irecs

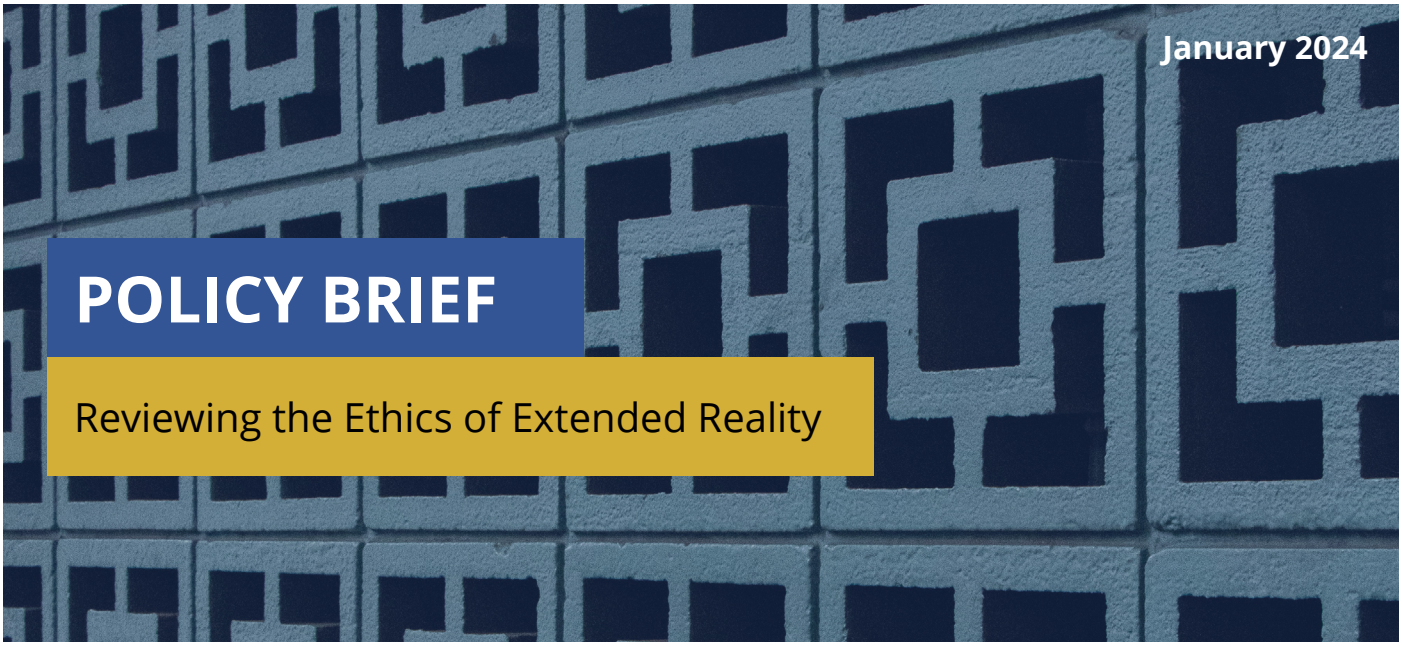
POLICY BRIEF

Reviewing the Ethics of Extended Reality

January 2024

Funded by the European Union

Funded by the European Union. UK participants in Horizon Europe Project irecs are supported by UK Research and Innovation grant numbers 10055935 (University of Central Lancashire) and 10037820 (De Montfort University). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Research Executive Agency or UKRI. Neither the European Union nor the granting authority nor UKRI can be held responsible for them.



January 2024

POLICY BRIEF

Reviewing the Ethics of Extended Reality

Why this policy brief on Ethics of Extended Reality?

Extended Reality (XR) and the 'metaverse' refers to a spectrum of technologies merging physical and virtual environments. XR has the potential to revolutionize various sectors, but it also presents important ethical challenges that need to be addressed to ensure responsible and safe use. This policy brief highlights three key issues and provides recommendations to mitigate risks and maximize the benefits of XR for policymakers and stakeholders, specifically targeting Horizon Europe ethics appraisal scheme experts and members of Research Ethics Committees (RECs).

Current challenges

1. Limiting nudging and subliminal manipulation

Social interaction in XR offers an immersive experience and creates a risk of using immersion for nudging human behaviour. This can go as far as manipulating humans based on subliminal (unconscious) influences. To address this challenge, clear sectorial and case-based guidelines should be developed to protect user autonomy, to put constraints on manipulative XR techniques, and to limit undesired effects (e.g. on consumer behaviour). Transparency and explainability criteria should be implemented to help users identify and mitigate potential subliminal manipulation.

2. Evaluating the relevance of XR training for developing real-world skills

XR is increasingly being used for training and skill development. It is essential to assess the effectiveness of such training when individuals begin to apply virtually learned skills in real-world situations. Thus, comprehensive research should be conducted to evaluate the transferability of XR-learned skills in different sectors, e.g. crisis management, healthcare, or manufacturing. Identifying specific domains where XR training complements traditional methods effectively, such as police training, can help evaluate the relevance of XR technologies for the individual and society.

irecs

www.irecs.eu

Funded by the European Union

Funded by the European Union. UK participants in Horizon Europe Project irecs are supported by UK Research and Innovation grant numbers 10055935 (University of Central Lancashire) and 10037820 (De Montfort University). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Research Executive Agency or UKRI. Neither the European Union nor the granting authority nor UKRI can be held responsible for them.

3. Overcoming ethics experts' difficulties in understanding the technical aspects of XR

To effectively regulate XR technologies, REC members and Horizon Europe ethics appraisal scheme experts need to enhance their understanding of the technical complexities involved. Currently, ethics experts tend to project material-world problems and solutions on XR situations, which is rarely warranted upon detailed examination. XR systems rely on multiple sensors which provide accurate tracking and spatial mapping. They use eye tracking, blood concentration rates, computer vision algorithms, sensor fusion techniques, and precise calibration. Further, the design of XR interfaces often involves methods such as hand tracking, gesture recognition, voice commands, or spatial controllers, in integration with cloud services, real-time multiplayer interaction, and avatar collaboration in virtual reality. Ethics experts need to familiarize themselves with these specific technical components and related ethical issues.

What is Extended Reality?

Extended reality (XR) is a broad term for technologies that create virtual and simulated experiences. This includes technologies such as virtual and augmented reality (used in games like Pokémon GO and Minecraft) and mixed reality (popularized by Instagram and Snapchat filters).

Recommendations

1. Establish "digital subcommittees" in RECs

To address the challenge of understanding technical aspects, policymakers should create dedicated 'digital subcommittees' within existing RECs or, if no RECs are competent, then establish dedicated 'Digital Ethics Committees' (DECs). These bodies should combine XR technical experts with specialists in research ethics, AI regulation, and other related areas. Providing mutual learning time, appropriate training and resources to REC members will enhance the quality of ethics appraisal. Whenever there exists relevant sectorial or professional regulation, it should be taken into account, for example in the medical sector or in security applications of XR.

2. Ensure that AI-generated content in XR can be identified by users

To mitigate risks related to misinformation and manipulation, it is crucial to clearly distinguish between AI-generated and human-generated content, particularly regarding provenance and control of avatars in XR environments. Mandating the use of easily identifiable watermarks in all AI-produced outputs, including avatars, text, images, audio, and video used in XR environments, can promote transparency and inform users about the authenticity and source of the content. Establishing guidelines at the regulatory level will ensure consistent practices across platforms. Ethics experts should consistently check the application of this principle in research projects that include content production by AI systems. Technical solutions are needed to ensure that provenance of XR content can always be identified.

3. Consider surveillance capabilities of XR, in particular in virtual work environments

As XR becomes integral to remote work and collaboration, privacy concerns arise due to the potential for increased surveillance capabilities. Policymakers should develop sectorial regulations to protect individuals' privacy and data in virtual reality, including virtual environments. Ethics experts and researchers should consider the possibility of surveillance in XR environments and analyze the implementation of limits on using data for surveillance. Consent documents should be adapted accordingly in order to safeguard user rights. Encouraging the adoption of privacy-enhancing technologies and best practices in data handling will further mitigate privacy risks associated with XR in the workplace.

Funded by the European Union

Funded by the European Union. UK participants in Horizon Europe Project irecs are supported by UK Research and Innovation grant numbers 10055935 (University of Central Lancashire) and 10037820 (De Montfort University). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Research Executive Agency or UKRI. Neither the European Union nor the granting authority nor UKRI can be held responsible for them.

Related EU projects

TechEthos (Horizon 2020 project)
A comprehensive resource providing insights into the ethical considerations of emerging technologies, including XR
https://www.techethos.eu

XR4HUMAN (funded by the EU)
An initiative focused on fostering responsible and human-centered approaches to XR technologies
https://xr4human.eu

How we did it

This policy brief is based on research conducted in *Task 2.2: Development of recommendations for addressing ethical challenges from research in new technologies*. Using desk research, expert consultation and a leadership roundtable, irecs identified ethical issues in XR as well as challenges faced by REC members and ethics appraisal experts. Recommendations were drafted with iterative input from irecs partners. The Stakeholder Advisory Board gave feedback and a dedicated focus group was organized by EUA to discuss and refine the recommendations.

Funded by the European Union

Funded by the European Union. UK participants in Horizon Europe Project irecs are supported by UK Research and Innovation grant numbers 10055935 (University of Central Lancashire) and 10037820 (De Montfort University). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Research Executive Agency or UKRI. Neither the European Union nor the granting authority nor UKRI can be held responsible for them.

About irecs

"Improving Research Ethics Expertise and Competencies to Ensure Reliability and Trust in Science"

irecs aims to advance research ethics expertise and competences in new and emerging technologies. The project will focus on 4 emerging technologies (AI in health and healthcare; Extended reality; Genome editing (human/non-human); Biobanking) and will develop, implement and disseminate training material for research ethics reviewers and (early career) researchers.

Funding: European Research Executive Agency (HORIZON-WIDERA-2021-ERA-01)
Duration: 3 years (October 2022 to September 2025)
Grant: 3.8 M€
Coordinator: Rheinische Friedrich-Wilhelms-Universität Bonn (Bonn, Germany)
Consortium: 17 organizations from 11 countries

Authors
Etienne Aucouturier (CEA-Saclay)
etienne.aucouturier@cea.fr
Alexei Grinbaum (CEA-Saclay)
alexei.grinbaum@cea.fr

Contributors
Etienne Aucouturier (CEA-Saclay)
Miltos Ladikas (KIT)

Layout design
Radboud University

Image credits
Photo by Mitchell Luo on Unsplash

www.irecs.eu @irecs_eu
contact@irecs.eu irecs Project

Funded by the European Union

Funded by the European Union. UK participants in Horizon Europe Project irecs are supported by UK Research and Innovation grant numbers 10055935 (University of Central Lancashire) and 10037820 (De Montfort University). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Research Executive Agency or UKRI. Neither the European Union nor the granting authority nor UKRI can be held responsible for them.