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, Oceania?

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

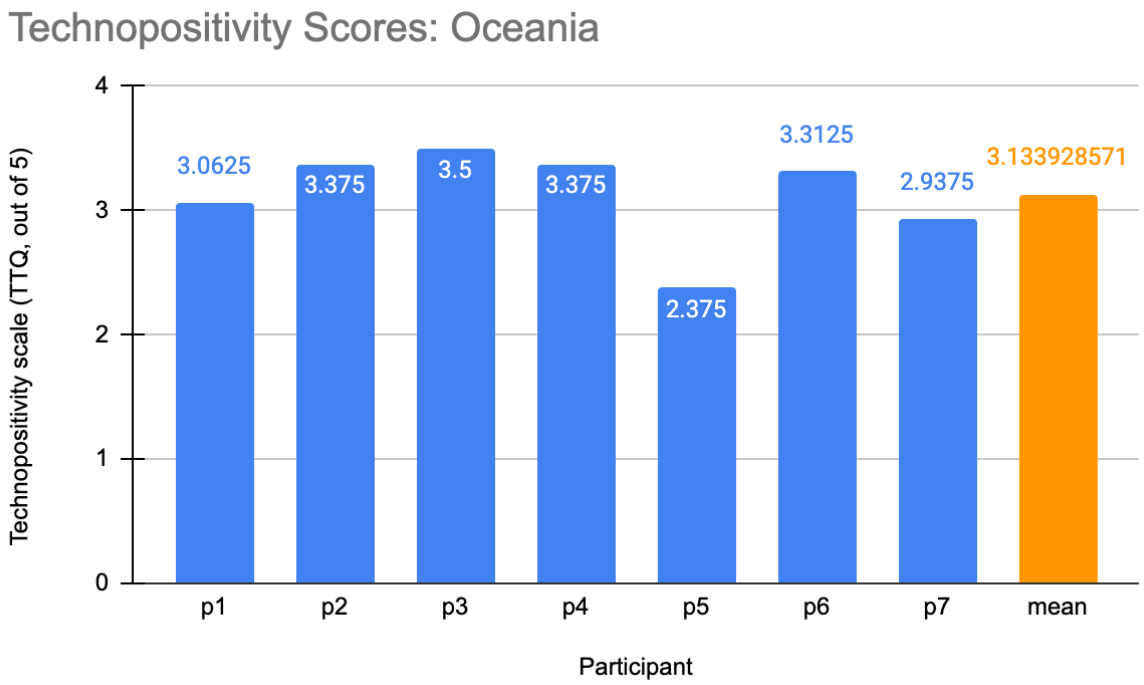
The workshop employed a **diegetic participatory design** approach, where participants developed detailed personas based on pre-built archetypes. This method, inspired by "design alter egos" (Triantafyllakos et al., 2010), enabled participants to project potential psychological impacts of interactional 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 consists of eight individuals whose expertise spans a range of disciplines, including Philosophy, Psychology, Human-Computer Interaction (HCI), Computing and Information Systems, and Law. Participants were from Australia and New Zealand, representing leading academic institutions across the region.

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. Participants demonstrated a wide range of technopositivity scores, with values ranging from 2.375 to 3.5. The group mean was 3.13, reflecting a moderately positive attitude toward technology. The mean score above the neutral midpoint of 2.5 indicates an overall technopositive inclination among participants, though notable variability is present, highlighting diverse attitudes toward technology 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 Expressive Psychology Student

This 19-year-old Native woman, a psychology student from a lower-middle-class background, leverages a diverse range of technologies to support her education, creative pursuits, and social influence. With hobbies like social media, video games, and painting, she uses platforms like TikTok, Instagram, Discord, and Twitch to connect with her audience, share her art, and engage in online communities. Recommender systems and tools like Pinterest and Canva inspire her content creation and provide resources for academic presentations and assessments. She uses advanced interactional systems like ChatGPT and other LLMs to generate content plans, analyse data for her studies, and seek inspiration for her creative work. Her online presence expresses her identity and advocates for her community, using tools like Adobe Creative Cloud and MidJourney to produce impactful visual content. Financial and productivity apps help her manage her budget and organise her schoolwork, while gaming and streaming platforms offer her entertainment and a means to connect with friends and followers. Her relationship with technology is multifaceted, combining education, advocacy, creative self-expression, and financial empowerment.

Persona 2: The Creative Preteen Explorer

This 11-year-old Caucasian girl, a primary school student from a middle-class family, enjoys blending traditional childhood hobbies with digital tools to explore her interests. Passionate about drawing, gymnastics, and watching cartoons, she uses digital drawing apps and platforms like YouTube to learn new techniques and watch tutorials. Her entertainment and learning experiences are enriched by recommender systems on platforms like Netflix and YouTube, which suggest age-appropriate shows, music, and educational content. While her technology use is moderated by parental controls, such as restricted access to social media and limits on screen time, she engages with interactive EdTech apps for homework. She uses messaging apps to stay in touch with friends under supervision. She also explores virtual gaming platforms to unwind and improve her problem-solving skills. Her access to

technology is balanced, offering both educational benefits and creative outlets while navigating boundaries set by her parents.

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 Connectedness and Cultural Enrichment:** Technology can enhance social connectedness by enabling diverse and meaningful interactions. It can broaden social and cultural understanding by exposing users to varied viewpoints and enabling them to form connections over shared interests. Platforms such as gaming communities and artistic forums can foster collaboration and camaraderie, building supportive environments that positively impact overall well-being.
- **Identity and Self-Expression:** Digital platforms can allow users to explore and express different facets of their identity. From celebrating cultural heritage to fostering artistic creativity, technology provides tools for self-expression and personal growth. These spaces also support identity exploration and self-affirmation, strengthening confidence and individuality.
- **Cognitive and Emotional Development:** Interaction with technology can improve problem-solving skills, cognitive abilities, and creativity. Gaming platforms enhance decision-making and reaction times, while educational tools foster digital literacy and support continuous learning. Emotional regulation tools can aid users in managing stress, building confidence, and achieving emotional balance.
- **Health and Productivity:** Fitness apps and productivity tools can promote physical activity and efficient time management, supporting healthier lifestyles. Technology can empower users by fostering self-efficacy, helping them achieve their goals and build skills relevant to modern workplaces.

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

Negative Impacts

- **Social Challenges:** Excessive reliance on digital interactions can lead to feelings of isolation and reduced physical social engagement. Risks such as online harassment, trolling, and targeted violence can be prevalent, particularly for vulnerable populations. Interpersonal and intergenerational conflicts can arise from differing digital habits and values.
- **Identity Struggles and Comparison:** Digital spaces may foster unrealistic self-comparisons, body image issues, and dependency on external validation. The conflict between online and physical identities can lead to feelings of inauthenticity and dissatisfaction. Algorithm-driven environments and AI agents can further exacerbate social comparison and self-doubt.
- **Cognitive Overload and Deskilling:** Over-reliance on digital tools for learning and decision-making may impair critical thinking and lead to deskilling. High exposure to content can cause overstimulation, reducing attention spans and the ability to focus. This overreliance may undermine personal accountability and resilience in non-digital contexts.
- **Health and Emotional Risks:** Excessive screen time may impact physical health and emotional well-being, increasing risks of hyperfixation, aggression, and stress. Exposure to traumatic content or algorithm-driven emotional manipulation can harm mental health, and the potential overuse of technology as a digital pacifier may reduce users' ability to regulate emotions independently.

This analysis highlights the dual nature of technology's influence, emphasising the importance of fostering mindful engagement and balanced usage to maximise its benefits while mitigating its risks.

Conclusion

The Oceania workshop of the PSAIS project, hosted by TUM IEAI, provided valuable insights into the psychological impacts of interactional technologies within the region. By bringing together experts from diverse fields and leveraging participatory design methods, the workshop facilitated rich discussions that revealed both these technologies' positive and negative effects on users' psychological well-being.

Key findings highlighted the potential of interactional technologies to enhance social connectedness, support identity exploration, and foster cognitive and emotional development. Positive impacts included building meaningful relationships, broadening cultural understanding, and empowering users through self-expression and skill-building tools. However, participants also identified significant challenges, such as the risks of over-reliance on digital tools, social comparison, and exposure to harmful content, underscoring the need for thoughtful design and ethical considerations.

The insights gathered during this workshop, visualised in the preliminary psychological impact map, provide a further foundation for refining the PSAIS framework. This framework aims to inform interactional systems' ethical development and deployment by ensuring they prioritise psychological well-being while accounting for diverse cultural contexts.

Looking ahead, the PSAIS project will enter a consultation phase in early 2025. This phase will expand upon the workshop's findings, incorporating feedback from a broader range of experts from diverse geographical backgrounds. Through this collaborative process, the framework will evolve to address regional and global nuances, fostering a balanced approach to integrating interactional technologies into daily life.

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