# Pilot Workshop Summary

## 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.

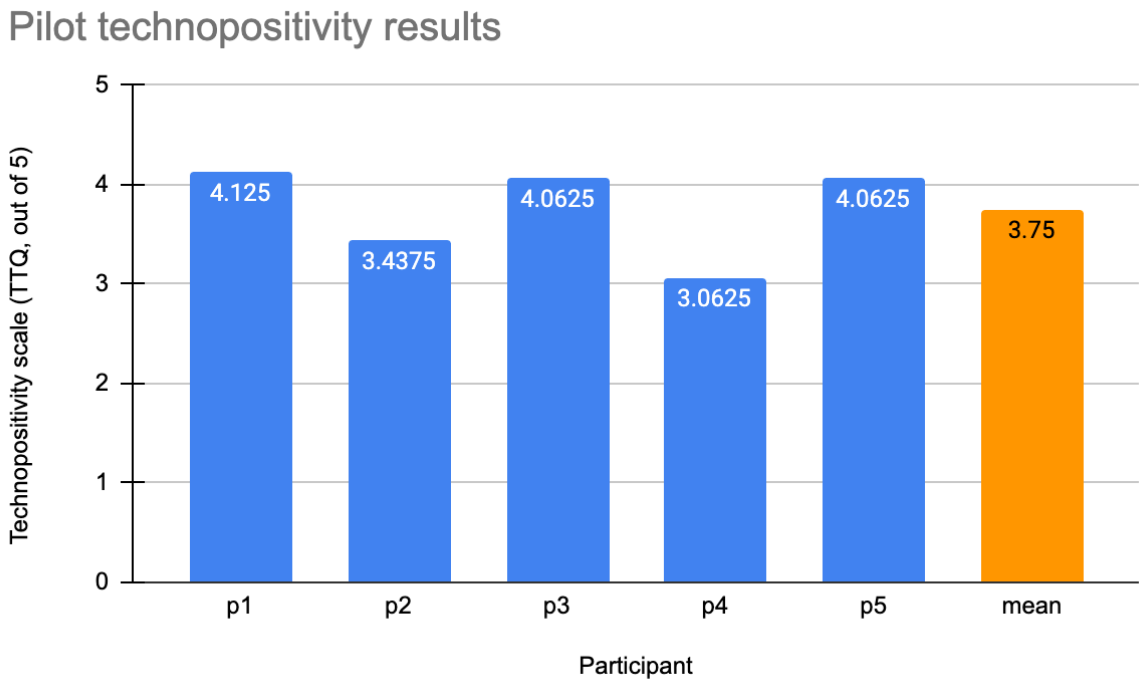
In cross-cultural settings, persona-based methods have proven effective in fostering empathy and bridging communication gaps, as shown in studies involving Namibian communities (Cabrero, 2019). This approach encouraged participants to explore the speculative dimensions of technologies' psychological 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

The workshop brought together five experts from leading European academic institutions, four women and one man, representing fields such as law and digital technologies,

human-technology interaction, cognitive science, and psychology. Participants hailed from the Netherlands, Germany, and the United Kingdom.

**Techno-positivity Control**




Techno-positivity was measured by the Technophobia and Technophilia Questionnaire (TTQ), a scale ranging from 1 to 5, where a score of 5 represents the highest level of techno-positivity, while a score of 1 indicates a strong technophobic attitude. Participants in the pilot study tended towards a techno-positive outlook, with no participant differing significantly, with a mean of 3.75 and an s.d. of 0.476. This shows a more positive view, as the mean (3.75) is significantly higher than the 'neutral' techno positivity value of 2.5.

## Outcome 1: Reshaping the Impact Grid

Based on the valuable input and feedback gathered from participants during the workshop, we have refined and restructured the grid used to evaluate the psychological impacts of interactional technologies. The new grid incorporates more precise and comprehensive categories, reflecting the diverse dimensions of psychological impacts discussed. This reshaped grid will be a more focused tool for future workshops and assessments.

The new evaluation grid includes the following categories:

- **Social**: Captures the impacts on interpersonal relationships, communication, community-building, and social isolation, as well as the role of interactional technologies in facilitating or hindering social connection.
- **Behavioural**: Examines changes in user behaviour, such as usage patterns, habits, and the influence of technologies on decision-making, attention, and multitasking.
- **Identity/Self Perception**: Focuses on how users perceive and experiment with their identity, including self-image, social comparison, and using technologies to explore gender, cultural, or personal identity.
- **Emotional & Well-Being & Mental Health**: Addresses the emotional responses and mental health outcomes associated with interactional technologies, such as anxiety, depression, emotional regulation, and the sense of well-being fostered by or challenged through technology use.
- **Developmental**: Considers the impact on individual development, particularly in children and adolescents, including cognitive growth, social maturity, and skill acquisition as shaped by interactional technologies.
- **Cognitive & Neuro-physiological**: Evaluates the effects on cognitive functions, such as memory, attention, problem-solving, and overall cognitive enhancement or overload due to technology use, and encompasses the physical and neurological effects of interactional technologies, including their influence on physical activities, brain activity, attention spans, sensory processing, and the potential for cognitive strain and stimulation.

This new grid will enhance our ability to systematically capture and assess the full spectrum of psychological impacts, providing a more robust framework for future evaluations of interactional systems.

## Outcome 2: 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: Non-binary Freelance Software Developer*

The first persona is a 27-year-old non-binary freelance software developer from a working-class background in the UK, designed to represent a highly interactive relationship

with professional and personal technologies. This individual relies heavily on coding and programming platforms like GitHub, tailoring software to their freelance needs. Large Language Models (LLMs), such as ChatGPT, assist with problem-solving and content creation, while decision support systems provide essential work-related insights. Their personal life is similarly immersed in technology, with engagement in online dating apps, exercise trackers, and audiobooks. Social interaction is mediated mainly through AI-driven recommender systems on platforms like Instagram and TikTok. At the same time, their gaming life revolves around PlayStation and/or Xbox consoles, with social collaboration via Discord and Twitch. At home, smart technologies such as IoT devices, smart home systems, and personal assistants like Alexa or Siri are integrated into their daily routine. Additionally, their use of mobile technology, smartwatches, and virtual reality reflects technology's pervasive role in their personal and professional lives.

*Persona 2: Primary School Student*

The second persona is an 11-year-old girl from a middle-class German family, reflecting a more supervised but diverse engagement with technology. As a primary school student, she interacts with educational apps and e-school software to manage her schoolwork and collaborative projects, including tools like the student version of Miro. Creativity and entertainment play a significant role in her digital life through platforms like Roblox and The Sims, where she creates digital environments. Parental supervision shapes her engagement, with time limits and activity tracking, while school systems also monitor her academic progress. Her use of generative AI extends to personal enjoyment, such as creating images and engaging with AI chat programs. Social media platforms like Snapchat, TikTok, Instagram, and YouTube play a central role in her entertainment, enhanced by filters, editing tools, and recommender systems. Her use of a tablet for both schoolwork and creative drawing, along with iPad games and music on Spotify, demonstrates technology's intertwined role in her educational and personal life.

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.

# CLUSTERING

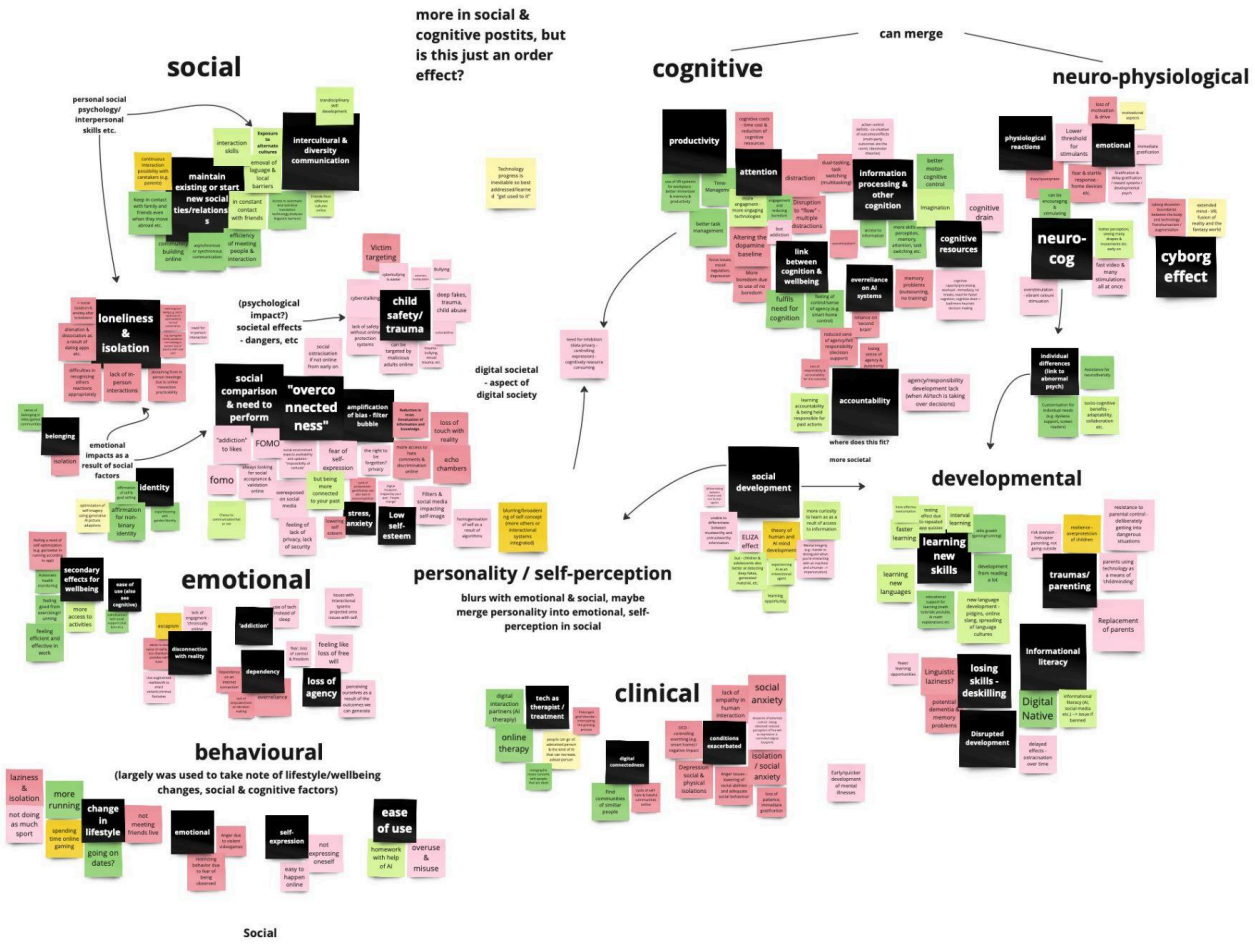



**Figure 1.** Preliminary Map of Psychological Impact during Pilot Workshop (PSAIS)

**Positive Impacts:**

- **Social Connection & Cultural Exposure (Social & Inter-Cultural Impacts)**: Participants highlighted the positive role of interactional technologies in maintaining connections with family and friends across distances, fostering new relationships and online communities, and facilitating asynchronous and synchronous communication. They also discussed the benefits of real-time translation technologies in breaking down language barriers and exposing users to intercultural communication.

- **Skill Development (Developmental, Social and Cognitive Impacts)**:
  Interactional technologies were seen as tools for educational growth, offering access to resources like AI-driven tutoring, language learning, and the development of new language forms (online slang, cultural exchanges). These technologies support transdisciplinary skill-building, collaboration, and experimentation with personal identity, such as gender exploration.
- **Cognitive Benefits (Cognitive Impacts)**:
  Cognitive enhancements through gaming, multitasking, and skill development were crucial benefits. Participants also discussed memory, attention, and task management improvements, with technologies customised to individual needs, such as dyslexia support. These systems foster curiosity, imagination, and problem-solving abilities. However, multitasking can also have a negative impact if related to loss of cognitive engagement and, thus, productivity in a given task.
- **Physical Well-being & Productivity (Well-Being and Cognitive Impacts)**:
  Fitness tracking apps and VR platforms for workplace productivity were seen as drivers for healthier lifestyles and improved personal efficiency. Technologies like mobile devices and interactional systems act as "second brains," helping individuals manage tasks, set goals, and maintain productivity. However, there were some concerns about potential distractions. Furthermore, the accessibility of information offered by those technologies can enhance an individual's well-being.
- **Emotional Well-being & Identity**:
  Technologies offer users a sense of agency and control, such as through smart home systems and health monitoring tools. Generative AI also supports self-expression and self-image optimisation. Participants discussed how online communities foster feelings of belonging, while AI-supported therapy can enhance emotional health.

**Negative Impacts:**

- **Social Isolation & Alienation (Social Impact)**:
  Despite the connectivity benefits, participants raised concerns about the risk of social isolation, where overuse of technology could lead to loneliness, abstaining from in-person interactions, and overstimulation from information overload. Social comparison and fear of missing out (FOMO) further contribute to social anxiety and the loss of social skills.
- **Cognitive Overload & Mental Health Issues (Cognitive and Mental Health Impact)**:

Constant connectivity can lead to cognitive drain and overstimulation, reducing attention span and causing multitasking fatigue. Increased reliance on AI for decision-making was seen as potentially diminishing user control and agency, contributing to mental health challenges such as anxiety, depression, and low self-esteem.

- **Overreliance & Loss of Self (Cognitive and Social Impact)**:
  The overuse and misuse of social media, particularly the pursuit of likes, can lead to addiction and reduced motivation. There were concerns about users becoming overly dependent on AI and digital systems for decision-making, which could diminish their motivation, patience, and self-concept. Participants noted the potential fusion of reality with virtual worlds and the risk of escapism in a digitally mediated environment.
- **Secondary Impacts: Privacy, Safety & Security Concerns (Mental Health, Social and Developmental Impacts)**
  Concerns about online privacy and safety were significant, including issues of cyberbullying, stalking, and the challenges of maintaining privacy in an age of constant digital footprints. Difficulties with data erasure, or "right to be forgotten," were highlighted. In particular, parents could be concerned about child safety, while some noted that overprotection might slow children's social and developmental growth.
- **Secondary Impacts: Trust, Responsibility & Agency Issues (Cognitive and Social Impacts)**
  Participants discussed how filter bubbles and misinformation degrade trust in information sources. The delegation of responsibility to AI in decision-making can reduce personal accountability, and there was concern about users feeling a loss of control or perceiving themselves as being constantly monitored, leading to heightened feelings of external control.

These outcomes provided a rich, multifaceted understanding of how interactional systems shape psychological impacts across different domains, offering valuable insights into both the positive potentials and negative risks associated with their use.

## Conclusion

During the workshop, participants reflected on the potential future of interactional systems and their psychological impacts. One of the recurring themes was the positive potential of

these systems to support tasks such as the treatment of PTSD, demonstrated by the use of TETRIS, or exploring new treatment possibilities in virtual environments, including ADHD testing through VR. Participants highlighted the benefits of interactional systems regarding cognitive support, task efficiency, and engagement but also raised concerns about societal implications. For example, while AI can enhance productivity, outsourcing cognitive tasks could lead to a reduced sense of responsibility, both personally and societally. Social robots and interactional systems were discussed as promising for therapeutic interventions, but concerns were raised about social isolation and overreliance. Participants emphasised the need for legal safeguards, accountability, and careful design of these technologies to maintain the balance between efficiency and responsibility.

Following this successful pilot workshop, it is clear that more data collection is necessary to further refine our understanding of the psychological impacts of interactional systems. Therefore, we will proceed with additional workshops to gather insights from a broader range of participants. These workshops will help us validate and expand on the initial findings.

In parallel, we will initiate a global consultation phase, engaging experts from diverse cultural backgrounds to enhance the mapping of psychological impacts from an intercultural perspective. This consultation will ensure that the framework we develop is comprehensive and culturally sensitive, allowing us to assess the psychological impacts of interactional systems on a global scale.

## Project Personal

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