Project Specification LSEPI Analysis (Specification 1)

I have chosen to analyse the legal, social, ethical and professional issues relating to the project from specification 1, 'Aiding visualisations for distraction and pain management through immersive virtual reality environments'. The first issue I have found relates to the difficulty of using VR in medicine. While integrating VR into a medical environment can indeed have great benefits, it has historically been difficult because of a 'lack of integrated systems and the lack of reliable equipment suppliers' (Greenleaf, 1996). 23 years later, the availability of the Oculus Rift that the project will use has made VR somewhat more accessible: however from release the Rift faced complaints that it was expensive – 'pricey' and 'awkward' (Fowler, 2016) – and has previously required 'high-end gaming PCs' which add a further cost to its £399 price (Oculus, 2019). There was also a very public example of the lack of reliability of the Rift in March 2018, when an admin error caused the Rift headsets to be inoperable for a whole day – not ideal in the medical field.

This issue is not as problematic as it would have been several years ago, as now the Oculus Go (2018) and Oculus Quest (2019) are available and do not require PCs, significantly reducing the cost of deployment. However, the student has not specified whether their project would work on the lower-powered Go and Quest, as many more intensive Rift games require the Quest to be plugged into a gaming PC to work (Hardawar, 2019). Therefore, the issue of cost remains a serious one: while it could be mitigated by using the Go or the Quest, this would be a best-case scenario and would still cost at a minimum £199 (Oculus, 2019). This is a potentially prohibitive cost just to buy the devices, particularly for a public healthcare provider like the NHS, facing 'staffing and financial problems ' (that) 'are the worst they have ever been' (Campbell, 2018). It is also true that some form of specialist (Harbert & Chatwood, 2018) support would be required to maintain and troubleshoot the devices, meaning that it is highly unlikely existing IT departments would be able to manage them. A possible way of resolving this would be by providing training to said departments – however there remains an extra cost associated with this. Finally, there is also an ethical issue – the NHS would have to make a decision as to whether it would be right to spend this amount of money, or whether there would be ethically more deserving cases. If the NHS did decide that the project was too expensive to pursue, this would have a negative impact on the project as not being used by the biggest healthcare provider in the country would significantly reduce its reach and ability to collect data.

A further issue with the project has both social and ethical dimensions and concerns the potential health impact of using VR with vulnerable people. For starters, VR is infamous for causing motion sickness – a public example of this was when numerous journalists experienced this in the early days of the Rift (Heffernan, 2014), (Nelson, 2014), . The reasons for this vary but include there being 'not sufficient visual information while sensory information coming from vestibular system keeps changing', and vice versa. Another problematic situation is where a player moves fast in a VR environment but their 'actual body is sitting or standing up without movement, causing disparity of information' (Jung & Whangbo, 2017). This particularly applies to the project because it aims to deliver an immersive virtual environment for the patient to explore (as they lack means to do so in the real world) and thus there will be movement in the VR world but not in the real world.

For a vulnerable person, this poses a number of issues: first the aforementioned motion sickness (which could be particularly unsettling for those with chronic pain or

mental illness), but also other issues such as falls, with it being suggested that 'someone needs to watch over you when you are using VR' (LaMotte, 2017) to avoid this, adding a further level of potential expense and complication to the process. There is also the question of legal responsibility, as there are numerous legal issues relating to VR (Harbert & Chatwood, 2018): for example if a vulnerable person does suffer a fall when using the Rift project, who is legally responsible? The student should speak with the organisation deploying the technology to make sure they know this and can therefore avoid any legal trouble resulting from the project.

Furthermore, there is also a social dimension to this issue, as it has been found that the Oculus Rift disproportionality impacts women in terms of inducing motion sickness (Munafo, Diedrick, & Stroffregen, 2017) because of biological differences. This factor should be considered when deploying the project, and it would be wise for the student to conduct further research into the possibility of mitigating its impact, particularly after a number of public examples of VR affecting the genders differently (Boyd, 2014).

Finally, there is also a very real risk of addiction – described as a 'come down upon exit' (Sutton, 2017) – when using the Oculus Rift. This is a particularly important issue to take into account when working with the vulnerable people mentioned in the specifications, who suffer from chronic conditions that could lead them to be more susceptible to addiction (Sinha, 2008). While this is traditionally seen in the context of drugs, as the source describes, addiction can also manifest in the context of virtual reality (Rajan, et al., 2018) similar to that seen in the context of video games. Addiction is a particularly relevant issue to the project because the student aims to create a pleasurable experience that individuals may wish to spend significant amounts of time in (and not one that is necessarily limited just to treatment sessions): therefore, the risk of addiction developing is greater. This issue could be addressed, however, by limiting the amount of time a user can spend in the virtual world (something which can be accomplished relatively easily through software) and also by allowing them to monitor the time they do spend in the virtual world (similar to the functionality provided by Apple's Screen Time feature on their devices).

In conclusion there are a wide range of issues involved with this project, and the student needs to think carefully about them as they proceed. Most of these issues are surmountable, but the student should consider alternative low-cost methods of delivery if possible, as cost appears to be the most challenging issue.

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