Collaborative XR Research between Social Science and Computer Science

An Exploratory Briefing Report

Digital Society and Economy Interdisciplinary Research Theme

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Workshop Synthesis

The Extended Reality (XR) technologies are a growing concern in social spaces. As developers improve technical capabilities, consumers increase their demand, and organisations turn more attention towards implementation of XR across various elements of social life, it is vital that social science researchers and practitioners have a firm grasp of the impact of these technologies, as well as a seat at the table when decisions are made.

In a bid to develop collaborations, explore new and interdisciplinary methods, and lay foundations for future joint investigative projects in XR research, a workshop was organised by the Digital Society and Economy Interdisciplinary Research Theme in the College of Social Sciences with the School of Computer Science. The workshop ran in February 2024.

The workshop was framed around two presentations from the School of Computer Science, and for each presentation, the 14 participants were split into two groups for discussion. Following these two sections, and a brief presentation on a potential upcoming cross-disciplinary grant opportunity, a final discussion centred around the key takeaways as well as what a fruitful research collaboration between social sciences and computer science at University of Glasgow might look like.

A publicly-available version of the slide deck can be found here.

Presentation 1: Prof Stephen Brewster drew on the ViAjeRo project ('Traveller' in Spanish) that seeks to radically improve all passenger journeys by facilitating the use of immersive Virtual and Augmented Reality (together called XR) to support entertainment, work and collaboration when on the move.

Presentation 2: Dr Mark McGill presented his AUGSOC ERC Starting Grant, starting in mid 2024, with the aim of exploring the societal impact that mass adoption of everyday Augmented Reality (AR) glasses and headwear will have in facilitating the Augmented Society - a world where spatial computing and mediated perception become the norm.

This briefing note summarises the key questions discussed, collected under four themes.

Theme 1: What are the implications, and impacts on social worlds, of XR technologies being employed in public spaces?

- As XR technologies develop, the meaning of 'social reality' becomes even more contested (i.e. how the 'real world' merges or does not with online virtual spaces).
- Open questions around how identity will be impacted, especially with respect to the 'layering' effect users of XR can have on the real world (e.g. how people design their avatars, how they present in virtual worlds, and if and how the immersive environment differs from existing social media environments).
- Open questions about freedom of self-expression (e.g. can users 'block out' visuals of real people they do not want to see? Can users modify others' avatars in their own view – their clothes, gender, race, features – to suit their preferences, without others' consent?)
- Particularly with respect to XR use in travel situations, reformulation of 'in-transit' behaviour, as well as in spaces where people wait.

Theme 2: What are the real-world social harms of XR technology?

- Increasing the digital divide even further, with open questions around access, affordability, and digital literacy.
- Potential for marginalisation of particular groups for use of technology in social spaces if not seen as socially acceptable by different groups.
- Impacts on education and schools in terms of both how to manage responsible technology usage in schools as well as if and how to prepare young people for both real and digital worlds.
- Further, and potentially very detrimental, private sector capture of social spaces if they are also mediated through privately-owned technologies and virtual realities.

Theme 3: What are the issues about social acceptability of XR use in shared public spaces?

- Open questions around how XR use impacts how comfortable people feel – both the users as well as those in the vicinity (e.g. direction of gaze of the headset-user could be perceived as staring).
- Cannot predict a timeline of social acceptability, but rather have to explore what are the various factors that influence how technologies are accepted, or not, into society (e.g. XR company marketing, media rhetoric, influential individuals (in various social groups), and policy and regulatory interventions).
- Arguably quite limited social outrage at the moment regarding XR technologies, however this could be due to the lack of exposure most have to them in social situations, and due to a lack of knowledge about what the technologies are doing (e.g. the cameras mounted on the headsets are not clearly marked).
- Open questions around which kinds of tasks will be seen as 'worth' the possible social costs of usage, and which kinds of inputs will be adopted (e.g. voice-input is still not fully adopted in shared spaces due to privacy, self-consciousness and general breaking of social norms – with the exception of very clearly being on a phone call).

Theme 4: How might we investigate XR in social spaces through interdisciplinary research?

- Need to consider ethical implications of conducting social research in XR, taking into account the impact XR technologies can have on memory, brain processing (particularly in children) and immersion in potentially traumatic virtual environments.
- Can take inspiration from so-called 'breaching experiments' where social situations are deliberately disrupted to explore reactions (e.g. a researcher paying for their shopping using only pennies to see how the teller and those in the queue react).
- Potential for computer scientists to build upon foresight and imaginaries work in social sciences to understand social acceptability over time.
- Social science has the potential to help map journeys from small laboratory studies to scale in communities.
- There is desire and need to embed technology development within a community environment to ensure participatory research and more just and equal outcomes.
- Need to find shared understandings of 'augmented society' terms to create shared research practices which can inform and build on top of each other.

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