Psychology Impact Assessment for Interactional Systems (PSAIS)

This workshop, hosted by the Technical University of Munich's Institute for Ethics in Artificial Intelligence (TUM IEAI) under the Friedrich Schiedel Fellowship, marked the first milestone in the Psychology Impact Assessment for Interactional Systems (PSAIS) project. The project seeks to develop a comprehensive framework to assess the psychological impacts of interactional technologies, focusing on mapping these impacts across diverse cultural contexts. In light of the growing importance of considering psychological impacts in technology design, the workshop addressed a fundamental question: What are the psychological impacts of interactional technologies from the perspective of experts within a specific region, in this case, Europe?

The workshop's core goal was to bring together experts for a collaborative discussion on the potential psychological effects of these technologies, informed by their diverse expertise. The specific objectives were:

- **Encouraging Reflection**: The workshop sought to stimulate in-depth reflection and dialogue using a participatory design approach and open-ended questions. Participants were encouraged to explore how interactional technologies influence psychological well-being, behaviour, and social interactions.
- **Collecting and Aggregating Insights**: Through persona-based exercises and a structured matrix, the workshop aimed to systematically collect and organise the insights shared by participants. These responses would be compiled to capture a broad spectrum of perspectives, which would later inform an evolving interactive map, visually representing the psychological impacts discussed during the session.

Concepts & Definitions

The workshop was built upon the assumption that **Interactional Systems** encompass both **interactive** and **interactional** technologies, representing distinct but related modes of human-technology engagement.

- **Interactive Technologies** allow users to actively engage with and manipulate digital environments in real-time. Examples include video games, virtual and augmented

reality, and immersive simulations. In these systems, users directly control aspects of the environment, which dynamically respond to their input, providing a highly immersive and participatory experience.

- **Interactional Technologies** prioritise human-machine communication and social interaction, simulating animal or human-like dialogue and responses. These systems rely on natural language processing (NLP), artificial intelligence (AI), and robotics to engage users in conversations and social behaviours, adapting based on the interaction context. Examples include chatbots, large language models (LLMs), and social robots.

Both categories fall under the broader umbrella of **interactional systems**, with **interactive technologies** focusing on user control of digital spaces and **interactional technologies** enhancing communication between humans and machines. These technologies often converge, as seen in AI-powered non-playable characters in video games, where elements of both interaction and communication are blended to create rich, responsive environments.

Methodology

The workshop employed a **diegetic participatory design** approach, where participants developed detailed personas based on pre-built archetypes. This method, inspired by "design alter egos" (Triantafyllakos et al., 2010), enabled participants to project potential psychological impacts of interactional technologies onto fictional characters in a ‘third space’ (Maaß et al., 2016). This approach allowed participants to reflect freely without personal disclosure, fostering a safe space for introspection, creativity, and constructive dialogue.

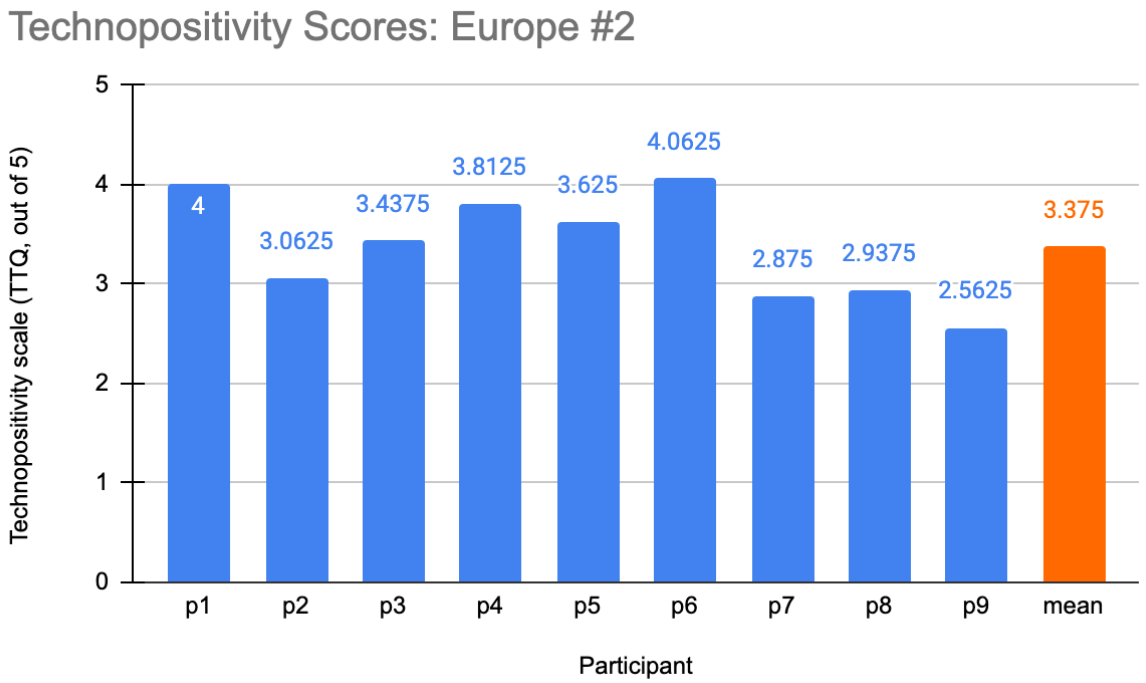
In cross-cultural settings, persona-based methods have proven effective in fostering empathy and bridging communication gaps, as shown in studies involving Namibian communities (Cabrero, 2019). This approach encouraged participants to explore the speculative dimensions of technologies' psychological impacts by providing relatable scenarios, supporting a more embodied and nuanced understanding of future technological implications across different cultural contexts (Rozendaal et al., 2016).

Participants Description

This group of participants comprised 12 individuals, including ten women and two men. Their areas of expertise span a variety of disciplines: Philosophy (3 participants), Psychology (5 participants), Science and Technology, Sociology, HCI/HRI, and Education.

They came from diverse geographical backgrounds: the Czech Republic, Germany, Italy, the UK, France, Spain, Belgium and Greece.

Techno-positivity Control



Technopositivity was assessed using the Technophobia and Technophilia Questionnaire (TTQ), with scores ranging from 1 to 5, where 5 represents the highest level of technopositivity and 1 indicates a strong technophobic attitude. In this study, participants demonstrated varied technopositivity scores, with values ranging from 2.5625 to 4.0625. The group mean was 3.375, reflecting a moderately positive attitude towards technology. This mean is above the neutral midpoint of 2.5, indicating an overall technopositive inclination among participants, although some variability was present within the group.

Outcome: Psychological Impact Mapping

Persona Selection & Precision

In this workshop, two personas were crafted based on given archetypes to guide discussions on the psychological impacts of interactional technologies, each representing distinct demographic and socio-cultural contexts.

Persona 1: The Tech-Savvy Psychology Student

This 19-year-old Polish psychology student and social media influencer seamlessly integrates a wide range of technologies into her academic, personal, and creative life. From generative AI tools like ChatGPT and MidJourney for content creation to gaming, XR painting, and mental health apps, she uses technology to enhance her studies, expand her artistic expression, and grow her online presence. She balances her gaming, painting, and social media hobbies with her academic responsibilities, utilising tools like intelligent tutoring systems, video editing software, and productivity apps for time management. Her relationship with technology is creative, exploratory, and strategic, enabling her to push boundaries in content creation, engage with her audience, and maintain social connections.

Persona 2: The Child Tech Explorer

This 11-year-old German girl, a primary school student from a middle-class family, integrates technology into her education, hobbies, and social interactions under parental supervision. Her use of tools like educational apps, VR/AR, and homework management systems support her learning while drawing apps on her iPad and AI co-creation tools allow her to explore her artistic interests. She uses ChatGPT to streamline homework, giving her more time for hobbies such as drawing, gymnastics, and watching cartoons. Socially, she connects with friends through interactive games and supervised social media apps while also using video conferencing tools to stay in touch with teachers and family. Her fitness tracker helps monitor and enhance her gymnastics performance, reflecting an early engagement with AI-driven coaching. This persona exemplifies a child's exploratory yet guided interaction with technology, blending education, creativity, and play.

Figure 1 exposes the mapping of impacts discussed in the workshop and highlights the main areas discussed. We will now present the summary of impacts as discussed in the workshop.

Positive Impacts

- **Social and Cultural Benefits:** Technology enables exposure to diverse cultures and communities, fostering empathy, inclusivity, and cross-cultural understanding. Social media and online communities strengthen connections, offer support networks, and create opportunities for meaningful interactions. Gaming and collaborative platforms enhance teamwork, conflict resolution, and socio-cognitive development.
- **Identity and Personal Growth:** Digital platforms provide safe spaces for self-expression, identity exploration, and confidence-building. Creative tools and

online learning environments inspire innovation and promote personal and emotional growth. Customised learning experiences help users acquire new skills, regulate emotions, and develop resilience.

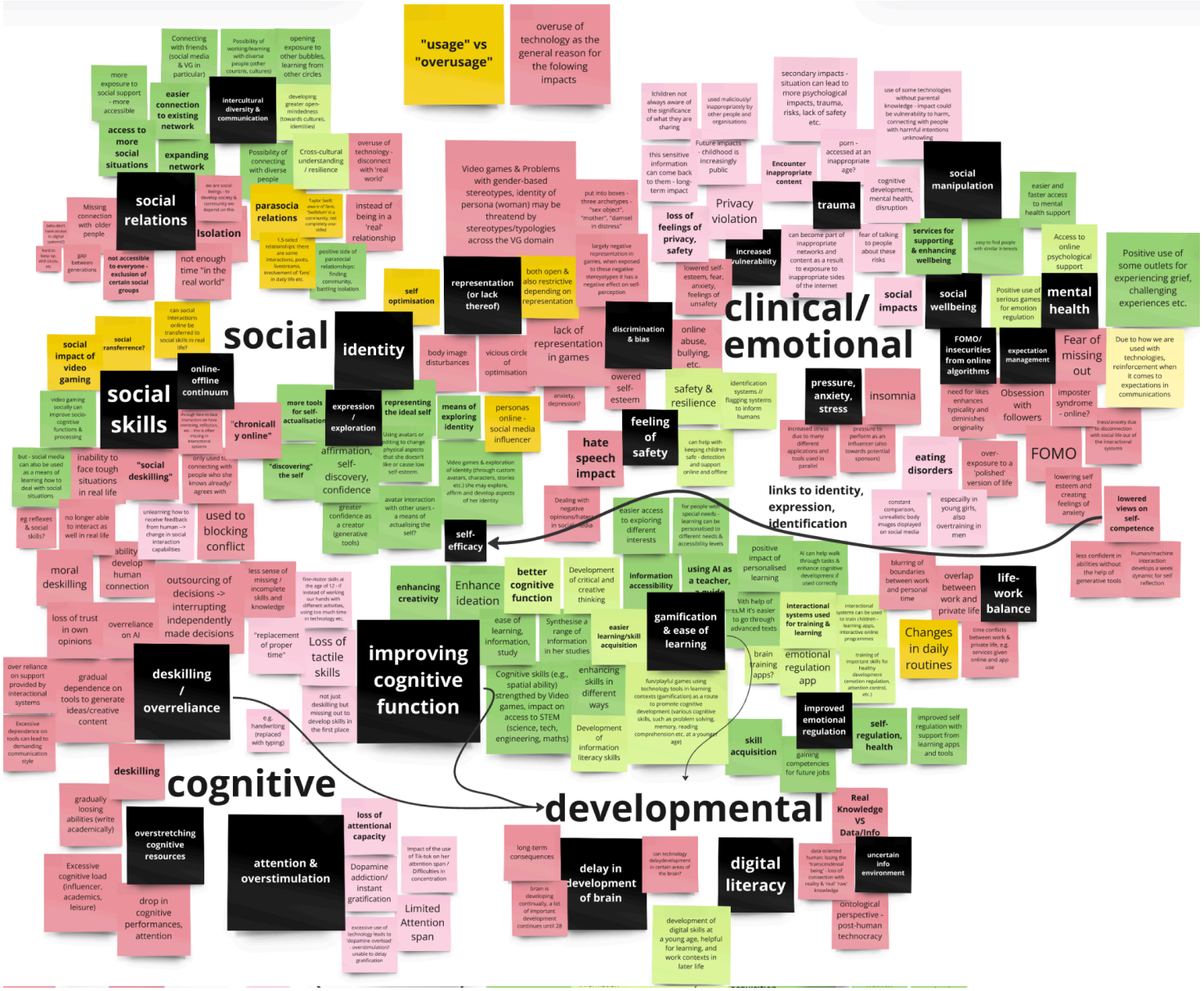


Figure 1. Preliminary Map of Psychological Impact during Europe #2 Workshop (PSAIS).

- **Cognitive and Emotional Benefits:** Interactive tools and gamified learning solutions improve memory, focus, and problem-solving capabilities. Digital mental health resources offer emotional support and tools for stress management. Apps designed for emotional regulation aid users, particularly children, in managing emotions effectively.

- **Health and Productivity:** Fitness and wellness apps promote healthier lifestyles by encouraging physical activity and self-care. Productivity tools enhance work efficiency and facilitate skill-building, preparing users for future challenges.

Negative Impacts

- **Social Challenges:** Overemphasising online interactions can lead to shallow relationships and weaken real-world social skills. Digital divides, and the rise of parasocial relationships may contribute to isolation and diminished engagement. Users, especially younger ones, face risks of harassment, manipulation, and exposure to harmful content.
- **Identity and Emotional Struggles:** Unrealistic portrayals online can foster self-doubt, body image issues, and pressure to conform. Constant comparison and fear of missing out (FOMO) contribute to stress and dissatisfaction. Gender stereotyping in digital media and overreliance on automated tools can limit identity exploration and creativity.
- **Cognitive Decline and Deskilling:** Excessive use and reliance on technology may reduce attention spans, critical thinking skills, and hands-on problem-solving abilities. Reliance on AI tools risks cognitive overload, deskilling, and diminished innovation.
- **Health and Dependency Issues:** Prolonged screen time leads to physical inactivity, sleep problems, and overstimulation. The blurred boundaries between work and personal life increase stress and dependency, negatively affecting mental well-being and life balance.

Conclusion

The PSAIS workshop hosted by the TUM IEAI has provided a crucial first step in understanding the psychological impacts of interactional technologies within a European context. By leveraging participatory design methodologies and fostering cross-disciplinary dialogue, the workshop has successfully gathered a wealth of insights into both the positive and negative effects of these technologies. These findings will serve as a foundation for developing a comprehensive framework to assess the psychological impacts of interactional systems across diverse cultural landscapes.

Key outcomes include the identification of positive impacts, such as enhanced social connectivity, personal growth, and cognitive development, as well as critical challenges like social deskilling, identity struggles, and dependency-related health issues. The preliminary

psychological impact map offers a visual representation of these insights, facilitating a nuanced understanding of how these technologies affect users differently across various demographics and socio-cultural contexts.

Looking ahead, the PSAIS project will enter a consultation phase in early 2025. This phase will engage a broader spectrum of experts from a more diverse geographical background to refine and expand the framework. The consultation will ensure the framework is robust, culturally inclusive, and actionable, guiding the ethical design and deployment of interactional technologies in ways that prioritise psychological well-being and equity.

Project Personal

Researcher: Auxane Boch, TUM Institute for Ethics in Artificial Intelligence, Friedrich Schiedel Fellow.

In Support:

- Elizabeth Emery, Intern at the TUM IEAI, Master Student in M.A. Responsibility in Engineering, Science & Technology
- Onur Alpaslan, Intern at the TUM IEAI, Master Student in M.A. Politics & Technology

Principal Investigators:

- Prof. Dr. Christoph Lütge, Director of the Institute for Ethics in Artificial Intelligence, TUM School of Social Sciences and Technology
- Prof. Dr. Jochen Hartmann, TUM School of Management