

The impact of persuasive technology in video gaming on users' well-being

A Research Paper Submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia – Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

By

Jacqueline Mazzeo

Spring 2021

On my honor, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Signed: Jackie Mazzeo Date May 11 2021
Jacqueline Mazzeo

Approved: _____ Date _____
Richard Jacques, Department of Engineering, and Society

Introduction

Technology has the power to change what we do and how we think. Technology can be purposefully designed to be persuasive and produce, at times, intentional destructive effects on end users. Persuasive technology describes “any interactive computing system designed to change people’s attitudes or behaviors,” (Fogg, 2011). Within the context of video gaming, we can identify persuasive properties and strategies that designers intendedly incorporate in their designs. Video games are designed to fulfill the motivational needs of the users and include extensive interactivity and anthropomorphic feedback. With the advancement of technology and accumulation of user data, video games today cause a concern for the behavioral and attitudinal changes of end users, (Khaled, 2008). Designers’ motivations, methods, and outcomes have real world effects on their users to encourage longer game playing time and customer loyalty, (Choi, 2004). As technology continues to advance, there is a fear that the implications will be detrimental and long lasting. Likewise, there is a gap in literature on the intersection of persuasive technology, gaming, and potential dangers.

This STS research paper aims to discuss and identify how persuasive technology in video gaming is growing into a more dangerous strain with the usage and collection of personal data. This STS paper mainly focuses on the social construction of technology theory that argues, “technology does not determine human action, but that rather, human action shapes technology” (Klein & Kleinman, 2002). Researcher Dongseong Choi provides evidence for the definition of the social construction of technology theory. Choi argues that the response end users have to persuasive technology: prolonged engagement time, social influence, customer loyalty and behavior changes, contribute to end users preferring said persuasive technology to

non-persuasive technology (Choi, 2004). Companies are incentivized to create aesthetic, easy to use, and relatable technology because these technology products sell better. Technology that is relatable is also persuasive, meaning the technology relates to its users by identifying and fulfilling users' motivational needs. Satisfying players, the end user, will increase sales, popularity, and playing-time. The impact seen on end users when persuasive technologies are used influence designers to adapt these tactics and include persuasive tactics more frequently, expressing just how valuable human action is in shaping technology. This paper will investigate video game design tactics similarity, immersion, gratification, praise and feedback; then show their impact on those who interface with this technology. This will be done with a combination of case-study investigations and survey of existing work.

The Application of Big Data

Game designers can allot their design using data-driven decision-making. There is an intersection of Big Data and consumer behavior that expresses gamers' media consumption and choices (Hofacker et al., 2016). Big Data comes from the detailed digital records setup in various types of purchase environments. Data is pulled from purchase activities on mobile application, in-store, social media and online browsing. Today, users consume digitally more than ever. Data collected contains users purchasing and browsing actions, but not why the consumer did what they did; the data contains only what action occurred. Psychological and emotional studies work to explain and build user profiles on consumers based on the aforementioned collected data. Game designers can better understand their players, and can pull information from these user profiles to create personalized, highly addictive games. Designers use persuasive design elements that are prevalent in technology, not limited to gaming. These design elements include

similarity, immersion, feedback, praise and gratification (Fogg, 2011). These tactics are intended to encourage increased playing time and customer loyalty.

Similarity Tactic

The similarity tactic is used when designers create technology with anthropomorphic traits similar to end users' personalities. To display and analyze this idea, we will investigate a study by Brian Fogg. Fogg, an American social scientist and a research associate at Stanford University, completed an experiment in which participants were tasked with interacting with a computer program similar to a chatbot. Half of the chatbots were given dominant personality traits and the other half were given submissive personality traits. Half the participants identified with a dominant personality and the other half identified with a submissive personality. The participants were given a scenario and had to work with their computers to rank a list of items based on priority. "After we ran the experiment and analyzed the data, we found a clear result: participants preferred working with a computer they perceived to be similar to themselves in personality style," (Fogg, 2011, p. 97). During the time of big data, it has never been easier for gaming companies to build user profiles to better understand their audience. Video game designers purposefully design with end users' generalized opinions, attitudes, and styles to make their games as relatable as a human does. All verbiage on-screen and spoken while playing can be tailored to the language and personality of the gamer. Likewise, designers can utilize demographic factors to further the appeal of their product

Designers can take advantage of knowing their users too well. Designers know what type of clothes their users wear, music they listen to and use trends that are popular in their users' age and gender demographic. Data can also identify and pinpoint what their users find attractive and in-style, what slang words users say, what fantasies users' desire and their level of social

resources. Social resources are social skills, social anxiety, quality, and quantity of offline friendships. The social compensation hypothesis is about how online video game play may attract people with lower levels of social resources. Designers know to integrate this information into the design of the game and create online gaming spaces with particular qualities such as visual anonymity and few non-verbal cues (Kowert, 2015). Video game designers are purposefully designing with the knowledge of end users' opinions, attitudes, and styles to make their games more successful. Designers continue to take their games' success to the next level with other tactics such as immersion.

Immersion Tactic

Video games are a big part of today's children and young adults' digital experiences. Designers take advantage of knowing their audience by using illusory design elements and fulfilling user needs, (Fogg, 2011). These engaging elements of video game design contribute to a paradigm known as user immersion. Using role-playing video games as an example, it was found that,

“Just as in real life, players learn through planning, decision making, and personally witnessing cause and effect relationships. Role-playing likely increases a player's personal stake in a video game's outcome. In part, role-playing performances combine the emotion of storytelling with the power of character immersion,” (Baranski, 2008).

Video games can very easily mimic the real world. When in role-playing games, we see user satisfaction because a user's motivational goals are met. One motivational goal of users is competence, meaning the user feels he/she has the knowledge, skills, and strength to complete gaming tasks and progress in the game world. It is seen that “satisfying players' need for

competence may therefore be the key to increasing the persuasiveness of persuasive games,” (Reit, 2018).

Game worlds and paths are designed to promote user satisfaction to meet designers' goals to maximize playing time and user retention. This means game makers work to avoid making players feel lost and confused. Feeling lost and confused will cause users frustration and irritation. Players that are stuck may eventually give up and stop playing the game.

However, a deeper view into gamer psychology reveals a tradeoff between difficulty and engagement. Designers understand that by challenging a player, players will be stuck and be forced to repetitively and continuously re-try the task in order to progress in the game world. This will actually increase playing time. Players that readily progress through levels or game stages may get eventually bored. Therefore, there must be a balance between how challenging and/or easy to create a game. Additionally, a challenging task or level may increase user engagement, leading them to interact with other players in the game community on online forums, in-game chat rooms, or offline. Game designers can curate the perfect difficulty of a game and its levels by understanding the competence level of their users. This can be comprehended by analyzing user data to deduce the user's critical thinking skills, intellectual and emotional levels. Designers are aware that their designs are persuasive and influential in creating addictive platforms that in the moment and over time transform users' behavior and attitude.

Another motivation goal is social relatedness, the ability to make social relationships and complete tasks collaboratively. Fulfilling these goals governs end user behavior. For example, “researchers have found that players perceive their online contacts to be as ‘real’ as any ‘real-life’ friendship, and they provide social capital, satisfy social needs that have not been met in offline contexts...” (Kowert, p. 9). This goes back to the social compensation hypothesis.

Players with inferior social skills may receive even more fulfillment from video games that encourage online social relationships and teamwork. Examples of design elements and functionalities that carry out the social relatedness user goal include in-game chat rooms, player organizations, public and private lobbies with audio communication and online forums. In addition to in-game communication amongst players, there are various third party platforms that facilitate collaboration and an exchange of tips and tricks. Game companies can closely monitor online platforms and utilize data mining and artificial intelligence to collect information and better understand their users. With this information, game designers can build in more favorable and requested components into the current or sequel game, to continue to satisfy users' goals and dramatically lengthen playing time and engagement. While advantageous to companies in the video game industry, there are detrimental consequences for end users spending copious amounts of time online.

Gratification, Praise and Feedback

Designers incorporate both gratification and praise into their video games to relate to their users and be more persuasive. Gratification is the pleasurable emotion reaction not just specific to gamers, but to all humans, in response to the fulfillment of a desire, goal, or social need. This is not a new idea, nor is it unintended. The Uses and Gratifications Theory (U&G) was first developed in research in the effectiveness of radio communication in the 1940s (Huang, 2008). U&G intends to gratify the identified physiological needs that motivate the user. Designers identify these physiological needs using data analysis and up-to-date demographics related to their users. U&G also provides a “user-level perspective rather than a mass-exposure perspective” (Rayburn, 1996). Appealing to the psychological layers of a user transforms video gaming into much more than entertainment, which is one of the many reasons the video game

industry will likely remain the fastest growing current form of media. The video game industry is a multibillion-dollar, worldwide enterprise (Kowert, 2015). Gratification and other persuasive tactics produce effectiveness in getting users to play for prolonged times, purchase boosts, add-ons, packages and the company's video game sequels and other products.

An example of praise can be seen in a slot machine game called Banana-Rama. "This slot machine has two onscreen characters—a cartoon orangutan and a monkey—whose goal is to persuade users to keep playing by providing a supportive and attentive audience, celebrating each time the gambler wins," (Fogg, 2011). The positive and encouraging feedback generated by the slot machine convinces the end user to continue playing in the same way as if a human were providing the feedback. Gratification, praise, and feedback are valuable tactics to keep players engaged, although there are damaging effects from prolonged engagement.

The Impact on Users

Technologies, especially platforms that incorporate personal and population data into their design become addictive to end users. These technologies introduce dependency, detachment, tolerance, compulsion and withdrawal symptoms related to interpersonal and health-related problems, and time management (Chen & Chang, 2008). The designers creating an immersive, enjoyable, and satisfying user environment may be unintentionally taking advantage of end users and negatively affecting their mental health.

Darren Chappell studied the highly addictive nature of Massively Multiplayer Online Role-Playing Games (MMORPGs) and specifically studied the video game EverQuest. Chappell evaluates online forums to learn more about how EverQuest has come to dominate users' lives because of excessive playing (Chappell, 2006). Findings have included that "most of the individuals in this study appear to display (or allude to) the core components of addiction such as

saliency, mood modification, tolerance, conflict, withdrawal symptoms, cravings and relapse.”

“[Users] used EverQuest as a way of altering their mood state, they built up tolerance to the activity over time, and they got withdrawal symptoms if they were unable to play the game and/or they try to cut down the amount of time that they spend playing the game” (Chappell, 2006, p. 214). Chappell’s findings exhibit users having real-life, physical symptoms related to their online gaming.

In addition to addiction-related ailments, players gaming for extended periods may experience deficits in social functioning and a hindering in their offline relationships. This is because video game users are spending less time than non-video game users socially interacting in an offline setting. Although, this can be said for any pastime, even academic and health enhancing activities. The difference between video gaming and other pastimes is that users have the opportunity to maintain online relationships. This can be further explained by the social displacement hypothesis, which assumes that “online and offline social interactions are zero-sum,” (Kowert, 2015, pp. 2-3). This means, “online gaming does not directly cause social deficits, but rather, social deficits are an indirect consequence of play caused by the displacement of offline social interaction,” (Kowert, 2015, p. 3). Video gaming with multiplayer campaigns can erode users’ well-being through the dismantlement of offline relationships. This is evident after the completion of a one-month long study by Dimitri Williams. Williams is a professor at the University of Southern California with extensive research focused on the social and economic impacts of online games. He completed multiple studies relevant to the impacts of online games and social capital.

One study was completed with 378 participants solicited via online message boards. The participants were mailed a copy of the game and told to play for at least five hours a week. This

was a month-long study with findings “that the more social online players began to isolate themselves overtime leading to an erosion of pre-existing friendships,” (Williams, 2006). This is because online relationships cause players to place a higher value on their in-game social contacts. Users return to the video game world day after day and expect to interact with their online peers, whom users have grown to have a relationship with. This results in a drop in physical contact. From the study, participants displayed drops in physical contact by reporting declines in how frequent friends and family came to visit, and how often participants left to visit friends and family (Williams, 2006). This displacement of in-person social connection for offline alliances is toxic for an individual’s social wellness. As a strategy to increase the revenue and popularity of their product, companies are ignoring the cost persuasive and addictive technology has on its end users.

Conclusion

Persuasive technologies used in game worlds have real world impacts on their users. Video game designs are intentionally created to be addictive to its users through the introduction of persuasive properties and strategies as discussed throughout this review. Strategies discussed include similarity, immersion, gratification, praise, and feedback. When paired with the collection of and insertion of personal data into game design, these strategies contribute to the wild success of video games at the cost of their users’ wellness. These tactics create games with features that are increasingly more situational to the characteristics, ideals, and trends of the game’s players. Users will continue to suffer unknowingly from the manipulation of the gaming industry.

References

- Baranowski, T., Buday R., Thompson D., Baranowski J. (2008). Playing for Real: Video Games and Stories for Health-Related Behavior Change. *American Journal of Preventive Medicine*, Volume 34, Issue 1, Pages 74-82.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2189579/>
- Chappell, D., Eatough, V., Davies, M. N., & Griffiths, M. (2006). EverQuest—It's Just a Computer Game Right? An Interpretative Phenomenological Analysis of Online Gaming Addiction. *International Journal of Mental Health and Addiction*, 4(3), 205-216.
<https://link.springer.com/article/10.1007/s11469-006-9028-6>
- Chen, Chi-Ying & Chang, Shao-Liang. (2008). An Exploration of the Tendency to Online Game Addiction Due to User's Liking of Design Features. *Asian Journal of Health and Information Sciences*.
https://www.researchgate.net/publication/255590068_An_Exploration_of_the_Tendency_to_Online_Game_Addiction_Due_to_User%27s_Liking_of_Design_Features
- Choi, D., & Kim, J. (2004). Why People Continue to Play Online Games: In Search of Critical Design Factors to Increase Customer Loyalty to Online Contents. *CyberPsychology & Behavior*, 7(1), 11-24.
<https://pdfs.semanticscholar.org/a044/7444276ca19ba1bb98d6f9a53675c659e9be.pdf>
- Danis, C., & Boies, S. (2000). Using a technique from graphic designers to develop innovative system designs. *Proceedings of the Conference on Designing*

Interactive Systems Processes, Practices, Methods, and Techniques - DIS '00.

<https://dl.acm.org/doi/epdf/10.1145/347642.347657>

Fogg, B. (2011). *Persuasive technology using computers to change what we think and do*. Amsterdam: Morgan Kaufmann , an imprint of Elsevier Science.

<https://dl.acm.org/doi/pdf/10.1145/764008.763957>

Hacq, A. (2020, February 11). Everything you need to know about Design Systems.

<https://uxdesign.cc/everything-you-need-to-know-about-design-systems-54b109851969>

Hofacker, C.F., Malthouse, E.C. and Sultan, F. (2016), "Big Data and consumer behavior: imminent opportunities", *Journal of Consumer Marketing*, Vol. 33 No. 2, pp. 89-97. <https://doi.org/10.1108/JCM-04-2015-1399>

Huang, E. (2008), "Use and gratification in e-consumers", *Internet Research*, Vol. 18 No. 4, pp. 405-426. <https://doi.org/10.1108/10662240810897817>

Khaled, R. (2008). *Culturally-relevant persuasive technology* (Unpublished master's thesis). Victoria University.

<https://researcharchive.vuw.ac.nz/xmlui/bitstream/handle/10063/365/thesis.pdf?sequence=1>

Klein, H., & Kleinman, D. (2002). The Social Construction of Technology: Structural Considerations. *Science, Technology, & Human Values*, 27(1), 28-52.

<http://www.jstor.org/stable/690274>

Kowert, R. (2015). *Video Games and Social Competence*. Routledge.

Rayburn, J.D. (1996), "Uses and gratifications", in Salwen, M.B. and Stacks, D.W.

(Eds), *An Integrated Approach to Communication Theory and Research*, Lawrence Erlbaum, Mahwah, NJ, pp. 145-63.

Riet, J. V., Meeuwes, A. C., Voorden, L. V., & Jansz, J. (2018). Investigating the Effects of a Persuasive Digital Game on Immersion, Identification, and Willingness to Help. *Basic and Applied Social Psychology*, 40(4), 180-194.

<https://www.tandfonline.com/doi/full/10.1080/01973533.2018.1459301>

Song, I., Larose, R., Eastin, M. S., & Lin, C. A. (2004). Internet Gratifications and Internet Addiction: On the Uses and Abuses of New Media. *CyberPsychology & Behavior*, 7(4), 384-394. <https://pubmed.ncbi.nlm.nih.gov/15331025/>

Williams, D. (2006), Groups and goblins: The social and civic impact on online games. *Journal of Broadcasting and Electric Media*, 50m 651-681.

https://www.researchgate.net/publication/238400701_Groups_and_Goblins_The_Social_and_Civic_Impact_of_an_Online_Game

Williams, D. (2007). The impact of time online: Social capital and cyberbalkanization. *Cyberpsychology and Behavior*, 10(3), 398-406.

https://www.researchgate.net/publication/6243744_The_Impact_of_Time_Online_Social_Capital_and_Cyberbalkanization