

Panel #2

SATISFACTION FROM A TRANSDISCIPLINARY PERSPECTIVE

An objective of the project Sensing & Sensibility is to build a university-wide research profile at the interface of technology, humans, and society. To this end, we organize panels to discover and exchange trans-disciplinary research ideas as a common ground for collaboration among different research groups within the University of Siegen. Our first panel took place in December 2020. It focused on “performance” and technology. We invited four speakers to give impulses from the perspective of engineering, history, operations research, and marketing (see here for more detail).

Panel #2 took place in February 2021. It was moderated by Marc Hassenzahl and focused on “satisfaction” with collaboration between humans and technology. The leading question had been: “How should the collaboration between the human and technology be designed to maintain or even increase human satisfaction?” This led to a lively discussion among the 60 participants that covered various topics from societal and political aspects of satisfaction to metrics and tools for measuring satisfaction, and tradeoffs between customers’ and employees’ satisfaction.

Prof. Gunnar Stevens from Consumer Computing research group discussed satisfaction from personal, social and societal perspectives. He pointed out that satisfaction is a very broad concept. It is predominately understood as the fulfillment of a goal (i.e., met expectations) or having an extraordinary experience. It can have both positive and negative aspects, and is a non-materialistic experience, which fundamentally shapes our life goals. It is therefore important to understand how satisfaction is “created”. On a personal level, satisfaction is to some extent genetically determined,

but also depends on the social and cultural background of that individual. For example, the satisfaction gained through listening to Wagner’s music can be an inherited practice, but also can refer to its significance in German history. On a social level, factors such as social comparison of life achievements can have an impact on the satisfaction level. Another defining factor is the socio-economical model of a product that can affect satisfaction. For example, advertisements that disrupt listening to music on Spotify impair satisfaction and lead to frustration, but buying a premium account enhances it. And finally on a societal level, being aware of climate change and one’s own CO2 footprint can influence satisfaction of travelling by airplanes. This raises the question of “What is the right design?” Due to the possible trade-offs between satisfying personal and societal needs, it is always important to first consider what products/technologies should be designed for fulfilling each of these needs. For example while car sharing, automated driving, and e-vehicles satisfy environmental goals regarding climate change, they impair satisfaction on a personal level, by removing the experience of feeling competent, or joy of driving. This makes us wonder whether the car is the right product for satisfying those personal needs and goals or an e-bike that relies highly on human’s competence and provides the possibility for social comparisons through sensor data?

From the perspective of ubiquitous computing, Prof. Kristof Van Laerhoven associates the overlap of “satisfaction” and “technology” with the smiley feedback systems at the exit of many retailers. With this everyday example, where he questions the validity of the measurement, he introduces one of his research

projects. Although this research was about other affects/emotions and not about satisfaction, the findings can be transferred. In the project standardized and established tests were used to generate emotions such as stress, amusement etc. Additionally, the participants were equipped with two types of sensors: a) expensive, high-frequency measuring, medical sensors (e.g. EMG, EGK) and b) less accurate sensors integrated in a smart watch. Based on the generated sensor data under the different affective states of the participants, algorithmic models were created to recognize the emotional state. Here, Prof. Van Laerhoven highlights that these models work very well and that the data from the smart watch led to only marginally inferior results. Trying to transfer the results from the lab conditions to everyday life turns out to be a big challenge, though, because the emotions are not so clear/pure and furthermore the context seems to be very relevant for the interpretation of the emotions. Prof. Van Laerhoven is confident that with further sensor technology and improvement of the algorithmic models, recognition of human emotions under everyday conditions will also be successful.

As chair holder of Service Development in SMEs and Crafts, Prof. Giuseppe Strina discussed satisfaction from the perspective of service research and development. Prof. Strina examined satisfaction in using and providing services through an example of a fine dining restaurant. He used a service blueprint diagram to represent different service layers that are distributed according to “a visibility line” (Sichtbarkeitslinie). In a restaurant, for instance, a client is exposed to only a fraction of services that the service provider actually carries out, the so-called “onstage”, while others, such as the kitchen work, take place in the “backstage” and remain invisible. “Onstage” is a very important area that comprises activities shared by customers and service providers, since it shapes customer experience and, therefore, satisfaction. Possibly, Prof. Strina speculated, we would not mind if the food was prepared by robots in the kitchen, unless it was tasteless. On the other hand, we might not be very excited to get food served by a robot. Thereupon, it is possible to automatise a lot below the visibility line, while the areas visible to customers should be handled with care. From within this context, Prof. Strina outlined two types of satisfaction. The first type is the client satisfaction, or the degree of customer’s met expectations in relation to the value of the service used. This type of satisfaction can vary with expectations, which in turn differ depending on context (if one eats in a fine dining res-

taurant or in an imbiss) or individual. The second type is the employee satisfaction, or the measure of the extent to which the fulfillment of the customer’s expectations and the simultaneous fulfillment of the company’s and employees’ expectations are achieved. The question is then, how can technology be used to increase both types of satisfaction? The traditional perspective is an “either or”-question, often prioritizing customer satisfaction over employee satisfaction. Here, Prof. Strina highlights recent research that shows the positive effect of satisfied employees on customer satisfaction. However, through technology-supported feedback processes, the other direction is also possible, resulting in an interaction of these two types of satisfactions. In the future, a major challenge will be to correctly assess the expectations of customers and employees through recorded data to generate higher satisfaction.

The scientific coordinator of Collaborative Research Centre (CRC) “Media of Cooperation”, Dr. Timo Kaerlein, critically explored the issue of measuring satisfaction. He argued that solutions to evaluation of satisfaction are often grounded in the research area of Affective Computing, which is concerned with affect and emotions as biological facts that can be mapped. In short, Dr. Kaerlein argued that affective computing mostly understands affect and emotions as states that can be determined and measured with the help of sensors and, thus, managed. As an example Dr. Kaerlein shared the case from the field of urban affective sensing and its vision of an affect-aware city. Here, citizens’ affective states are mapped and turned into algorithmically organised city models according to the city districts. Dr. Kaerlein criticised such practices of affective modeling due to their obvious potential for crowd control and policing. He also argued that such instrumentalization of affect actually contradicts historical affective computing vision of Rosalind Picard and others, who aimed to attune HCI to human needs, instead of instrumentalizing them for infrastructural control. Dr. Kaerlein proposed to go beyond the above-described and limited understanding of affect as a form of physiological states and to perceive it instead as a relational socio-cultural phenomena, tied to culturally situated and dynamic practices that resist easy formalisation. He provided an example from the realm of urban affective sensing and the fields of public health and environmental research that aim to differentiate approaches to affective sensing by combining different methods and thereby arriving at a better, more diverse picture of affect and emotions. In this context, Dr.

Kaerlein argued for the merit of combining relational, situated understanding of affect and HCI design by pointing to research carried out by Kirsten Boehner et al. that perceive affect as a design resource. From this perspective, satisfaction at a workplace should not be perceived as a mental state that can be measured and optimised – in fact, this could be even detrimental to the aim of increased satisfaction – but as an ongoing social accomplishment that takes situated workplace issues and ethics seriously .

The discussion in this panel covered the satisfaction topic from various perspectives. Several participants mentioned that satisfaction is shaped through a comparison between the expectations that one has from a technology and the experiences they gain through using/working with it. It is therefore important to understand how to best design technology for satisfaction fulfillment or enhancement. Pursuing this, we should distinguish whether personal, social, or societal needs should be fulfilled. On each of these levels, we also need to define whom we are aiming to satisfy by our design? Are these the employees collaborating with the technology or the customers using the services provided through this collaboration?

Another topic raised was measuring, understanding and applying metrics for satisfaction. While the sensor data and affective computing approaches allow for the mass gathering of human affect in different situations, transferring the results from controlled lab conditions to everyday life is still challenging. Moreover, applying these methods in isolation and without considering the context-dependent, culturally situated and dynamic nature of affect, can lead to designing technologies that control humans' practices towards predefined goals rather than fulfilling their needs in daily practices. In the future panels we aim to explore questions such as:

- When and how sensor data should be used for enhancing satisfaction?
- How to design technologies to fulfill individual, social, and societal needs?
- Can we define satisfaction as a factor for optimizing technologies?
- What are transdisciplinary approaches for enhancing satisfaction?