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, North America?

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

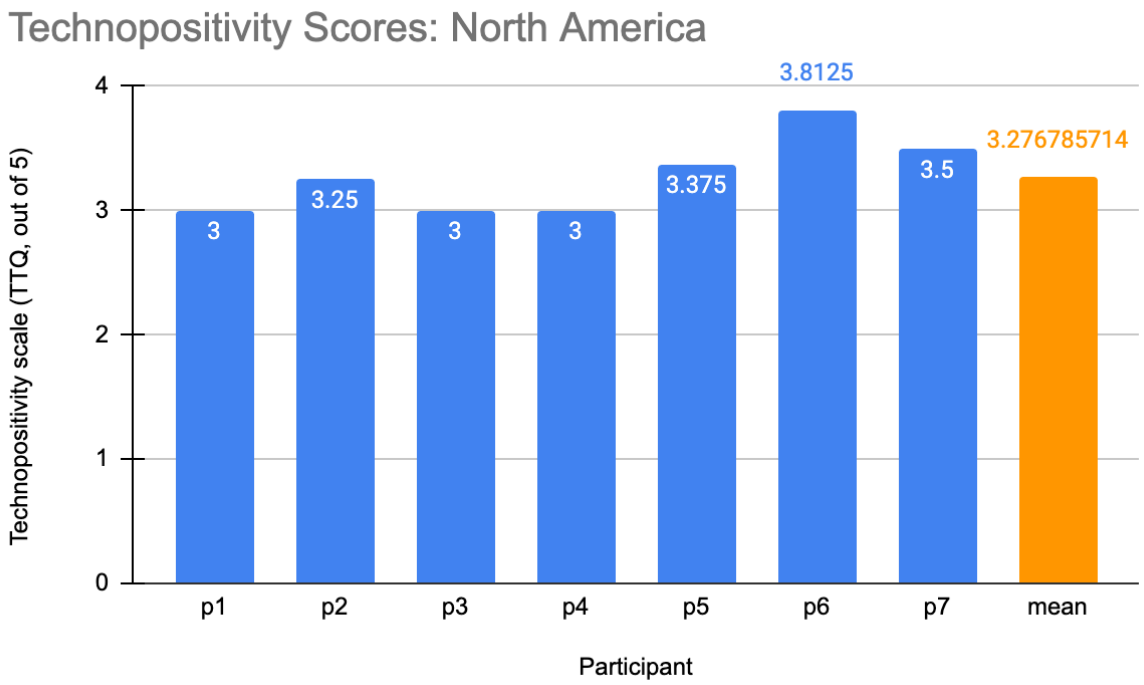
The workshop employed a **diegetic participatory design** approach, where participants developed detailed personas based on pre-built archetypes. This method, inspired by "design alter egos" (Triantafyllakos et al., 2010), enabled participants to project potential psychological impacts of interactional 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 seven individuals whose expertise spans a range of disciplines, including Computational Linguistics, Game Design, Public and International Affairs, Economics, Civic Media, Design, Linguistic Anthropology, Human-Computer Interaction, and Child Development. Most participants were based in the US or Canada.

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 3.0 to 3.8125. The group mean was 3.277, 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 Community-Oriented Retiree

This 67-year-old Japanese retiree, a former public school teacher, incorporates a variety of technologies into his daily life to enhance his hobbies, maintain social connections, and stay intellectually engaged. With a passion for gardening, chess, and documentaries, he uses tools like AI-powered plant identification apps and citizen science platforms like iNaturalist to deepen his knowledge and share his findings with others. Virtual social companions and AI apps provide casual interactions and help him explore new ideas. At the same time, messaging platforms like WhatsApp and LINE enable him to connect with friends, family, and his local community. He stays informed on current events and weather using voice assistants like Alexa and Siri and engages with community activities through Nextdoor and local mailing lists. Technology supports his hobbies, such as practising chess with mobile apps or finding chess events, and allows him to explore new interests, like learning a language with Duolingo. His relationship with technology is practical, explorative, and community-driven, reflecting his lifelong love of learning and his commitment to staying socially and intellectually active.

Persona 2: The Creative Young Learner

This 9-year-old primary school student combines his love for soccer, LEGO, and video games with his curiosity for technology, using a variety of interactional systems to support his learning, play, and social engagement. Tablets and educational apps help him complete homework, explore topics of interest like soccer techniques, and demonstrate his progress in school. Gaming platforms like Minecraft, Fortnite, and Roblox provide a space for creativity, teamwork, and fun with friends, fostering both his social and problem-solving skills. He uses classroom software to stay organised and meet academic expectations, while tools like ChatGPT assist him with school assignments and offer tips for improving his gaming strategies. With access to smart home technologies and a chores/savings app, he begins to learn about responsibility and goal-setting. His relationship with technology is playful,

interactive, and exploratory, seamlessly blending learning and leisure to reflect his dynamic and curious personality.

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 Connection and Belonging**: Technology fosters new friendships, expands social networks, and bridges intergenerational gaps. It enhances family relationships, creates a sense of belonging, and reduces isolation.

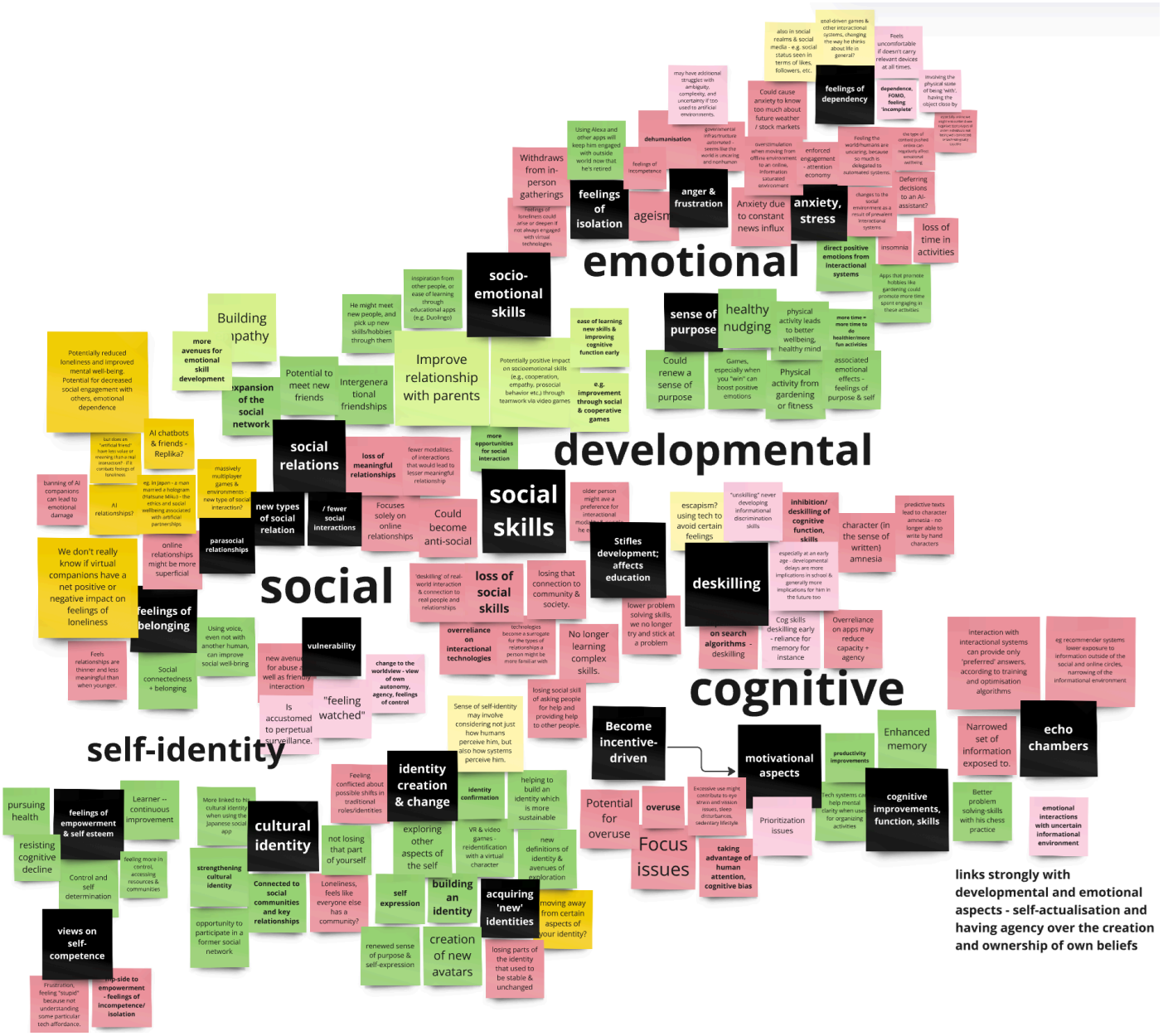


Figure 1. Preliminary Map of Psychological Impact during North America Workshop (PSAIS).

- **Empowerment and Personal Growth**: Digital tools support continuous learning, skill-building, and identity exploration. They help users connect with cultural roots, express themselves, and build self-esteem.
- **Cognitive and Emotional Benefits**: Interacting with technology promotes cognitive development, improves memory, and supports mental clarity. Positive content and virtual companionship can boost emotional well-being and reduce anxiety.

- **Health and Productivity**: Fitness apps encourage physical activity, while organisational tools enhance productivity and free up time for healthier pursuits.
- **Skill Development**: Games and apps promote problem-solving, teamwork, and socioemotional learning.

Negative Impacts

- **Social Challenges**: Overreliance on digital interactions can lead to social deskilling, superficial relationships, and diminished real-life social connections. Constant surveillance may reduce comfort and authenticity.
- **Identity and Emotional Struggles**: Technology can create identity instability, dehumanisation, and dependence on system perception. Users may face frustration, self-doubt, or feelings of inadequacy due to technological complexities.
- **Cognitive Decline**: Overuse can lead to deskilling, reduced problem-solving abilities, focus issues, and narrowed exposure to diverse perspectives.
- **Health and Overuse**: Excessive screen time can cause physical inactivity, sleep disturbances, and overstimulation. Overuse behaviours and prioritisation issues may negatively affect well-being and life balance.

This analysis highlights the dual nature of technology's impact on psychological well-being, emphasising the importance of mindful engagement and balance in digital interactions.

Conclusion

The North American workshop of the PSAIS project, hosted by TUM IEAI, has laid a solid foundation for understanding the psychological impacts of interactional technologies within the region. By leveraging participatory design and cross-disciplinary expertise, the workshop provided a platform to explore these technologies' multifaceted effects, highlighting their potential benefits and associated risks.

Key findings underscore the positive contributions of interactional technologies, such as fostering social connection, promoting personal growth, and enhancing cognitive and emotional well-being. These technologies empower users by facilitating continuous learning, skill development, and creative expression. However, the workshop also revealed significant challenges, including risks of social deskilling, identity instability, cognitive decline, and health issues linked to overuse and dependency.

The preliminary psychological impact map reflects the insights gathered during this workshop, providing a visual summary of the discussions and areas of concern. This map will serve as a valuable resource for further refinement and cross-cultural comparison in the ongoing development of the PSAIS framework.

In early 2025, the PSAIS project will enter a consultation phase to expand on these findings and engage a broader range of experts from a more diverse geographical background. This phase will ensure that the framework is inclusive, adaptable, and actionable, guiding the design of technologies that prioritise psychological well-being and equity.

Project Personal

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