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Metaverse: Who Will Be Excluded from Higher Education?

Abstract
The premise of this paper is that using the metaverse for higher education presents a new inclusivity challenge. The paper presents a counter-example to the argument that the metaverse will increase accessibility. This paper argues that visually induced motion sickness has the potential to become a new form of disability discrimination. This barrier is one that needs addressing if access to the metaverse becomes more prevalent in higher education.

Keywords
Metaverse, disability, excluded, higher education, accessibility

Introduction

This paper imagines a future in which higher education takes place in the metaverse and asks whether this will result in people with disabilities being treated more equally than in higher education in the current physical world. The potential advantages of higher education in the metaverse are highlighted, before identifying a challenge, visually induced motion sickness, that could potentially increase inequality in this imagined future. First, a brief explanation of what metaverse is taken to mean within this paper. In what follows, Ball's[1] definition of "a massively-scaled and interoperable network of real-time rendered 3D virtual worlds that can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data" will be applied[2]. The term virtual environment is used to denote a wider range of immersive virtual environments that have some of the qualities of the metaverse, but that are lacking elements such as the interoperability, synchronicity, persistence or real-time-ness, of the metaverse.

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[1] M. Ball, *The Metaverse: And How it Will Revolutionize Everything,* WW Norton & Co, New York 2022
[2] Ibi, p. 163.

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The advance of the metaverse presents opportunities for growth in the use of virtual environments in higher education[3]. Research at the University of Nottingham into the use of the metaverse in higher education found that students valued the ability to choose and customise avatars to represent their identity[4]. This research found that the use of avatars also reduced discomfort in communicating with the wider group, meaning that they collaborated and engaged more than via video-conferencing. This research replicated findings from other studies that the use of avatars gives a feeling of being there with the rest of the group[5]. Further, Burnett et al. observed very high motivation to learn in the students involved in the project, that the lecturers were able to design challenging, customised teaching and that curiosity in the students increased due to the novel experience[6].

The potential advantage of higher education in the metaverse focused on in this paper is that of accessibility. Some research argues that virtual environments present an opportunity to improve accessibility. For example, Li et al.[7] test the premise that virtual environments present a way for people with physical disabilities or chronic conditions to experience the benefits of nature exposure on physical and mental health. Similarly, the metaverse has the potential of making it easier for disabled students to access educational opportunities[8]. This is sup-

[3] S. Murray, *Business schools explore teaching in the metaverse* in "Financial Times"*,* 29 Nov 2022, https://www.ft.com/content/260e92f8-980d-4930-8b5f-f8e32d407d0b; S. D'Agostino, *College in the Metaverse Is Here. Is Higher Ed Ready?* in "Inside Higher Ed", 2 August 2022, https://www.insidehighered.com/news/2022/08/03/college-metaverse-here-higher-ed-ready; F. Lavanga, M.R. Mancaniello, *Formazione dell'adolescente nella realtà estesa. La pedagogia dell'adolescenza nel tempo della realtà virtuale, dell'intelligenza artificiale*, Libreriauniversitaria edizioni, Padova 2022

[4] G.E. Burnett, C. Harvey, R. Kay, *Bringing the Metaverse to Higher Education: Engaging University Students in Virtual Worlds* in A. Correia and V. Viegas (edited by), *Methodologies and Use Cases on Extended Reality for Training and Education,* Information Science Reference, Hershey, Pennsylvania 2022, pp. 48-72, https://doi.org/10.4018/978-1-6684-3398-0.ch003

[5] D. Bombari, M. Schmid Mast, E. Canadas, M. Bachmann, *Studying social interactions through immersive virtual environment technology: virtues, pitfalls, and future challenges in* "Frontiers in Psychology" 6, 2015, https://doi.org/10.3389/fpsyg.2015.00869

[6] G.E. Burnett, C. Harvey, R. Kay, *Bringing the Metaverse to Higher Education: Engaging University Students in Virtual Worlds*, cit.

[7] H. Li, X. Zhang, H. Wang, Z. Yang, H. Liu, Y. Cao, G. Zhang, *Access to Nature via Virtual Reality: A Mini-Review* in "Frontiers in Psychology" 12, 2021, https://www.frontiersin.org/articles/10.3389/fpsyg.2021.725288

[8] A. Koohang, J.H. Nord, K.B Ooi, G.W.H.Tan, M. Al-Emran, E.C.X Aw, A.M., Baabdullah, D. Buhalis, T.H. Cham, C. Dennis, V. Dutot, Y.K. Dwivedi, L. Hughes, E. Mogaji, N. Pandey, I. Phau, R. Raman, A. Sharma, M. Sigala, A. Ueno, L.W Wong, *Shaping the Metaverse into Reality: A Holistic Multidisciplinary Understanding of Opportunities, Challenges, and Avenues for Future Investigation* in "Journal of Computer Information Systems" 63(3), 2023, pp. 735-765, https://doi.org/10.1080/08874417.2023.2165197

ported by wider research considering the possibilities of the metaverse, as it reduces geographical and physical constraints, as well as travel challenges, to accessing opportunities[9].

Improving accessibility in higher education for disabled students is an important topic. This is because accessibility continues to be an issue in higher education. Bolton and Hubble[10] report that in the UK disabled people are underrepresented in higher education and that disabled students in higher education have worse outcomes than non-disabled students; they are both more likely to drop out of their course and to achieve a lower degree result. This then has knock-on effects, as disabled students are then less likely to find employment when they enter the workplace. Shaw[11] supports these findings, agreeing that there are barriers to inclusion for disabled students within higher education. If the metaverse can improve accessibility to higher education, then exploring its use is a valuable enterprise.

However, this paper takes the opposing view that virtual environments will potentially reduce accessibility to higher education. Often, accessibility concerns related to higher education in the metaverse tend to focus on inequalities in terms of being able to afford virtual reality (VR) headsets or access reliable internet connectivity[12]. In this paper, a large body of research is drawn upon that suggests visually induced motion sickness is a significant barrier to accessibility. This significance is demonstrated through application of current work on disability and discrimination, making a case that in a possible virtual future in the metaverse, discrimination based upon the disability of visually induced motion sickness is a real possibility.

[9] S. Singh, S. Vanka, *Metaverse and Future of Work: Avenues and Challenges* in "IUP Journal of Organizational Behavior" 22(2), 2023, pp. 107-118; T. Šímová, K. Zychová, M. Fejfarová, *Metaverse in the Virtual Workplace: Who and What Is Driving the Remote Working Research? A Bibliometric Study* in "Vision", 2023, https://doi.org/10.1177/09722629231168690

[10] P. Bolton, S.Hubble, *Support for disabled students in higher education in England, House of Commons Library*, 22 February 2021, https://commonslibrary.parliament.uk/research-briefings/cbp-8716/

[11] A. Shaw, *Inclusion of disabled Higher Education students: why are we not there yet?* in "International Journal of Inclusive Education", 2021, https://doi.org/10.1080/13603116.2021.1968514

[12] G.E. Burnett, C. Harvey, R. Kay, *Bringing the Metaverse to Higher Education: Engaging University Students in Virtual Worlds*, cit.; A. Koohang, J.H. Nord, K.B Ooi, G.W.H.Tan, M. Al-Emran, E.C.X Aw, A.M., Baabdullah, D. Buhalis, T.H. Cham, C. Dennis, V. Dutot, Y.K. Dwivedi, L. Hughes, E. Mogaji, N. Pandey, I. Phau, R. Raman, A. Sharma, M. Sigala, A. Ueno, L.W Wong, *Shaping the Metaverse into Reality: A Holistic Multidisciplinary Understanding of Opportunities, Challenges, and Avenues for Future Investigation,* cit.

The Problem

The problem is that virtual environments where participants take a first-person perspective, such as in the metaverse, cause visually induced motion sickness in a significant proportion of participants. This visually induced motion sickness is prevalent even when the virtual environment is accessed via monitor or laptop, rather than via an immersive VR headset. There is a wide range of existing research that has established this connection between virtual environments and visually induced motion sickness. The argument here is that visually induced motion sickness will potentially constitute a form of disability discrimination in the metaverse.

First, consider visually induced motion sickness caused by first-person video games, played on monitor or laptop, as these give a similar experience to accessing the metaverse via this type of hardware. Stoffregen et al.[13] found that video games carry a significant risk of motion sickness. Their study aimed to estimate the general likelihood of motion sickness among players of video games, using a video monitor rather than head-mounted display units. They found that rates of incidence were between 42% and 56% of the participants in their study, depending upon the test conditions. These findings are supported by Chang et al.'s[14] study, which found that 67% of adult participants experienced visually induced motion sickness when asked to play an off-the-shelf video game on a monitor.

Note though, that some studies did not straightforwardly replicate these findings. Dong et al.[15] found that in their study using a driving video game, where a participant was in control of driving the car, only 15.4% of participants experienced visually induced motion sickness. However, where someone was watching a recording of the car being driven, 69.2% of participants reported visually induced motion sickness, leading them to conclude that something to do with control is relevant to feelings of nausea. This variation is interesting, as it may

[13] T.A. Stoffregen, E. Faugloire, K. Yoshida, M.B. Flanagan, O. Merhi, *Motion sickness and postural sway in console video games* in "Human Factors: The Journal of the Human Factors and Ergonomics Society" 50(2), 2008, pp. 322-31, https://doi.org/10.1518/001872008X250755

[14] C.H. Chang, W.W. Pan, L.Y. Tseng, T.A. Stoffregen, *Postural activity and motion sickness during video game play in children and adults* in "Experimental Brain Research" 217, 2012, pp. 299-309, https://doi.org/10.1007/s00221-011-2993-4

[15] X. Dong, K., Yoshida, T.A. Stoffregen, *Control of a virtual vehicle influences postural activity and motion sickness* in "Journal of Experimental Psychology: Applied" 17, 2011, pp. 128-138, https://doi.org/10.1037/a0024097

point toward solutions with to the problem. Chang et al.[16] later repeated this pattern with pre-adolescents, finding that participants controlling the car in the game felt motion sickness, as opposed to 73.08% of those watching the car being driven in the game. Martirosov et al.[17] did not replicate these findings about high prevalence of visually induced motion sickness. In their study, they found that a low-immersive environment using a monitor presented no sickness problems that caused their participants to end the experiment early. However, participants did still report higher nausea scores after the experiment. It is also worth noting that they asked participants to play for only 10 minutes as compared to, for example, 50 minutes in Stoffrogen et al.'s study. Overall, there is sound, although not conclusive, evidence that virtual environments of the type found in video games and experienced on a monitor can give rise to visually induced motion sickness in roughly half of adults. From this, we can reasonably conclude that those accessing the metaverse via monitors would experience similar levels of visually induced motion sickness.

More recent research has focused on the use of head-mounted display units as these have been developed, become cheaper to purchase, and therefore more accessible to consumers. This recent research has a consensus that visually induced motion sickness is also a common side-effect of using head-mounted display units to access virtual environments; in fact, research has found it to be even more common than with monitor displays. Palmisano and Constable's[18] literature review summarises that first-person gaming in virtual reality provokes visually induced motion sickness, and that this sickness is more likely to occur and to be more severe where a head-mounted display is used, rather than a display monitor. Specific studies include Yildirim[19], who found that visually induced motion sickness was not only prevalent in desktop display conditions, for both a first-person shooter and a driving game, but that sickness was even more prevalent when a head-mounted display unit was used. The

[16] C.H. Chang, T.A. Stoffregen, L.Y. Tseng, M.K. Lei, K.B. Cheng, *Control of a virtual vehicle influences postural activity and motion sickness in pre-adolescent children* in "Human Movement Science" 78, 2021, https://doi.org/10.1016/j.humov.2021.102832

[17] S. Martirosov, M. Bureš, T. Zítka, *Cyber sickness in low-immersive, semi-immersive, and fully immersive virtual reality* in "Virtual Reality" 26, 2022, pp. 15-32, https://doi.org/10.1007/s10055-021-00507-4

[18] S. Palmisano, R. Constable, *Reductions in sickness with repeated exposure to HMD-based virtual reality appear to be game-specific* in "Virtual Reality" 26, 2022, pp. 1373-1389, https://doi.org/10.1007/s10055-022-00634-6

[19] C. Yildirim, *Don't make me sick: investigating the incidence of cybersickness in commercial virtual reality headsets* in "Virtual Reality" 24, 2020, pp. 231-239, https://doi.org/10.1007/s10055-019-00401-0

reported sickness was not only more prevalent, but also more severe. This study backed up the earlier findings of Dennison et al.[20] who also compared the prevalence of nausea with display monitors as compared to head-mounted displays. They also found that the severity of the sickness reported increased with the use of the head-mounted displays, with half of participants choosing to leave the virtual environment after 6 minutes, reporting nausea as the reason.

Munafo et al.[21] also explored whether the symptoms of motion sickness increase with the use of head-mounted display units. Their study found that in a first-person game, navigating rooms and corridors, as you would in the metaverse, 56% of their participants experienced symptoms of motion sickness. A similar study by Risi and Palmisano[22] also found that participants had high susceptibility to visually induced motion sickness when using head-mounted visual displays to access virtual reality environments. A further study by Clifton and Palmisano[23] reported very high levels of visually induced motion sickness, with 96% of their participants reporting that they experienced nausea on at least one of the four trials carried out in a virtual environment, using a head-mounted display unit. A literature review, summarising the findings of a wide range of studies by Stanney et al.[24] found that on average more than 60% of participants in the studies they included in their review experienced some form of sickness in virtual environments.

More recently, these findings have been repeated in further studies, such as Martirosov et al.[25] who found similar data a result of their

[20] D.M.S. Dennison, A.Z. Wisti, M. D'Zmura, *Use of physiological signals to predict cybersickness* in "Displays" 44, 2016, pp. 42-52, https://doi.org/10.1016/j.displa.2016.07.002
[21] J. Munafo, M. Diedrick, T.A. Stoffregen, *The virtual reality head-mounted display Oculus Rift induces motion sickness and is sexist in its effects* in "Experimental Brain Research" 235, 2017, pp. 889-901, https://doi.org/10.1007/s00221-016-4846-7
[22] D. Risi, S. Palmisano, *Effects of postural stability, active control, exposure duration and repeated exposures on HMD induced cybersickness* in "Displays" 60, 2019, pp. 9-17, https://doi. org/10.1016/j.displa.2019.08.003
[23] J. Clifton, S. Palmisano, *Effects of steering locomotion and teleporting on cybersickness and presence in HMD-based virtual reality* in "Virtual Reality" 24, 2020, p. 453-468, https://doi.org/10.1007/s10055-019-00407-8
[24] K. Stanney, B.D. Lawson, B. Rokers, M. Dennison, C. Fidopiastis, T. Stoffregen, S. Weech, J.M. Fulvio, *Identifying Causes of and Solutions for Cybersickness in Immersive Technology: Reformulation of a Research and Development Agenda* in "International Journal of Human–Computer Interaction" 36(19), 2020, pp. 1783-1803, https://doi.org/10.1080/10447318.2020.1828535
[25] S. Martirosov, M. Bureš, T. Zítka, *Cyber sickness in low-immersive, semi-immersive, and fully immersive virtual reality* in "Virtual Reality" 26, 2022, pp. 15-32, https://doi.org/10.1007/s10055-021-00507-4

study. Where their participants experienced full immersion using a head-mounted unit, they found that 58% of their participants had to finish the game earlier than the 10 minutes end time due to sickness symptoms. Garrido et al.[26] similarly found that during their 10-minute virtual reality immersion test, 65% of participants experienced some form of sickness, with 24% identifying the sickness as severe. From the evidence from this wide range of studies, we can reasonably conclude that visually induced motion sickness will be a potential problem for any future where higher education takes place in a virtual environment such as the metaverse.

Visually induced motion sickness as a disability

The premise in this section is that visually induced motion sickness will become a new form of disability discrimination in a future where higher education is carried out in the metaverse. Philosophical literature is concerned with disability because it is concerned with equality in many forms; for example, reducing the effect of disadvantage, such as that caused by disability, particularly where that disadvantage is unearned[27]. However, there is no consensus in the literature as to the definition of disability. Here, the definition of disability based on welfare is applied to visually induced motion sickness.

Savulescu and Kahane[28] outline their welfarist account, characterising disability as a stable physical or psychological property of a person that leads to significant reduction in their wellbeing in their particular context, and that reduction in wellbeing is not based upon prejudice against that property by others in that society. Broadly speaking, a disability is a condition that makes the person worse off, dependent upon their specific context.

Note that there are objections to the welfarist view. Wasserman and Aas[29] identify a potential problem in that a condition where the only harm is that generated by prejudice would not be classed as a disability under this view. They point out that this view also stands in opposition to affirmational models, which argue that being disabled does not necessar-

[26] L.E. Garrido, M. Frías-Hiciano, M. Moreno-Jiménez, G.N. Cruz, Z.E. Garcia-Batista, K. Guerra-Pena, L.A. Medrano, *Focusing on cybersickness: pervasiveness, latent trajectories, susceptibility, and effects on the virtual reality experience* in "Virtual Reality" 26, 2022, pp. 1347-1371, https://doi.org/10.1007/s10055-022-00636-4

[27] D. Wasserman, S. Aas, *Discrimination and disability* in K. Lippert-Rasmussen (edd.), *The Routledge Handbook of the Ethics of Discrimination*, Routledge, London 2018

[28] J. Savulescu, G. Kahane, *Disability: A Welfarist Approach in "Clinical Ethics"* 6(1), 2011, pp. 45-51, https://doi.org/10.1258/ce.2011.011010

[29] D. Wasserman, S. Aas, *Discrimination and disability,* cit.

ily entail cost to wellbeing or being worse off. Under the welfarist view, if there is no cost to wellbeing, then the condition is not a disability. However, for the purposes of this paper, the welfarist view provides a useful ground for assessing whether visually induced motion sickness could be a disability in a future where higher education takes place in the metaverse, because it does not depend upon unknown future social constructs. For here, it captures well enough our ordinary usage of the term disability and its context-dependence allows consideration of possible futures.

Under the welfarist approach, there is an explanation of why visually induced motion sickness is not currently considered a disability. Based upon the way the world currently is, not being able to access virtual worlds does not reduce the wellbeing of an individual. At present, the most prevalent use of virtual worlds is in gaming, so, although the individual may be limited from choosing gaming as a leisure activity, this is no more damaging to their wellbeing than, say, my fear of heights limiting me from choosing rock climbing as a hobby. Having visually induced motion sickness does not currently affect the wellbeing of an individual by making it harder to achieve their goals or to engage with others. Now let us consider the possible future world where higher education takes place in the metaverse.

Applying the welfarist approach, would visually induced motion sickness be a disability? In a possible future where higher education takes place in the metaverse, there are two ways in which visually induced motion sickness could be considered harmful. The first way is that it would reduce the overall goodness of a life by preventing or limiting access to education opportunities in the virtual world. If an individual experiences nausea or other symptoms of visually induced motion sickness, they may only be able to access education opportunities for a short period of time or potentially not at all, depending on the severity of the symptoms. As outlined in the introduction, limiting accessibility to education has a negative effect on the overall life outcomes of an individual. The second way in which visually induced motion sickness could cause harm in the imagined metaverse future is by making it harder to achieve one's education goals and to collaborate with others engaged in higher education. One can imagine reasonable adjustments being made to offer offline education opportunities, but without being able to engage in the full education experience, it will be harder for the individual to achieve their education goals and to be part of the education community with other learners.

To summarise, there are grounds on which visually induced motion sickness could be regarded as a disability, in a future world where the context of more activity taking place in the metaverse results in this condition being one that causes harm to the individual. It is a further question whether the disability of visually induced motion sickness would

create a barrier to accessing education in the metaverse that is morally wrong or unjust. Just because there is a disadvantage, does not necessarily mean that justice requires correction or compensation[30]. Putnam et al.[31] give the example of spending the municipal arts budget on a concert hall rather than an art museum, which may disadvantage those who cannot hear. However, that disadvantage is not necessarily unjust, depending upon the particular context. To illustrate, some forms of barriers are unjust or morally wrong, such as a disabled person not getting a job for which they are qualified because of employer prejudice, but others are not; for example, some disabilities mean the person cannot obtain a driving licence, but this is not unjust.

In this section, the argument builds that the delivery of higher education in the metaverse would amount to discrimination against those who have visually induced motion sickness. The argument draws upon theories of redistribution and recognition and particularly Brown's[32] account of relational equality to argue that this discrimination would be wrongful.

Taking a pluralist approach toward the wrongfulness of disability discrimination is common[33] The need for a pluralist approach is demonstrated in Wolff's[34] explorations of the meaning of disability. Wolff's central claim is that disability means that an individual's internal resources, that is natural assets, are impaired meaning that they do not have "genuine opportunities for secure functioning" given the society they live in and the external resources they have[35]. He says to enhance the opportunities of a disabled person, society needs to improve the resources of the individual, whether internal or external. He adds that to develop equality in that society, it also needs to enhance the status of the disabled person, to accept difference, reduce stigmatization and reduce risks. He argues that both these demands are important and in-

[30] D. Putnam, D. Wasserman, J. Blustein, A. Asch, *Disability and Justice in "*The Stanford Encyclopedia of Philosophy", 2019, *https://plato.stanford.edu/archives/fall2019/entries/disability-justice/*

[31] *Ibidem*

[32] J.M. Brown, *What Makes Disability Discrimination Wrong? in "Law and Philosophy"*, 40, 2021, pp. 1-31, https://doi.org/10.1007/s10982-020-09384-5

[33] J. Wolff, *Disability Among Equals* in K. Brownlee and A. Cureton (edd.), *Disability and Disadvantage,* Oxford Academic, Oxford 2009 https://doi.org/10.1093/acprof:osobl/9780199234509.003.0005; D. Wasserman, S. Aas, *Discrimination and disability* in K. Lippert-Rasmussen (edd.), *The Routledge Handbook of the Ethics of Discrimination*, Routledge, London 2018; J.M. Brown, *What Makes Disability Discrimination Wrong?,* cit.

[34] J. Wolff, *Disability Among Equals* in K. Brownlee and A. Cureton (edd.), *Disability and Disadvantage,* Oxford Academic, Oxford 2009 https://doi.org/10.1093/acprof:osobl/9780199234509.003.0005

[35] *Ibi*, pp. 116-121.

teract in complex ways, creating a balance of fairness in resources and in relations between people.

Brown[36] develops a pluralist account that considers both the harmful effects of discrimination, as well as what the discrimination expresses about the social status of the person. He bases his account of the wrongfulness of disability discrimination on the notion of relational equality, that is, relations between people should be of equal status. Applying this argument demonstrates that relocating higher education to the metaverse would amount to discrimination on the grounds of the disability of visually induced motion sickness because it breaches relational equality. This develops the account of disability based on harm outlined in the first section, and expands the definition to include harm both in terms of unequal distribution of resources and unequal recognition of social status. Higher education in the metaverse would breach the requirements of relational equality because it would exclude those with visually induced motions sickness from higher education opportunities, and it is necessary for an individual disabled person to function as an equal within society to have equal opportunity to access higher education. Higher education is fundamental to a particular individual person being able to make use of their opportunities and other social goods.

Brown develops his account to demonstrate that failing to make reasonable accommodations for a disabled person amounts to a breach of the demands of relational equality. He argues this on the grounds that the accommodations are required so that disabled persons are able to "function as citizens with equal social status"[37]. Applying this to the case in hand, an educational institution would have a duty to alter the design of the educational environment so that those with the disability of visually induced motion sickness can access the same educational goods as non-disabled people. One could imagine an alternative way of accessing a virtual lecture to be via video conferencing rather than through the metaverse, for example. This would enable those with visually induced motion sickness to access the same opportunity as those without the condition. According to Brown's account, failing to make this adjustment would be wrongful because it is denying the disabled person sufficient opportunity to function equally in that society. Further, this discrimination would be wrongful because it would lower the status of disabled people[38]. Excluding disabled people from higher education and failing to make adjustments to include them would have consequent effects on

[36] J.M. Brown, *What Makes Disability Discrimination Wrong?,* cit.
[37] *Ibi*, p. 19
[38] *Ibidem*

inequalities in employment and wealth, and that exclusion implies that disabled people have lower social status than non-disabled people do.

In summary, there are grounds to regard visually induced motion sickness as a disability in a future world where higher education takes place in the metaverse. However, were higher education to be based in the metaverse, this would discriminate against those with that disability. This is because it would prevent people with that disability functioning as an equal within that society, both in terms of the resources available to them and of their social status. Following Brown[39], any failure to make reasonable adjustments to accommodate this disability in the metaverse future would also amount to wrongful disability discrimination.

Conclusion

The practical implication of the argument laid out in this paper is that higher education institutions should take a broader view of accessibility issues when considering extending education opportunities into the metaverse to make sure that they do not inadvertently exclude people. These accessibility issues are not only limited to questions of resource availability, such as VR headsets and internet access, but extend to the people who are the future students. Of course full inclusion is an ideal[40] so there will always be compromises to be made. In this case, there will be trade-offs between the accessibility improvements for students with some types of disabilities were higher education to move to the metaverse, against the increased accessibility issues for other students, with perhaps unforeseen disabilities emerging, such as visually induced motion sickness.

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[39] *Ibidem*

[40] D. Putnam, D. Wasserman, J. Blustein, A. Asch*, Disability and Justice,* cit.

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