Digital life in a physical world: rethinking digitization

Increasingly, all areas of our lives are pervaded by digital technologies, services and products. Aiming for human-machine synergies, digital technologies are blended with our physical bodies and surroundings. What are the real demands on us as a species, both from a contextual as well as a human viewpoint beyond contemporary technological hype? What are the needs not yet known and how can they be unveiled? What radical new possibilities originate from or facilitate this new ‘digitality’? A comprehensive and interdisciplinary approach is needed to envision, design and develop futures that recognize and embrace human diversity.

Chair:  Manfred TSCHELIGI, Professor of Human-Computer Interaction, Center for Human-Computer Interaction, University of Salzburg & Head, Center for Technology Experience, AIT Austrian Institute of Technology, Vienna

Coordination:  Martin MURER, Senior Scientist, Center for Human-Computer Interaction, University of Salzburg

Program

13.00 – 13.10 Opening:  Manfred TSCHELIGI

13.10 – 13.30 Introductory Statement: Landesrätin Andrea KLAMBAUER
Salzburger Landesregierung

13.30 – 14.00 Session I: Digital Learning in a Physical World (10 min talks + 5 min Q&A)

Robert PRAXMARER
Founder, Polycular, Hallein (Austria)

Teresa TORZICKY
SEED - Hier wachsen Ideen, DaVinciLab, Vienna (Austria)

14.00 – 14.45 Discussion

14.45 – 15.15 Coffee Break

15.15 – 16.00 Session II: The Internet of Everything (10 min talks + 5 min Q&A)

Joep FRENS
Assistant Professor, Eindhoven University of Technology, Eindhoven (The Netherlands)

Michael SCHINEIS
President Winter Sports Equipment, Amer Sports, Altenmarkt (Austria)

Bieke ZAMAN
Assistant Professor, Mintlab, KU Leuven – imec, Leuven (Belgium)

16.00 – 16.30 Discussion

16.30 – 16.45 Break

16.45 – 17.30 Panel Discussion

17.30 – 18.00 Résumé and outlook:  Manfred TSCHELIGI
Singularity is dull – Why we need new ways of learning and experiencing life

Soon most of us will face an identity crisis being outperformed by AI and robots. Since the industrial revolution employment and work defined our socio-cultural role and filled most of our time with “meaning” before that we were simply trying to survive. In the future, however we will have lots of leisure time where boredom awaits us. This is not necessarily a bad thing as it can be a source of creativity but we believe that we need new ways of play, education and inspiration to create meaning and motivation in the age of neurological reproduction otherwise we will end up in a cheap entertainment matrix amusing ourselves to death. As a startup we specialise in the future of learning and develop new formats and interfaces for education in mixed reality. We believe that with smart experience design paired with technological innovation we can deliver tools that will be able to foster critical thinking, creativity, communication, and collaboration—the very things computers currently aren’t good at all. It is of uttermost importance to start a paradigm shift in school education now, before we wake up in a society educated for a world which is not existing anymore.
School 2.0 – How does formal education that prepares all students for a digitalized world need to look like?

Digitalisation as an emerging trend is changing our world and the environment we live in, starting from the way how we communicate and interact with each other, to how we consume up until the way we work and cooperate. Digital tools have spread to nearly all areas in Austria and thereby also changed the requirements needed for joining the labour market.

However, the field of formal education for children under 14 has not adapted to the emerging digitalisation they are experiencing outside of school. Formal education should enable all individuals to actively participate in society and let them play a part in creating and shaping our common future. Therefore, we need to ask ourselves how formal education needs to look like in order to prepare students for this quick changing world. Digital tools can open tremendous opportunities, if designed, implemented and used with a focus on the learning experience and development of students and the usability for teachers.

During this session the following questions will be addressed:

- How does the role and objective of formal education change in a digitalized world?
- How should/could a school that prepares students for a digitalized world look like?
- How could learning settings that put students in the role of active developers and creators instead of passive consumers look like at school?
- What are the implications for teachers?
- How can we prevent the broadening of the educational gap between students from different social backgrounds driven by digitalisation?
Joep FRENS
Assistant Professor, Eindhoven University of Technology, Eindhoven (The Netherlands)

Designing for embodied and rich interaction in growing IoT systems

The field of (interactive) product design is changing, products become connected and form systems of multiple people and multiple connected products. The phenomenon of the Internet of Things (IoT) is a good example of this and I position my research around it. In my research I focus on the home environment and I observe that this environment is characterised by physical things that are often telling a story of their use in form. Think for example how kitchen utensils are all shaped to do specific tasks. When connected IoT products are brought into the house it is striking to see that these are generally interfaced through standardised touchscreen or speech interaction. This contrasts with the more specific interfaces in the home. The aim of my research is to explore alternative interaction styles for connected IoT products that are more suitable for the home. In this ambition I am inspired by work on embodied and rich interaction in the HCI community. This is not as straightforward as it sounds. Of course we could simply re-design the IoT artefacts to have more embodied and rich interaction styles but that is not taking into account the dynamics of the IoT systems. Through time IoT products can be added or removed from the system and firmware of these IoT products can be updated. In sum, these IoT systems are not static but dynamic in use, they ‘grow’ together with their user and the functionality of the IoT systems emerges in use. That makes it hard to design for, particularly when an embodied and rich interaction style is aspired. This conflict between the dynamics and openness of a ‘growing’ IoT system and the physicality of the embodied and rich interaction styles forms the basis of my research question. In my talk I aim to demonstrate how we try to answer this question by showing work of my students, my collaborators and myself as well as the IoT Sandbox, a design tool that we developed to support designing for embodied and rich interaction in growing IoT systems.
Digital capabilities and opportunities in mid-size companies

Digital capabilities and opportunities are reaching mid-size companies faster and faster. If mid-size companies are able to find the right strategy this can provide significant business opportunities in the backside of the business (production, supply chain, industry 4.0,...) and in the frontside of the business (consumer engagement, product solutions, marketing, R&D,...).

**Backside**

The winter sports industry has several specific challenges like seasonality, high volatility in production, human resources management,... Industry 4.0 provides new solutions to manage these challenges much better than in the past. Examples will show how Amer Sports is investing into this new environment.

**Frontside**

All consumers are nowadays digital natives. Any consumer journey is starting through digital touchpoints. This brings new opportunities for brand marketing. Connected products are providing consumers new experiences. They also bring consumers new possibilities to learn sport activities faster and/or improve their skills. Examples will show how Amer Sports and in specific Atomic is using these new opportunities.
Bieke Zaman
Assistant Professor, Mintlab, KU Leuven – imec, Leuven (Belgium)

The Internet of Toys: a posthuman perspective on the design qualities of connected toys

Bieke Zaman will engage in a posthuman reflection on a particular manifestation of the Internet of Things, that is the Internet of Toys. The term *Internet of Toys* is used as an umbrella term for a wide variety of hybrid play objects that are electronically connected to other objects and/or to the internet and database data. It specifically considers the extension of the digital and the internet into the physical realm of toys by means of technological advancements like artificial intelligence, voice and facial recognition software, location and movement detectors, 3D printing, or touch sensors.

By shedding a posthuman understanding on this emerging phenomenon, Bieke Zaman will discuss the implications of treating objects and humans on an equal stand as both having agency, i.e. considering them as being entangled, acting upon each other in dynamic, complex, often unpredictable ways. The rationale of her presentation is that connected toys provide a rich case to explore how children’s play is increasingly embedded in a rich ecology of objects (e.g., toys, data, apps, sensors, internet) and people (e.g., child users, parents, siblings, peers).

**What connected toys can do**

A posthuman perspective allows us to move beyond an exclusive focus on human interactions (e.g. parent-child, child-child) and also accounts for what connected toys can do. Internet-connected toys are data-driven objects that monitor children’s actions (e.g., their movements, speech). By paying attention to what these toys can and can’t do, we become sensitive to what is happening ‘behind the scenes’: which data is being captured, how is it stored, who has access to it, how these data trigger other actions. It might for instance reveal how children’s personal data is used by companies for personalized advertising.

**Revisiting research methods**

A posthuman perspective avoids anthropocentrism in empirical research. Rather than only capturing verbal utterances of the children as the primary users who interact with connected toys (e.g., through the analysis of transcriptions), it broadens the research scope by also accounting for data –this can be audio, visual, tangible data- from other stakeholders shaping the interactions (like parents, siblings, peers) as well as for the non-human actions from toys, screens, apps or other connected objects.

**New Design Paradigms**

A posthuman perspective invites designers of connected toys to embrace divergent interactions in a rich ecology of children, toys, apps, devices and data. It encourages alternative design paradigms that move beyond rationality, consistency and predictability. Such an open-ended design space, challenges designers to find a balance between incorporating the probability of open-ended play possibilities and freedom to the child on the one hand and children’s online safety and privacy on the other.

In sum, Bieke Zaman’s contribution to the panel is a brief introduction of how a posthuman perspective can yield a multifaceted understanding of the design qualities of IoT applications and how it can be informative in reconsidering the research methods to adequately describe the interactions that cross the virtual and physical world, the online and the offline, and digital and nondigital boundaries.

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