VR Technology and Well-Being: an Oxymoron?

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ABSTRACT

Well-being predominately is a subjective state that denotes a feeling of safety and comfort of body and a happy, content mind. Technology-rich environments like in immersive Virtual Reality (VR) leave many people at unease. We tried to enhance the experience in VR to enhance the well-being of users in our environments. For this, we tried to enrich the predominately visual stereoscopic VR experience by adding other sensory channels like olfaction and rumbling floors. We also investigated into guiding the mind through emotional VR and re-framing disturbing factors. Nevertheless, we found in our projects that even though the presence and engagement of one time users increases, still, after a while, many people feel uneasy with the technology, some even getting sick.

The implication for the design of tools for well-being is that the use of technology often also comes at a cost. People are different in their sensitivity to technology and, if the cost is too large, it might diminish the desired benefit of the application. This especially might be the case, when using current immersive and augmented visual technologies.

Author Keywords

Well-being, slow technology, virtual reality, emotional virtual environments, interaction.

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

WELL-BEING

Well-being predominately is a subjective state and denotes a sense of well being of both body and mind. This includes mental well-being, i.e. having a positive attitude towards what is and what will be, and a happy content state of mind. And it comes with a feeling that the body is well and in a safe situation or at least with the absence of a feeling of disturbing bodily factors.

MULTISENSORY VR DEVELOPMENT

Technology encompassing installations as in immersive Virtual Reality (VR) surround users with technology to deliver virtual, often low-fidelity and visual only information. In those settings, the body is often unconsciously not in a state of comfort. In our experience with immersive projection systems and head-mounted displays since the late 90's, people often liked the application, but, immediately or after a while, suffered from symptoms like motion sickness, headaches or just general uneasiness.

Therefore, we started to investigate into immersive VR technology, applications and interaction methods that focus on enriching the human experience in virtual environments and make them more interesting, engaging and human-friendly. In this sense, we were trying to design for the well-being of users in our installations.

We took the above proposed way of including both body and mind into our consideration on how to improve the well-being of users, who want to experience a virtual reality. We did for example work that tried to connect the virtual world to the user by delivering a more complete sensory representation of the environment. Here, we aimed at enriching the sensory experience of users and thereby increasing their presence and motivation through **multi-sensory VR technology.** In our lab, this included visuals, sound, olfaction, and a rumbling floor (see [5] for the range of projects). The aim was to re-connect users to the body senses in a normally just visual environment. A second approach was to **include real artifacts** into the environment. For example, we created interaction techniques like the ChairIO, a chair-based interface for controlling complex motion through virtual environments, that makes the steering through a virtual world highly intuitive, joyful and gives a body feedback [1]. A third part of research was in creating **emotional immersive virtual environments**, i.e. virtual worlds that change in a subtle way to support the change of user emotions in various ways [4]. Even though consistent rich, multi-sensorically experienced reality aids in realism and allows for intuitive and joyful interaction with the environment, working with the mind and **storytelling** also can do a lot for feeling content with the presented reality. Therefore, a fourth approach to improve the well-being in VR was to investigate into guiding people's minds by way of telling stories, where technology otherwise might hinder [1, 2]. Storytelling does not remove the technological impact on people's body, but largely influences the perceived experience and also in some cases relieves some

of the undesired reactions to the technology. This shows the large contribution of a person's frame of mind and attitude to the experienced situation.

All these approaches strived at making the interaction with computers and virtual worlds more rich and effective. We found that the ChairIO was in fact very successful, as by way of passive feedback to the body and an immediate action-reaction loop, user were experiencing the world congruently with their body. They had a sense of being fully under control of what is happening in the environment. People were more engaged in the virtual world when using a rumbling floor and sound to make the world more believable. In our emotional VR project we learned that it is possible to influence emotions in a reproducible and consistent way in interactive settings, especially in immersive ones. But still, people felt uneasy in the environment.

A more successful installation, with regard to the well-being of users who experience it, was the GranulatSynthese. This is a meditative audio-visual tabletop application on an interactive table, covered with granules [3]. It aimed at providing a multi-sensory, interactive, calming, meditative installation that has the tactile features of playing in sand. The installation allowed to work in the sand or just stand back and watch and listen to the meditative sounds and visuals. This had a calming effect on users and fostered playfulness and mental rest. In this installation, people were not immersed in the environment in a technical sense. The table was easily accessible but was part of the normal environment. It was using monoscopic images projected from under the table surface. The granules covered most of the the table, therefore the projection and all technical details were hidden. Only the sand-like granules, enriched with colorful light and meditative sound were the interface to the experience. In contrast to immersive VR, people were able to use it or leave it at any time.

Lessons learnt from these projects are that a technology filled environment makes many people feel uneasy and that multi-sensory enrichments make the virtual worlds more believable and more engaging, but they do not relieve the impact that the technology imposes. Our VR approaches are steps on the way, but they do not solve the fundamental issue: VR technologies, especially visual stereoscopic displays, induce stress in people. This, regarding this topic, might be counterproductive to a desired well-being effect. Our non-VR installations were much more successful in creating a suitable environment, for example, to aid relaxation or create a pleasant environment.

In my opinion, even with improved current technological means, it is nearly impossible to create immersive stereo-scopic 3D virtual worlds that foster well-being. The technologically induced unease of body and mind through stereoscopic devices is, at least for many people, too large compared to a benefit of the application. VR of course is an extreme case and there are many subtle ways to include technology into our daily life to support well-being. Other technological means, like audio worlds, ambient information delivery, tactile, tangible interfaces, might be much more beneficial in terms of technology and I propose to look into these. The implication for the design of tools for well-being is that the use of technology often also comes at a cost and, especially to this topic it needs careful consideration and a thoughtful design to receive the full benefit.

SUPPORTING WELL-BEING
As introduced before, well-being to me is a subjective, personal state, coming from inside and strongly depending on the current personal needs and a person's inner resources. Many successful ways to improve well-being directly work on those inner resources, e.g. [6].

However, also technology can be utilized to aid people develop skills and attitude towards their personal well-being, including awareness for body and mind. It also might help in aiding to negotiate and 'stay true' to identified needs – with the constraint that it can only help to operationalize something that is already identified by the person as being important to him or her. For some examples, I propose to differentiate between short, medium and long term goals and their support:

short term support aids e.g. in drinking enough, keeping a time table, noticing body state (by feedback of heart rate, muscle tension etc.), negotiating relax and meditation time.

medium term support aids e.g. in managing social needs, in reflecting on current situations and goals, and do housekeeping and bodykeeping.

long term support aids e.g. in developing my attitude towards life and events, helps me find and pursue my long term goals, fosters insight, aids in training and meditation.

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