

Serious Games for a Sustainable World: Design and Implementation of Values-based Digital Games for the Young

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ABSTRACT

The vision and aim of this research is to combine digital game design theories with decision-making theories to propose artefacts for the creation, analysis, and implementation of values-based digital games for the young. In particular, to propose a platform to guide the values-based design and implementation of games. Studies show that many digital games include violence and about half of the violent incidents have negative repercussions such as increased aggression, serious injuries or death in the "real" world. This influential nature of digital games therefore calls for research on ways in which digital games can be leveraged instead. One way is to use digital games to foster positive values, including sustainable practices. This is especially relevant to young players that are considered most malleable. Digital games present constant opportunities for decision-making, eliciting and influencing players' decision-making models. As players interact with games, they go through several decision-making cycles, each time, subconsciously reviewing the consequences of their actions to guide future decisions. In essence, players' virtual worlds and real worlds start converging and affecting their attitudes, beliefs, behaviors and consequently actions, in either world. This research will use a multi-methodological approach combining qualitative research methods with design science to explore and create tools to guide the design and implementation of digital games for the young. Our ultimate goal and hope is that these tools will help bring about positive changes in individuals, families and organizations to foster a more sustainable world.

Keywords: Serious Games/Digital Games, Sustainability, Values, Young/Early Childhood

INTRODUCTION

Sustainability and sustainable living has been a popular topic of discussion in the last decade, be it among researchers or practitioners. Sustainability refers to practices that enable the survival or preservation of existing systems or processes. There is merit in thinking about every aspect of our life and surroundings "sustainably" – eating well, exercising, managing our finances, managing our social interactions, looking after the environment, among others. Creating a sustainable world begins with fostering the value of being sustainable at an individual level. Values refer to "central desires or beliefs regarding final states or desirable conducts that transcend specific situations, guide the choice and evaluation of our decisions and, therefore, of our conducts, becoming an integral part of our way of being and acting to the point of shaping our character" (Schwartz & Bilsky, 1987). In our day to day lives, we demonstrate and practice these values with the decisions we make, be they major and minor. This research is crafted on the belief that creating a truly sustainable world involves a generational shift. It is something that is best nurtured and fostered in young individuals (ages 0 -8) that will shape the future. Digital games have the potential to facilitate this objective with their prevalence and persuasive nature.

A digital game refers to an activity supported by digital media, and primarily for entertainment, that follows rules, and can be played by one or more people (Kramer, 2000). Specifically, digital games designed for the

purpose of education are referred to as serious games. However, the nature of values and sustainability is such that they may be embedded and fostered through a variety of game types. We therefore use the general term “digital games” for this research. This includes the variety of mobile applications for entertainment that are easily available through ubiquitous devices. Digital games for the early childhood audience are among the most popular and fastest growing categories of games (Shuler, 2009). Further, researchers are increasingly finding that many games are highly influential and persuasive, where virtual interactions and experiences are shaping players’ perceptions and interactions in the real world (APA, 2015; Children Now, 2015; Gentile, 2014; Young & Whitty, 2010), be they positive or negative. Herein lies the opportunity for us to leverage this influence of games. This is particularly relevant for the early childhood (ages 0 – 8) audience, referred to as the “young” in this research. This is because it is the most malleable phase of life (Gentile, 2014; Tootell, Freeman, & Freeman, 2014) where majority of our values, behaviors, attitudes are nurtured. In addition, researchers and parents are realising that teaching children good values and emotional intelligence is more important than teaching them basic literacies. The aim of this research stems from these findings.

Based on preliminary investigation of the research area, the key research problems are:

1. General research on digital games and early childhood is limited when compared to the other age groups (Hwang & Wu, 2012; Judge, Floyd, & Jeffs, 2015). Also, while there is some research on digital games and early childhood, digital games and decision-making, values and decision-making, early childhood and values, and digital games and values, research on the intersection of these is lacking.
2. There is research supporting the importance of considering values in digital games (Barr, Noble, Biddle, & Khaled, 2006; Dijk, 2014; Mehallow, 2010), however, there is a paucity of research on the design of values-based digital games, especially for specific contexts (Flanagan & Nissenbaum, 2014; Martens, Diener, & Malo, 2008) such as early childhood.
3. Research on the implementation, particularly, platforms for creating context specific (early childhood) values-based digital games is lacking.

The research problems and vision lends itself to the following research objectives:

RO1: Identify problems, issues, and requirements for the design of values-based digital game platforms for the early childhood context.

RO2: Propose context specific (early childhood) concepts, models, processes, frameworks, and architectures that fulfil the requirements established in RO1.

RO3: Build a flexible, evolvable, and customisable values-based digital game platform for early childhood that supports the above conceptual artefacts using design science principles; and

RO4: Validate the conceptual and system artefacts using design science and qualitative methods.

In the following sections we first outline the key literature on digital games, sustainability, values, early childhood and decision-making. We then discuss the research design and methodology, research progress and conclusion outlining the key contribution of this research.

LITERATURE REVIEW

Digital Games and Values

As researchers, we believe that game designers and developers must be made aware and take into consideration any values being taught through their games. These could come in various forms and as part of various components and mechanisms of game design. Some of the undesired or less desired values may be engrained in the content that gets used in the game design as well as in the text, audio, imagery and video used within the game. In this instance, the game designer may not even stop to evaluate the values if they are a part of the classical nursery rhymes collections. The nursery rhyme “Johnny Johnny Yes Papa” for example: “*Johnny, Johnny Yes, Papa? Eating sugar? No, papa! Telling lies? No, papa! Open your mouth Ah, ah, ah!*” While it is a fun little nursery rhyme showing interaction between father and child, it introduces the child to the concept of lying had they not known about it. We can argue that to an extent, it demonstrates that lying is ok and even funny. We propose that game designers should therefore specifically consider designing games that demonstrate and foster good values in children.

Decision-Making, Values and Sustainability

One way of teaching values is through the process of decision-making. Let us consider an example of a decision one may be faced with: “Should I open the box without asking or not? In this case, the curiosity of what is in the box may be too overpowering but asking before touching or opening someone else’s belongings may be an important value for the child being faced with this decision.

While decisions are guided by values, they are also intrinsically linked to the concept of sustainability, or more accurately, being sustainable. The main types of sustainability are: personal – practices or beliefs that enable individuals thrive in the world; social – practices or beliefs regarding one’s engagement with people in their surroundings, economic – beliefs regarding a country’s survival and upkeep; cultural – practices or beliefs regarding the preservation of cultural aspects such as customs, language, dressing style; and environmental – refer to one’s beliefs about maintaining and preserving the environment for the wellbeing of both the current and future generations.

Values and Decision-making in Digital Games

Decisions are at the heart of digital game design when teaching this complex and experiential concept of values. It would effective to simulate the consequences of decisions in the virtual world to drive sustainable behavior and decision-making in the real world. In terms of applying decision-making theories to digital games, we find that the nature of decision-making is such that as one experiences similar decisions repeatedly, they become better at making these decisions. This is used in many games. In fact, in majority of the games, the players’ decisions have an impact on a game event later in the game. This may be compared to the five stage model of skill acquisition (Dreyfus, 2004). Further, we note that our decisions are often interrelated, with several repercussions. Langley’s model of decision linkages (Langley, Mintzberg, Pitcher, Posada, & Saint-Macary, 1995) illustrates this interrelated nature of decisions, and may be a valuable tool when considering the design of values-based digital games.

Games	Values
Kokoro	A virtual global community where the goal of the players is to help a society work together by making ethical decisions throughout the game. Some values described in the game include solving conflicts, challenging prejudices and stereotypes, respect, and improving relations. The overarching goal of the game is to promote unity and peace in the world.
Minimonos ¹	A virtual world where kids create their monkey avatars and play mini games. The game is set in nature, encouraging values of looking after the environment and planet.
E-Critter game	This game is aimed at teaching children financial responsibility and personal values to children. It also teaches the values of living within your means (being sustainable financially) and separating needs from wants. Decision-making is not explicitly mentioned but it is clearly at the heart of this game’s mechanisms.
Peek-a-Zoo (part of Duck Duck Moose games)	Teaches kids (ages 1-5) emotions and behaviors. Decision-making is not evident in this game, but could easily be embedded given its nature.
Cool School: Where peace rules	Teaches kids how to resolve conflicts and reduce bullying. The players are empowered to make decisions and choices in terms of their locations and their solutions, and they’re rewarded for making good choices.
Ansel and Clair: Little Green Island	A game about environmental conservation. Kids are presented with environmental issues and are required to solve these.

Table 1: Examples of values-based digital games for the young

¹ This game was closed in 2013.

In terms of values, a preliminary exploration indicates that there are only a handful of serious games that teach values and more complex experiential concepts such as sustainability to the young. Furthermore, of the games that exist, many are not particularly designed for this purpose. They just happen to have subtle, subconscious values embedded in the game. Table 2 outlines some examples of digital games that teach values and explores any decision-making aspects in the game to achieve this.

RESEARCH DESIGN AND METHODOLOGY

This research calls upon different strands of literature: Information systems (design and implementation of digital games), Psychology (development and motivation), and Education (to understand how values are fostered through digital games). The philosophical assumptions guiding this research are a combination of interpretive and critical research due to its exploratory and design nature. A multi-methodological approach has been outlined, adapted from Nunamaker et al. (1991) since it will involve the development of a system. The methodology will combine qualitative research methods (M. Myers, 1997) such as netnography (Kozinets, 2015), interviews and/or focus groups with educators and parents, with design science principles for the design and implementation of system artefacts as well as their evaluation (Hevner et al., 2004).

RESEARCH PROGRESS

In an effort to lay the foundation this research, we have explored various research on the design and implementation of digital games, and in particular, any research that explicitly addresses values in digital games. We have looked at the various components and mechanisms of digital games that need to be considered and addressed in its design and implementation. In terms of mechanisms, in addition to reviewing examples of all the different game design components (Flanagan & Nissenbaum, 2014), a specific mechanism we have explored is scenarios involving decisions. We created a storyline involving a set of decisions in a relatable family context using Chat Mapper™. The scenario is aimed at encouraging the positive attitude of being helpful, kind, and doing things together as a family.

CONCLUSION

This research addresses the research and practical problems of the lack of tools to support the design and implementation of games that are values-based. In particular, there is limited research on the design and implementation of these games for the young. This research therefore identifies the need to explore, analyse and create artefacts to support the design and implementation of values-based digital games for the young.

The nature of this research may contribute to literature on research methods as it considers ethics in Information Systems (M. D. Myers & Venable, 2014). It will also contribute to foundational research (conceptual artefacts such as concepts, models, processes, principles and frameworks) that may be built upon, as well as system artefacts that may be used in practice. These artefacts will form stepping stones for future multi-disciplinary researchers interested in exploring this area. The system artefacts generated through this research may also be leveraged, improved and validated using different scenarios to determine their generalisability and effectiveness.

REFERENCES

- APA. (2015). *Technical violent games*. Washington. Retrieved from <http://www.apa.org/news/press/releases/2015/08/technical-violent-games.pdf>
- Barr, P., Noble, J., Biddle, R., & Khaled, R. (2006). From Pushing Buttons to Play and Progress: Value and Interaction in Fable. *Conferences in Research and Practice in Information Technology Series*, 50, 51–58.
- Children Now. (2015). Talking with Kids™ about Violence. Retrieved November 16, 2015, from <http://www.childrennow.org/parenting-resources/violence/>
- Dijk, T. Van. (2014). *Present or Play*.
- Dreyfus, S. E. (2004). The Five-Stage Model of Adult Skill Acquisition. *Bulletin of Science, Technology & Society*, 24(3), 177–181. <https://doi.org/10.1177/0270467604264992>

- Flanagan, M., & Nissenbaum, H. (2014). *Values at Play in Digital Games*. The MIT Press.
- Gentile, D. (2014). Violent video game effects on thinking and behaviour. Retrieved November 9, 2015, from <http://www.drdouglas.org/>
- Hevner, A., March, S., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly*, 28(1), 75–105.
- Hwang, G.-J., & Wu, P.-H. (2012). Advancements and trends in digital game-based learning research: a review of publications in selected journals from 2001 to 2010. *British Journal of Educational Technology*, 43(1), E6–E10. <https://doi.org/10.1111/j.1467-8535.2011.01242.x>
- Judge, S., Floyd, K., & Jeffs, T. (2015). Using Mobile Media Devices and Apps to Promote Young Children's Learning. In K. L. Heider & M. R. Jalongo (Eds.), *Young Children and Families in the Information Age* (pp. 117–131). Dordrecht: Springer Science + Business Media. <https://doi.org/10.1007/978-94-017-9184-7>
- Kozinets, R. V. (2015). *Netnography*. Wiley Online Library.
- Kramer, W. (2000). What is a game, really? Retrieved April 26, 2015, from <http://www.thegamesjournal.com/articles/WhatIsaGame.shtml>
- Langley, A., Mintzberg, H., Pitcher, P., Posada, E., & Saint-Macary, J. (1995). Opening up Decision Making: The View from the Black Stool. *Organization Science*, 6(3), 260–279. <https://doi.org/10.1287/orsc.6.3.260>
- Martens, A., Diener, H., & Malo, S. (2008). Game-based learning with computers - Learning, simulations, and games. In *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* (Vol. 5080 LNCS, pp. 172–190). https://doi.org/10.1007/978-3-540-69744-2_15
- Mehallow, C. (2010). Teaching Sustainable Values through Serious Gaming. Retrieved from http://www.triplepundit.com/2010/11/teaching-sustainable-values-serious-gaming/?doing_wp_cron=1415237815.1487360000610351562500
- MindTools. (2017). What Are Your Values?
- Myers, M. (1997). Qualitative research in information systems. *Management Information Systems Quarterly*, 21(June), 1–18. <https://doi.org/10.2307/249422>
- Myers, M. D., & Venable, J. R. (2014). A set of ethical principles for design science research in information systems. *Information & Management*, 51(6), 801–809. <https://doi.org/http://dx.doi.org/10.1016/j.im.2014.01.002>
- Nunamaker, J. F., Chen, M., & Titus Purdin. (1991). JMIS systems development in IS research Nunamaker.pdf. *Journal of Management Information Systems*, 7(3), 89–106.
- Schwartz, S. H., & Bilsky, W. (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology*, 53(3), 550–562. <https://doi.org/10.1037/0022-3514.53.3.550>
- Shuler, C. (2009). iLearn A Content Analysis of the iTunes App Store's Education Section, (November 2009).
- Shuler, C., Levine, Z., & Ree, J. (2012). iLearn II: An analysis of the education category of Apple's app store. *Joan Ganz Cooney Center ...*, (January). Retrieved from <http://www.joanganzcooneycenter.org/Reports-33.html>
- Tootell, H., Freeman, M., & Freeman, A. (2014). Generation Alpha at the Intersection of Technology, Play and Motivation. *2014 47th Hawaii International Conference on System Sciences*, 82–90. <https://doi.org/10.1109/HICSS.2014.19>
- Young, G., & Whitty, M. T. (2010). Games without frontiers: On the moral and psychological implications of violating taboos within multi-player virtual spaces. *Computers in Human Behavior*, 26(6), 1228–1236. <https://doi.org/10.1016/j.chb.2010.03.023>