Towards a Coming Together of Transhumanism and Play

Florian 'Floyd' Mueller
Exertion Games Lab
RMIT University
Melbourne, Australia
floyd@exertiongameslab.org

Yan Wang
Exertion Games Lab
RMIT University
Melbourne, Australia
yan@exertiongameslab.org

Zhuying Li
Exertion Games Lab
RMIT University
Melbourne, Australia
zhuying@exertiongameslab.org

Yash Mehta
Exertion Games Lab
RMIT University
Melbourne, Australia
yash@exertiongameslab.org

Tuomas Kari
Exertion Games Lab
RMIT University
Melbourne, Australia &
University of Jyvaskyla
Finland
tuomas@exertiongameslab.org

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Abstract
We note a trend on utilizing interactive technology to extend human capacities through bodily cyborg-like integrations such as artificial limbs and implantables. This trend is often captured by the term "transhumanism", referring to the use of technology to extend human capacities. We find that many transhuman discussions appear to focus on instrumental benefits (i.e. exploiting opportunities to be more productive). We extend this by proposing engagement with transhumanism also from a perspective of "play". We reflect on our own and other's work to articulate three strategies for game designers on how they can engage with transhumanism when aiming to facilitate playful experiences. Ultimately, we aim to contribute to a more playful transhuman future.

CSS concepts
• **Human-centered computing → Ubiquitous and mobile computing design and evaluation methods** • *Human-centered computing → Interaction design*

Author Keywords
Transhumanism; Cyborg; Whole-Body Interaction

Introduction
Transhumanism is a collective term for a movement that seeks the "acceleration of the evolution of

intelligent life beyond its currently human form and human limitation by means of science and technology, guided by life-promotion principles and values" [23]. Although definitions vary, this movement generally aims to utilize interactive technology to extend human capacities through bodily cyborg-like integrations such as artificial limbs and implantables. Discussions around the cultural (e.g. [15]), ethical (e.g. [16]) and philosophical (e.g. [32]) aspects of transhumanism have emerged and developers have begun to create transhuman systems (e.g. [29]). However, we find that "play" is often missing in these discussions. An example of this is the common pro-transhuman argument that transhumanism allows to be more productive (e.g. not needing to carry keys anymore thanks to an NFC implant [19]). We extend this by proposing to engage with transhumanism also from a play perspective. We believe we can learn from the way people currently play with transhuman systems and also from envisioning how they would play with it in the future. This would allow us to derive implications for designs that aim to facilitate novel playful experiences. Unfortunately, there is little structured understanding of the potential of transhumanism to facilitate playful experiences. To address this, in this article, based on our own and other's work, we articulate an initial set of strategies targeted at designers who are interested in engaging with transhumanism to facilitate playful experiences.

Performance artist Neil Harbisson is probably the most prominent transhumanist: he is the first person legally recognized as a "cyborg" [35] as a result of having implanted an antenna into his skull that allows him to receive data and sense colors by feeling and hearing them as audible vibrations inside his skull. He exemplifies the extension of human capacities through bodily integration. Research labs are also working on transhuman systems. For example, the MetaLimbs design presents users with two artificial arms that are controlled by the user's legs [33].

We are interested in technologies that are designed to become integrated with the human body in order to enhance its capacities. Unlike wearables, they are not just extensions, but rather integral parts of the body and are meant to work in symbiosis with it [21]. We believe these characteristics offer opportunities for play that are different to what is possible with, for example, wearables (such as proposed by the Superhuman Sports challenge [36]). With our work, we aim to begin building transhuman play theory, so that ultimately, we can contribute to a more playful transhuman future.

Related Works

The idea of transhuman play draws inspiration from existing research that is concerned with the intersection of interactive technology, the human body and play, in particular embodiment [11], whole-body interactions [12], exertion [25] and pervasive games [22].

With games increasingly pervading contemporary life (for example see pervasive games [22]), we believe that games enabled by transhuman technologies integrated with the human body can be a key aspect of contemporary life. Benford et al. [5] argued from a designer's perspective that the consideration of bodies could be developed further with the advent of advanced sensor systems. Our work extends this thinking about sensing by considering not only sensing from afar (such as sensing the human body through a Kinect, which led to frameworks around sensed bodily play [26, 34]), but

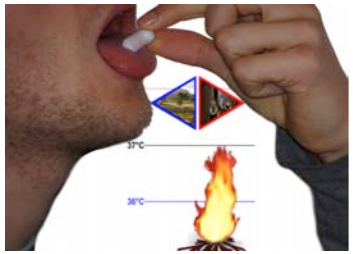

Figure 1. The Guts Game – a game using ingestible sensors.

also when sensors become integrated with the human body.

Research has also investigated how technology can be used to engage the human body, mostly to achieve instrumental objectives such as improved health (e.g. [7, 18, 38, 39]). However, more recently, studies emerged that also investigate bodily design from an experiential perspective. For example, Segura et al. proposed that designers of bodily games should design for the joy of movement [34]. Similarly, Höök et al. critiqued that most existing designs around the human body only focus on the instrumental aspects and they proposed that designers should also consider the "felt body" [13]. Furthermore, Mueller et al. [28] introduced an experiential perspective from sports philosophy. These works highlight seeing the human body not just from an instrumental, but also from an experiential perspective can have benefits for design. However, they do not explicitly consider a playful perspective' when it comes to transhuman technologies. When it comes to the human body and game design, Isbister et al. [14], Mueller et al. [25, 26] and Kari et al. [17] proposed that designing with the human body in mind demands specific design knowledge. Our article extends this specific knowledge by examining the emerging transhuman technologies and their potential to facilitate playful experiences.

In summary, prior work has highlighted the benefit of considering not just instrumental aspects when it comes to technology and the human body but also experiential aspects, while advances now allow for technology to become integrated with the human body. However, concrete strategies on how to engage with transhumanism to facilitate playful experiences that designers can use in their practice are still missing. With this article, we aim to close this gap by providing an initial understanding of how designers can engage with transhumanism to design playful experiences.

Transhuman Examples

We now present three existing transhuman systems that exemplify our thinking. We chose these examples because they a) are possible with today's technology, b) provide practical insights in contrast to purely theoretical work on transhumanism, and c) were designed for play or we were able to find instances where people have used them for play.

Guts Game

The Guts Game (fig. 1) [20, 40] is a two-player game that aims to facilitate a playful experience around ingestible sensors. The Guts Game makes for an interesting transhuman example as the pill travels inside the human body (and therefore becomes "part of" the body) but will be excreted after 24-36 hours. Players swallow an ingestible temperature sensor that measures their body temperature every 10 seconds and transmits it to a smartphone. Throughout the game, players are faced with different challenges such as guessing their temperature or changing it to a value determined by the system or by their partner. The Guts Game mobile app provides players with a flame animation to represent their temperature and rewards successful task achievements with points. During the game, the players can send pictures to each other to discuss how they managed to change their body temperature, such as through eating hot or cold food or engaging in physical activity.

Figure 2. NFC implants show up on an X-ray.

xNT Implantable

People are increasingly voluntarily implementing radio-frequency identification (RFID) and near-field communication (NFC) microchips for non-medical purposes [8]. We focus here on the xNT NFC chip, as it seems a popular choice [4]. It uses 13,56 Mhz and has 880 bytes of memory. Thus, it enables the use of an NFC device, such as an Android phone, to read out one's VCard details by just holding it above the implanted spot.

Bebionic Bionic Hand

The Bebionic bionic hand is a commercial myoelectric-controlled prosthesis designed to help amputees in everyday tasks [29]. Controlling the bionic hand is based on the electrical signals generated by one's own muscles. It is connected to the residual limb (the portion of a limb remaining after an amputation) of the person via a custom fabricated socket. Some of the afforded capabilities are not possible even for able-bodied persons, such as maintaining a constant gripping force when carrying heavy objects [1].

Design strategies to facilitate transhuman play

We now articulate three strategies on how designers could leverage the emergence of transhumanism for play. The strategies have emerged through an iterative process in which thinking about transhumanism has also influenced our design practice in return. This process has been previously used to develop a framework about bodily sensing [5] and bodily play [27]. By engaging with such a process, we believe we can paint a picture of transhuman play that is abstract in nature yet close to design practice.

Design strategy 1: Highlight opportunities for play resulting from the "always available" transhuman technology

This strategy is concerned with the extent to which the system highlights opportunities for play that are the result of the technology's intrinsic characteristic: it is always available. Unlike mobile devices or wearables, which are often left behind, lost, or buried at the bottom of a bag, transhuman devices are always with the player, as they are integrated with the body, therefore are always available for play. Designers can support this by highlighting to players that there is always an opportunity for play. This highlighting is important, as due to the transhuman device being integral to the body, players can "overlook" that they have this device [6].

For example, in the Guts Game, the player may receive a "challenge" task to change his/her body temperature sent by the other player at any time. This feature was designed to increase awareness in players of opportunities for play, in case they have "forgotten" that they still have the pill inside their bodies. One risk is that it could interrupt daily life. Players could just ignore the challenge if the timing was not convenient, with no loss of points.

With the xNT, there is currently no highlighting of the opportunity for play. However, we can envision future iterations where systems can highlight the presence of these tags to invite others to play. For example, a system could detect if multiple people within a crowd carry an xNT, such as at a conference's social gathering. The system then highlights to participants wearing an xNT (for example through directed audio beams), that there are others "like them" in the crowd,

and the game challenge is to guess who they are. Players stand closely next to their "guess" and secretly swipe their phone across the other person's hand to detect if a sensor is present. If they are wrong, they are "punished" by the social awkwardness of having stood too close to a stranger, having invaded their intimate zone [27].

With the Bebionic, the "always available" characteristic provides opportunities for play that could be leveraged by implementations that afford the user to engage in some superhuman-like activities during their daily routines, such as spectacularly crushing tin cans or making playful hand gestures such as an exaggerated Vulcan salute from Star Trek. This could offer playful engagement with the added possibility to feel empowered.

Design strategy 2: Engage transhumanism to support players playfully learning about their bodies

This strategy is concerned with the extent to which the system draws on the ability of transhumanism to support players playfully learning about their bodies. We believe this is important as gaining an increased understanding of one's body can lead to an increased appreciation of the body, subsequently facilitating a better self-understanding [28].

In the Guts Game study [40], players reported that the game helped them learn about their body temperature and what affects it (such as playing sports). For example, a participant said: *"I just assumed my body stayed at 37 degrees all the time but it apparently doesn't. It's interesting to learn about what makes my body temperature changes"*.

The online content (such as user reports and FAQs) surrounding the practice of using the xNT suggests that potential users are interested in learning about how their body would respond to such a device. For example, users are interested in how their body would react to implanting or removing the chip and how the tissue context affects use [9]. Users are also curious whether it is visible under the skin [10]. Although there is only limited playfulness here, it seems transhumanism could facilitate a sense of curiosity that might in turn support playful learning about the body.

With the bionic hand, the designers could aim to facilitate not only learning how to operate the "new" hand (as it takes some training [30]), but also users learning about the limitations of the other hand. For example, the bionic hand could, during the training of how to rotate it, ask users to also rotate their other hand as part of a game to learn about their existing bodily capacities.

Design strategy 3: Engage transhumanism to support players reflecting on what it means to both have a body and be a body

This strategy is concerned with the extent to which the system supports reflection on what it means to both have a body and be a body. Prior work [24] has highlighted the importance of realizing that human beings both *have* a body and *are* a body. This was underlined by using the German words "Körper" and "Leib" that allow seeing the body from two perspectives: from a material perspective ("Körper") and a lived perspective ("Leib").

We believe that transhumanism offers a unique opportunity to support players engaging with these two

perspectives, as the user usually begins to examine the technology (for example, when considering purchasing it) taking on a "Körper" perspective by asking material questions such as: "Will the size fit me?". This "Körper" perspective considers the body in a similar manner as one would consider the "body" of a car when buying an accessory ("Is this accessory compatible with my car model?"). The user might then try on the transhuman device, and through this first-person "Leib" perspective [37], he/she might ask questions such as: "How does it make me feel?".

In the Guts Game study [40], participants were asked about their instrumental and experiential perspectives on their body and how the game affected it. This seemed to facilitate a reflection on what it means to both have a body and be a body. Designers could include such an approach even if they do not conduct a formal study, for example by encouraging self-reflection through a diary that asks about participants' instrumental and experiential engagement.

We find that user reports on the xNT, as often posted online, are seemingly used to reflect on both instrumental and experiential aspects. For example, Shanti Korporaal talks about using such a chip to open her gym's gate [2]. But she also talks about how she feels about the chip, which enabled her to get engaged in activities she would not have had without such a chip, for instance, she was invited to star at the launch of the Deus Ex video game [31].

Devices like the bionic arm appear to support reflection on what it means to both have a body and be a body, with user testimonials suggesting that prosthesis are not only about what functionality they have, but also how users feel about them [3]. We believe supporting these two perspectives through play is an intriguing area for future work.

CONCLUSIONS

There is an ongoing interest in the intersection between interactive technology and the human body, fueled by technological advancements. In particular, we note a trend in integrating the human body with interactive technology, often described under the term transhumanism. We find that "play" seems to be underexplored in discussions around transhumanism and propose to also engage with transhumanism from a perspective of play. We highlight the need for critical reflection on the potential but also dangers of engaging with transhumanism and play. As with any other new technology, it has the potential to trivialize play as well as utilize it for immoral purposes. For example we can imagine corporations offering transhuman devices for play, yet secretly collect intimate bodily data. To begin such a discourse, we hope our work can serve as initial starting point by offering the first structured approach towards understanding the coming together of transhumanism and play.

In summary, we hope our work can encourage transhuman technology designers and developers to consider how their expertise could be useful for the creation of playful experiences. Ultimately, with our work, we aim to contribute to a more playful transhuman future.

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