in a game format that allowed them to **interact** with pictures as soon as they popped up. This garnered their interest and as more showed the children then moved to the newest object.

This was a positive exercise as it allowed children who were on the spectrum of autism that prevented their acceptance of new variables of life to take a positive attitude on changes within their life and **improve** their understanding and dealing of the situation while also maintaining attention to the previous objects or hurdles that have presented themselves. This is very **beneficial**, and I feel that many people deal with on a day-to-day basis and once we consider that if we were unable top deal with a change in our circumstances then how would we cope with the rest of the day.

The use of the augmented reality is also improved in these support classes as because they aren't virtual reality, they take the form of the world around us which allows the children to feel more comfortable and more accepting of the exercises. The report stated "A systematic review that included some of these studies, among others, concluded that the use of AR produces positive results in autistic people, especially in children" (Pérez-Fuster Patricia, 2022) .

Another study that was done for the aid of children with Autism is a study done in Taiwan to showcase Facial Cues and a variety of emotions. Within the report they explained "We developed 20 stories to assess the participants' perception of their self-facial emotions and their perception of the intentions of others." (Chien-Hsu Chen, 2015) This allows the children to read people a lot easier and to understand what is going on in their surroundings which is also an excellent aid for Lifelong skills. Their study was **proving effective** and is now utilized in many schools to build the children's understanding

Figure 11 PictoGram used in aid of Autism

7. Maths Induced Anxiety

Anxiety is largely related to stressed induced situations and not being able to gain control. This can have an effect that can lead to **social Isolation and loneliness**. The learning and examination of mathematics can cause people to feel stressed and so maths does make a lot of people feel anxiety. One way of tackling the issue was a study from Carlo H. Godoy Jr. from the **Technological University of the Philippines-Manila**, where they explored the use of AR as an integrated **STEM** lesson that would corelate the maths learned with real life situations to create a background of the usefulness of the equation.

This would allow people to associate the various equations with real life obstacles and to engraved it in memory the basis of the use of AR was “a game-based learning approach for teaching Precalculus will control and make use of the student’s intrinsic motivation together with their interest in playing and lead them in a very interactive way of solving exercises and seat works for the Precalculus subject” (Jr, 2021).

The use of AR in mobile application was widely used worldwide back in 2016 when a company called Niantic released **Pokémon Go**. This used **google maps** to use the real world as a playground for anyone with a phone to relive their childhood. The app Scavenger-Calc used the exact same premise, but they would **change real life images** around the world with puzzles that the player could solve to gain in game rewards. This accomplishment along with the comfortability and control one feels

from a game allows the user to feel in control and so making them more comfortable when doing mathematical problems.

Figure 12 AR being used to help math equations (www.semanticscholar.org)

8. Physical Harm

In 2014 Google released 'The Google Glasses These were glasses that used cameras to **scan** the surrounding environment and then a small projector to output information on the glass to give a **hologram feel**. This was the **first open world AR** the world had experience. But it was also cause for concern as people were concerned their privacy was taking as someone walking past with these glasses would have scanned their faces and would be giving all their information. This negative view had a snowball effect on the perception of AR and was deemed **immoral** to certain people.

So much so that the people wearing the 'Google Glasses' were often attacked and beaten up on the streets. This led to a large scandal in 2014 and soon the glasses had to be discontinued for safety reasons. One such victim was Sarah Slocum who was physically abused in a bar in San Francisco. An article from the 'Washington Post' it says, "Another video, shared with San Francisco television station KRON4, shows one of the alleged attackers telling Slocum that people like her are "**destroying**" the city of San Francisco" (Tsukayama, 2014). This **highlights** the thoughts of AR a day-to-day use.

While it may be good for medical and educational situations it could prove to be borderline lethal to some. Another attack happened then 2 months later to a reporter

for ‘The Business Insider” named Kyle Russel where he stated, “when a person put their hand on my face and yelled, "Glass!" In an instant the person was sprinting away, Google Glass in hand.” (Russel, 2014), Which shows that because he was wearing a piece of AR equipment, he became a target for a mugging. This adds to the point that AR can put the user **in risk** to all sorts of attacks as it can become a perceived invasion of privacy to the public but to people who wanted to wear these for their own benefit and interest it can be dangerous to leave the house with them, on and so to use these AR devices it would be safer to do it at home in isolation but then this covers both negative aspects of this report as if you were **isolating** at home to gain the benefit of AR it would in turn take a negative effect on your social life.

Figure 13 Google Glasses AR Hardware (www.time.com)

9. Division of Labour

Aaron O Brien and Maurice Brazil

BSc (Hons) in Creative Computing Yr. 2 and BSc (Ord) in Multimedia Applications Development Yr. 2

Professional Practice module

Item or Action to be completed	Aaron's Role	Maurice's Role
User Isolation & Social Effects of Augmented Reality	We met after class in the college canteen to discuss what topic to pick. We look over the list and pick the best three we could work on. Over the weekend, we kept in contact using WhatsApp, which we then decided on augmented reality. We choose this topic because it not as talks about because the rise of popularity of Virtual Reality nowadays.	
Timescales		Setup a 12-day plan over the Easter break.
Meetings	Set up online calls using the social media app "Discord". We contacted every seconded day during Easter Break.	
Word Cloud		On the 4th of March during a three-hour break we began our research on word cloud. Using monkey learn as the word cloud generator.
Submit group report	Design the layout of the report, research and wrote the word cloud and three sections of the report including photos added in. Added table of contacts and Harvard references at the end.	Planning and deciding on which section that we needed to put down on the report. Also, research and wrote the introduction and three sections of the report. Adding fig captions.
Presentation: Technology choice	Request not to use PowerPoint as this module counted towards my final grade in Multimedia Applications Development. I didn't want to lose marks. Use Canva.com	Use Canva.com

Slide Contents	We each did a slide on each section we cover in our group research. We both contribute to the intro and outro, making the workload fair.	
Practicing Presentation		Planned to meetup at the college campus during the Easter break. Practicing our presentation talk in an empty room in the IT Building.

Signed:

Aaron O Brien Maurice Brazil

Aaron O'Brien *Maurice Brazil*

10. Conclusion

We are glad we chosen augmented reality as the research topic. We believe this technology could be become more popular with years to come. The biggest takeaway was learning how beneficial this tech was in the medical sector. As it can be used for surgery and allow the patients to get a better understanding of the human body. It was interesting to also learn how it help people with special needs, including child autism.

As a group, it was difficult at times to get in contact as it was the easter break, so its time off for students. Meaning one of us was working more hours in their part-time job. However, in the end we decided to meet up at the campus as it was empty, and it allow for better communications rather than online via zoom/Microsoft teams. Within this process, we both learn how to co-operate, communicate and be flexible in a group team of two.

Figure 14 Teamwork (www,pixabay.com)

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