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Design for Transfer

Kuipers, Derek

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Beyond Eyes (2015)

Beyond Eyes is a modern fairy tale about finding courage and friendship. Step by step, uncover an incredible world, carefully guiding Rae, a young blind girl, on a life-changing journey.

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H1: Introduction and Rationale

BLOAD"CAS:",R,

We must have been around 6 years old, my brother and I, when everything was a game to us. Tree houses were sky castles, rafts were pirate ships and everything we built from Lego came to life. We were not alone in this, as to the best of my knowledge all our contemporaries engaged in play back then. Playing was an autotelic experience [1], done without instructions or supervision. We discovered and gave meaning to the world through play. It is said that children learn by playing, and that could well be the case. But at the time, we didn't play to learn something, we just played for fun.

Not long after our tree house construction period, we were the first in our little village with a home computer: an MSX-1 with its sometimes precarious tape recorder. The video games we played on this magical device fitted seamlessly into our fantasy world and virtually extended our playground. It's remarkable how many details I still remember of those video games: the end bosses, the quests and even the music. Even though it was over 30 years ago, the in-game experiences felt real and meaningful. But: was playing those games meaningful? Did I learn anything from playing them? Did it somehow influence my behavior in the now? Somehow I know it did.

For quite some time now serious games are held in high esteem for having great potential for education and learning [2]. Studies on serious gaming offer insights on how these should be designed to facilitate learning, and why they are unique to use in learning situations, e.g., [3,4,5].
These studies share an analytical perspective on such games through trying to understand them, explicating their mechanics, or finding out how they perform juxtaposed to existing approaches. Reality shows that in many cases the serious game lacks the feel of a leisure game and cannot provide the same levels of flow and immersiveness.

Some scholars point out that in general, game research lacks quality [6,7] and that serious games are not more effective in terms of learning than other instruction methods [8]. An often-observed phenomenon is that despite rules and guidelines [9,10], efforts in making a serious game do not result in a good game [11], mostly because the unique motivational features of games are lost in the design process, whilst the foremost reason to use serious games is their alleged motivational appeal [12]. A recent meta-analysis of the cognitive and motivational effects of serious games [13] showed that serious games are not more

motivating than the instructional methods used in the comparison group. This is a remarkable result, keeping in mind that the scientific interest in games as a learning tool stems primarily from the strong motivational properties of a game [14]. This provokes the idea that this inevitably has to do with the design of these serious games themselves.

If game-based learning is regarded as an emergent paradigm of digitally mediated learning [15,16] in formal and professional contexts, what conceptual work can the design of these games be based upon? Why do so many serious games in Health hardly resemble the games I grew up with? If good video games are regarded as learning machines [11], it seems justified to go into more detail on how to keep them good, also as a serious game. Broadening the field of education with technologies such as video games not only raises questions on their appearance and mechanics, but surely needs rigorous research on how serious content can be integrated in a game without harming the unique features games offer for learning, since the connection between game design with a focus on entertainment and instructional design with a focus on learning is not a natural one [13].

Simulations and Games

It is important to be clear about the distinction between simulations and games. Key features of simulations are that they represent real-world systems [17], whereas games do not have to. The term game-like interventions used throughout this thesis refers to the space between simulations and games: game-like simulations or simulation games. The past two decades have seen rapidly growing interest in using simulation for purposes of improving patient safety and patient care through a variety of applications [18], but games for Health hardly seem to gain a foothold in Health education.

Design for Transfer

This thesis argues that the results achieved with games and game-like interventions are not so much due to the capacities of the medium itself, but are diminished due to persisting difficulties in, from an instructional perspective, making existing learning content suitable for use in games. I am giving here a somewhat exculpatory version of reality, with the aim of highlighting the issue at hand. Transfer theory distinguishes between mere learning and transfer [19]. Mere learning is about remembering knowledge, with the aim of passing a test.

Often this knowledge is, in fact, de-contextualized knowledge and can be seen as the findings of someone else. The learner only has to take note of it and try to remember and reproduce it as correctly as possible. A test environment can be seen as a target context, but that is not what transfer theory is about. The recontextualization of mere knowledge in a simulation is based on -with simulations being seen as representations of real-world systems- imitating the source context as accurate as possible. When simulating an operating room or following medical protocols, it is of the utmost importance that the learning within the simulation context matches the required competencies needed in the target context. In an almost self-evident way, this thinking about learning leads to the simulations we know from Health, the army or aviation: learning occurs via the road of literal transfer.

The difficulty of applying learning content in games depends on the way in which this explicit, mere knowledge is given a place in the game itself. When we think of mere knowledge as a derivative from an existing context, and we consider the game as a new context, this mere knowledge must be recontextualized. Placing mere knowledge as is in serious games leads to flow-breaking pop-ups, textual interventions during game-play and quiz-like games. With the preservation of the unique motivational and immersive properties of games in mind, the focus of this thesis is on design for figural transfer by metaphorical recontextualization of mere knowledge, for the purpose of learning via the road of figural transfer. The reason for further exploring this subject is the assumption that metaphorical recontextualization of mere knowledge fits in a more natural way with how learning takes place in games. If in-game learning occurs by figural transfer [20] using metaphorical recontextualization can be seen as a key element for success in learning and game-play. This defines the premise of this thesis and in case of proven effect and feasibility, a focus on figural transfer contributes to the field of serious gaming research by adding a new possibility in approaching designing serious games.

The results and explorations of this dissertation may be of interest to Health education innovators, curriculum developers and Health experts who are involved in the development of serious games and game-like interventions. In addition, this research hopes to contribute to the discourse regarding the design of serious games in general and thus also to be relevant for game designers outside Health contexts.

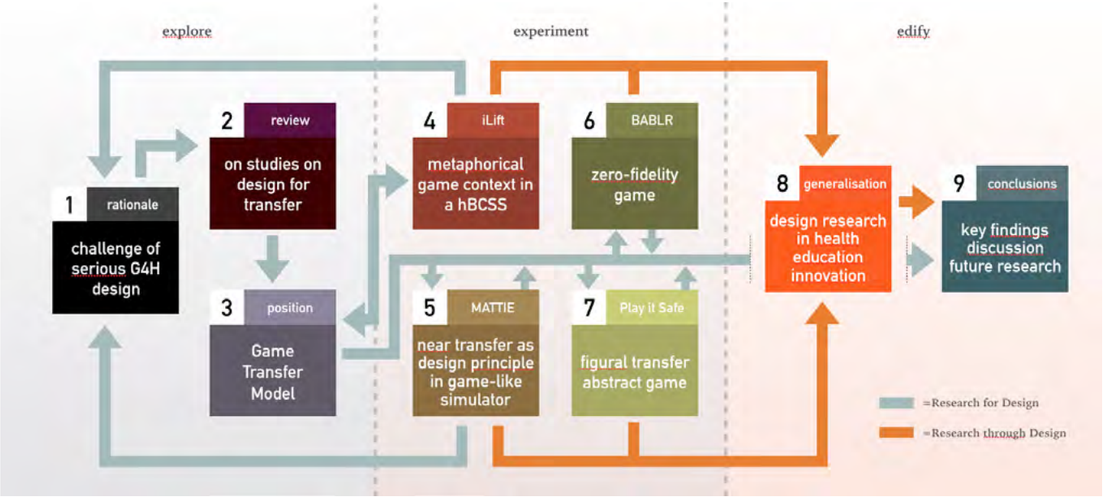
Outline of the thesis

Figure 1 provides a schematic overview of the following chapters and their interrelationships. The chapters can be divided into three themes (explore, experiment and edify), which are explained in more detail below. The image shows two tracks, where the blue route involves the exploration, conceptualization, and application of transfer theory in games for Health, the orange route describes the by-catch of the design research and the unforeseen effects of the gaming artifacts as boundary objects in the social system for which the game-like interventions are designed.

EXPLORE

In a systematic review, **Chapter 2** describes the literature found specifically on the second class of transfer types in the design of serious games and simulations. Focusing on game-like interventions for Health and Health care, this study aimed to (1) determine whether the second class of transfer is recognized as a road for transfer in game-like interventions, (2) review the application of the second class of transfer type in designing game-like interventions, and (3) assess studies that include second-class transfer types reporting transfer outcomes.

Figure 1: a schematic overview of the chapters in this thesis in their mutual relationship.



Building on the findings of the previous chapter, **Chapter 3** provides an in-depth exploration of the use of Design for Transfer in simulations and serious games, aligning associated concepts in the Game Transfer Model (GTM). It describes the importance of conceptual continuity in serious game design, defined by the congruence of fidelity-elements and elaborates on the differences between realisticness and realism. Furthermore, this article coins the term fidelity dissonance as a possible influential factor in the problem of making serious games good games.

Because almost no games for Health were found that were deliberately designed on the basis of a desired or expected transfer type, within this thesis the possibilities of Design for Transfer are explored through a number of cases. By means of design research, game-like interventions are designed for a number of Health-related contexts, all with a conscious transfer-focused approach.

EXPERIMENT

Chapter 4 describes the substantiation, development, and evaluation of a serious game as an essential part of a Health Behavioral Change Support System (hBCSS). The prototypical game BackSpace is designed to facilitate figural transfer of a specific form of behavioral change in order to prevent low back pain in nurses. Data gathered in the final field test showed an in-game training effect, causing players to exhibit correct techniques for static lifting and transferring techniques but also revealed the necessity for future social system development, especially regarding intervention acceptance. Social system factors showed a strong impact on the game's persuasive capacities and its autogenous intent.

Chapter 5 delineates the conceptualization and development of an assistive application that focuses on learning social problem-solving skills for adolescents with a mild intellectual disability. This article describes and substantiates a number of meticulously made design choices to bring together target groups, learning objectives and environmental variables in a game-like intervention for psycho-education. A guiding principle is a design-for-transfer requirement, bridging the transfer problem by instigating a near transfer approach in alignment with the possibilities of the target group.

In the systematic review, we found that in games for Health a distinction is made between high fidelity and low fidelity. In fact, this distinction is a major design decision, because it directly translates into the design of the game itself. Second class transfer could possibly become manifest in a low fidelity design because abstractions or metaphorical recontextualization do not necessarily have to be created with high fidelity. The reasons for choosing low fidelity in games for Health turned out to be different: reducing cognitive load by omitting detail, lowering production costs or a focus on training skills. In addition to the distinction in figural and literal transfer, design choices with regard to fidelity are rarely explained, argued or consciously utilized.

Chapter 3 describes the importance of congruence of these three fidelity types: physical fidelity, functional fidelity and psychological fidelity, in which the basic idea is that the level (low, middle, high) of these fidelity types can differ from each other independently, as long as there is conceptual continuity in the game design. This is the starting point for Chapter 6.

In **Chapter 6** a prototype of a so-called zero-fidelity simulator is developed with the aim of discovering whether a learning experience can be elicited with psychological fidelity as the sole carrier. With physical and functional fidelity limited to an absolute minimum (hence the indication zero-fidelity), the transfer can only take place in a figurative way: the learning context exists only in the head of the player. Building on the experience gained in underpinning and investigating the gaming artifacts for Health in the previous studies, this chapter also introduces a framework for conducting design research into serious games.

Chapter 7 describes the design choices and theoretical constructs that have led to the development of an occupational safety game, going by the name Play it Safe. Play it Safe is a tower defense game that uses situational data collected by employees during their daily work, to impact the parameters of the video game. The game, as a behavioral change support system (BCSS), utilizes metaphorical re-contextualization to create parameters for similar decision making encountered in the work environment and implicitly reinforce the training of the STAR protocol and conservative decision making. Play it Safe aims to improve employees' situational awareness, creating a shared mental model and bottom-up accountability, meant to improve and align (shared) safety behaviors.

EDIFY

Chapter 8 aggregates lessons learned from earlier chapters and addresses the problem of the classical conception of implementation in design projects. It describes a novel framework for future design research projects for digital innovation in Health. Moreover, designers of Health curricula as well as educators in Health innovation are called upon to address the transformation of the social system as an integral part of a design process for successful integration of the developed artifacts.

The essence and conclusions of all chapters will be summarized in **Chapter 9** including a modest draft on future perspectives in Design for Transfer for games for Health.

References

1. Jackson SA, Marsh HW. Development and Validation of a Scale to Measure Optimal Experience: The Flow-State Scale. Journal of Sport and Exercise Psychology. 1996;18: 17–35.
2. Annetta LA. Video Games in Education: Why They Should Be Used and How They Are Being Used. Theory Pract. 2008;47: 229–239.
3. Gee JP. What video games have to teach us about learning and literacy. Computers in Entertainment. 2003;1: 20.
4. Shaffer DW. How Computer Games Help zaChildren Learn. 2006.
5. de Freitas S, Maharg P. Digital Games and Learning. Bloomsbury Publishing; 2011.
6. O'Neil HF, Wainess R, Baker EL. Classification of learning outcomes: evidence from the computer games literature. Curriculum Journal. 2005;16: 455–474.
7. Baranowski T. Games for health research—past, present, and future. Prävention und Gesundheitsförderung. 2018; doi:10.1007/s11553-018-0657-y
8. Clark RE, Yates K, Early S, Moulton K. An Analysis of the Failure of Electronic Media and Discovery-Based Learning. Handbook of Improving Performance in the Workplace: Volumes 1-3. 2010. pp. 263–297.
9. De Castell S, Jenson J. OP-ED Serious play. Journal of Curriculum Studies. 2003;35: 649–665.
10. Wouters P, van Oostendorp H, Boonekamp R, van der Spek E. The role of Game Discourse Analysis and curiosity in creating engaging and effective serious games by implementing a back story and foreshadowing. Interact Comput. 2011;23: 329–336.
11. Gee JP. Learning by Design: Good Video Games as Learning Machines. E-Learning and Digital Media. 2005;2: 5–16.
12. Malone TW. Toward a Theory of Intrinsically Motivating Instruction*. Cogn Sci. 1981;5: 333–369.
13. Wouters P, van Nimwegen C, van Oostendorp H, van der Spek ED. A meta-analysis of the cognitive and motivational effects of serious games. J Educ Psychol. 2013;105: 249–265.
14. Garris R, Ahlers R, Driskell JE. Games, Motivation, and Learning: A Research and Practice Model. Simul Gaming. 2002;33: 441–467.
15. Prensky M. Digital Natives, Digital Immigrants Part 1. On the Horizon. 2001;9: 1–6.
16. Squire KD. Video game–based learning: An emerging paradigm for instruction. Performance Improvement Quarterly. 2008;21: 7–36.
17. Crookall D, Saunders D. Communication and Simulation: From Two Fields to One Theme. Multilingual Matters; 1989.
18. Gaba DM. The future vision of simulation in health care. Qual Saf Health Care. 2004;13 Suppl 1: i2–10.
19. Salomon G, Perkins DN. Rocky Roads to Transfer: Rethinking Mechanism of a Neglected Phenomenon. Educ Psychol. Routledge; 1989;24: 113–142.
20. Royer JM. Theories of the transfer of learning. Educ Psychol. Routledge; 1979;14: 53–69.