
AS IF: A Game as an Empathy Tool for Experiencing the Activity Limitations of Chronic Pain Patients

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Abstract

Pain is both a universal and unique experience for its sufferers. Nonetheless, pain is also invisible and incommunicable that it becomes difficult for the public to understand or even believe the suffering, especially for the persistent form of pain: Chronic Pain. Therefore, we designed and developed the game – *AS IF* – to foster non-patients' empathy for Chronic Pain sufferers. In this game, players engage with the connecting dots tasks through whole body interaction. After they generate the connection with their virtual body, they will experience a certain degree of activity limitation that mimics one of the sufferings of Chronic Pain. In this paper, we introduce the game design that facilitates the enhancement of empathy for Chronic Pain experience, and illustrate how this game acts as a form of communication media that may help to enhance understanding.

Author Keywords

Gaming for a purpose; stimulate empathy; body interaction; mobility; Chronic Pain experience.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

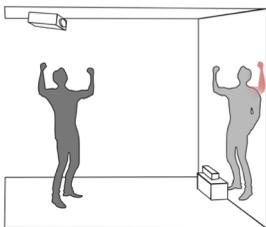


Figure 1: The *AS IF* game setting, participant interacts with his/her impaired virtual body. © SFU SIAT Pain Studies Lab 2016



Figure 1: Player interacts with *AS IF* and the pain attack happens to her occasionally. © SFU SIAT Pain Studies Lab 2016

The Motivation of Designing *AS IF*

Pain is both a universal and unique experience for its sufferers. Nonetheless, pain is so invisible and incommunicable that it becomes difficult for the public to understand or even believe that someone might be in pain, especially when pain persists over six months that characterizes Chronic Pain. Unlike a broken arm or leg, Chronic Pain can neither be seen nor be detected by any objective medical examinations. Because its sufferers often look just like “normal” people, it is sometimes difficult for healthcare professionals, patient’s family and friends, and the public to understand the pain experience or even believe the existence of pain.

Feeling empathy for patients *AS IF* people have the same medical condition is the public’s first step towards fully understanding the burdens that invisible pain brings to patients. Research, for example, shows that patients feel confusion, frustration, anger, as well as vulnerability to shame and social isolation when they are not feeling believed and understood [1]. Therefore, as suggested by [2], gaining an empathetic understanding of patients’ experience is not an adjunct, but is integral to help patients move forward alongside their pain.

Therefore, *AS IF* was developed and introduced in this paper. This game enables players to experience Chronic Pain through whole body interaction. It aims at enhancing empathy by demonstrating pain on the virtual body after the player has constructed the virtual body illusion. This illusion is akin to the famous rubber hand illusion, only on a larger scale, achieved by visual-motor synchronicity between the avatar and the self.

In this paper, we first discuss the history of utilizing game mechanics to facilitate empathy for different groups of people. Next, we introduce the main mechanics and the design process of *AS IF*. Finally, we propose an evaluation strategy that will be used to test the effectiveness and efficacy of *AS IF* in the future.

Related Work

Games are particularly good at fostering empathy among players even though the primary goal is entertainment [3]. This is because they allow players to inhabit the roles and perspectives of other people or groups in a uniquely immersive way. A diverse range of empathy games, for instance, has been created to foster empathy in participants for educational purpose. Similarly, many interventions designed to reduce prejudice also function by eliciting feelings of empathy towards victimized groups.

Studies of a simulation experience like the aging game created by Varkey et al. [4] was found to be an effective method that increased nursing students’ empathy toward caring for the elderly in a medical school curriculum. Moreover, we assert that the positive effects of empathy go beyond improving attitudes by providing a means of motivation that does not assume a prosaic behavior toward humans. In another research, Gordon et al. [5] designed a role-playing game *Participatory Chinatown*, which examined how the game affected players’ understanding of local issues and engage with their community. They pointed the challenges of extending players’ empathy from the magic circle of gameplay to a larger context. Several serious games aim to raise awareness in order to invoke empathy [6]. However, to our knowledge, few computer games have yet explored the subject of Chronic

Pain experience in a way that present an impaired body image to the players.

Game Overview

In *AS IF* (fig. 1), the player controls his/her virtual body with whole body interaction to complete the game tasks. We name the game *AS IF* since we aim at creating the experience as if the player is the Chronic Pain patient him/herself.

Game Mechanics 1: Connecting the Dots

In *AS IF*, the player needs to use limbs to touch and connect the dots following certain sequences. The resulting shapes of connected dots are related to Chronic Pain patient's experience. In the game tutorial, players construct a connection with the virtual body by controlling the body to complete the simple connect-dots task. As the game progresses, the duration of pain attack increases, and the tasks advance to be more complex.

Game Mechanics 2: Inducing the Sensation of Pain through the Impaired Virtual Body

In *AS IF*, the virtual body switches between two modes: the "normal mode" (the virtual body reflects the actual action of its manipulator) and the "Chronic Pain mode" (the range-of-motion of joints on the virtual body is limited). This joint movement limitation randomly attacks predefined body joints within arbitrary time interval, mimicking the unexpected nature of chronic pain attack. While the visual representation of an impaired body in the game mimics the actual situation of patients' mobility under pain, it creates a visual-motor incongruence for the player, which intensified the sensory disturbances, such as sense of alienation of one's body, loss of control, etc. Such disturbances are

also known to be regularly expressed by Chronic Pain patients [7]. The system also visualizes different kinds of pain via the shapes and motion of particles generated around the pain area. The additional visual clues on affected body part may induce synesthesia. Therefore, the transformative experience of pain may be generated by these visual clues on the virtual body.

Game Mechanics 3: Multimodal Input for Engagement and Narrative

Besides body-sensing and visual cues, the user can also interact with the system by speaking and asking questions. This is realized with Kinect voice-recognition. When the player is stuck or feels frustrated with the limited mobility of his/her digital body, with indications on screen, they can ask "why", or "what's the reason" as if it is the scream from the patient. These words will trigger the system to play a preset narrative recorded from Chronic Pain sufferers. The personal narrative may enhance the empathic experience by situating the player into the emotional states of pain patients.

Evaluation Strategy

As the game has been finished and reiterated based on feedback from participants in a small-scale pilot study, we plan to conduct a formal mixed-method study in the near future. To better evaluate the effectiveness and design strategies of *AS IF*, we will firstly invite 5-7 Chronic Pain patients and ask them to play the game. After that, they will receive qualitative interview as well as a self-reported questionnaire on their game experiences, including to which extent they feel the game expresses their feeling, to which degree they feel the game resonate their situation, etc. Next, we will have 10-12 non-patients to experience the game and collect their feedback: how they perceive themselves as



Figure 3: 3A (above) shows the tutorial of the Connecting Dots game; 3B (below) shows one game level with pain visualization on the impaired right shoulder. © SFU SIAT Pain Studies Lab 2016

pain patients, and to which level they can understand the negative impact the invisible pain exerts on its sufferers.

Conclusion and Future Work

In this paper, we present the Kinect body-sensing game *AS IF*, which is designed to enable the public to empathize with Chronic Pain patients. This research contributes to the Chronic Pain community by providing a potential tool for understanding and empathy. It also demonstrates how games can be a resonant interactive media that provides motivation FOR GOOD and FOR CHANGE, rather than solely for entertainment. Our future work will include conducting a mixed-method playtesting study with both patients and non-patients to better iterate the gameplay and evaluate the effectiveness of this game. Constrained by the Kinect's sensor range, *AS IF* can only present the pain experience affecting the major body part, rather than reflect the Chronic Pain experience as a whole. Nevertheless, it still provides empathetic experience of living with Chronic Pain that is otherwise difficult to communicate through other forms of media.

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