

The gameplay challenge in combining learning and computer games

1 Research focus

What traditionally binds games and learning together is the desire for learning to become more entertaining. This is the first argument brought forward by researchers, educators and teachers in the field and, only secondarily is the quality of learning through games discussed. In this sense, computer games to a large degree follow other media surges. It seems that every new media invention is bound to go through a stage of being considered of potential high value for educational purposes, where you combine the magic of the new media with the traditional need for conveying information to new generations. It has been so for the book, television, cinema, computer and lately the computer game is warranting still more attention.

Although games are in some senses like other media, they are different in their potential for interaction. When computer games work they draw the users into the experience, makes him loose sense of time and place, and put extraordinary strain on the users concentration, focus and energy. Games challenge the user to his limit and the user loves it. For every action, the game demands a counter-action – a constant and high-paced ping-pong. This strain leads some people to compare games with sports. A phenomenon that makes researchers and educators believe in the learning potential of games and its superiority compared to other media. This despite the evidence that computer games can provide a better learning experience than other learning forms is ambiguous.



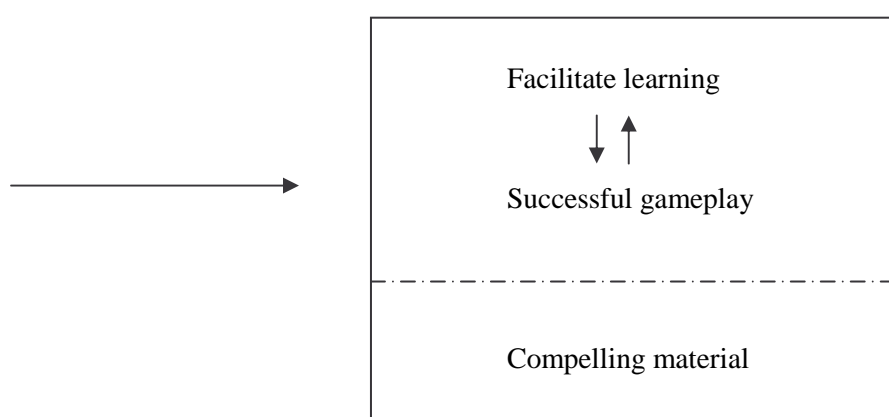
Europa Universalis II: It is one of the best attempts of constructing learning games with compelling material.

The desire to use computer games for learning purposes is as old as the fear for the violent content in games and dates back to when the first games became popular among a wider audience in the late 1970's. Both learning and violence are a part of the same story. When addressing violence in games the fear is that kids will pick up unhealthy behavior from the games. It is this presumed link between games and reality that we try to exploit and control when talking about learning in games: How can we make sure that what goes on in the games are transferred to other contexts. A natural extension is the discussion whether it is possible to construct games that are both entertaining, engaging and have learning potential.

With the current development in games and notions like interactivity, emergence, immersion, narratives, virtual worlds, virtual reality and increased realism, we are moving back to a world of doing. We are seeing games that could be real alternatives to real life learning especially considering that the skills needed to get on in real life to a higher degree require symbolic and abstract processing. Today the majority of people have no use for learning how to saw, use a hammer, build ships or similar practical skills – but rather symbol manipulation. Throughout the project, this form of learning will be explored. Not only establishing that this kind of learning take place but also how it happens, when it is effective, and the limits of learning in games.

2 Problem Statement

This PhD project will explore learning in computer games with emphasis on how it is possible to facilitate learning through games, while maintaining a successful gameplay. The project's goal is to frame the learning experience in games, not as a clash between the learning material and gameplay but rather to use learning material as compelling material that supports and enriches the gameplay.



3 Theoretical Background

The theoretical framework is a combination of three major theoretical angles: Learning theory, narratology, and ludology. The most prominent and important learning theorist used is John Dewey, Jerome Bruner, Jean Piaget, and Lev Vygotsky. The project's narratology perspective does not stem from literature theory. Instead, it is framed from a psychological and cultural perspective.

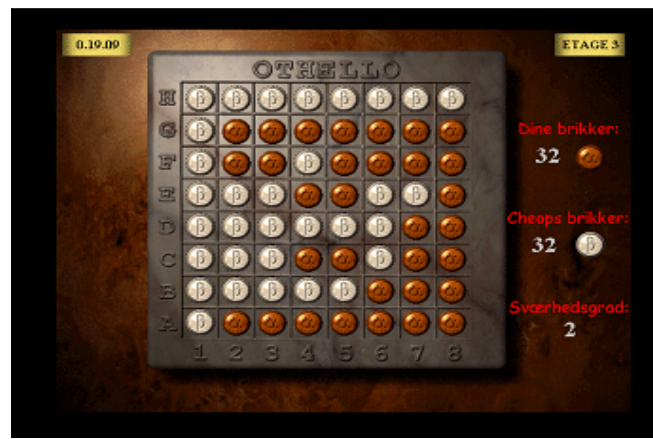
My perspective stresses the importance of *exploration*, which is seen as the best starting point for analyzing games from a learning perspective. The player can explore the game universe in different modes with varying frequency and support in different genres. Until now, two have been identified: Interpretation (creating meaning) and logic principles (creating rules).

4 Current status in the field

Up till now the use of computer games for facilitating learning has not been very successful and is a scattered field without internal consistency and successful application (also see Squire, 2002). Furthermore the current attempts have primarily focused on either adventure genre or simulation genre, which are two of the smallest genres in term of players and revenue, and the ones with the smallest appeal to younger age groups. The development of games with learning potential have also to a large degree been lead by the 'faction' called edutainment, which is an invention made more by businessmen than people interested in the learning potential of games.

Edutainment is short for education and entertainment but the genre has been more about entertainment than education. Games in this genre are for example *The adventures of Ulysses*, *Versailles series* and *Egypt 1156 BC*. Some researchers have tried to qualify the notions of edutainment, for example Prensky (2001) but without much success. Edutainment has taken patent on learning in games, and have established a frame that is not effective, and is not drawing on the expanding knowledge and fast development in the game industry. The edutainment genre seems to be lost in a narrow perception of learning, as a thing that goes on in school and can easily be measured and tested like for example arithmetic, the alphabet, words, sorting things or similar not very complex undertakings. Alternatively become a fuzzy concept like problem solving, system understanding and overview, which can be applied to almost all games and indeed; it is true that all games (as all human activity) have an intrinsic learning potential.

Below are some of the titles drawing attention in relation to learning and computer games.



When learning is present in a game it is often presented in split-screens or separated from the game play (Egenfeldt-Nielsen, 2002). These attempts have yielded poor results in respect to learning despite this the educational game titles continue to sell. The encompassment and successful use of learning in games is often more based on vague assumptions than empirically derived and tested facts with few notable exceptions like the work of for example Debra Lieberman (2001), Leyland (1996), Yasmin Kafai (1995) and the Playground project¹. Learning and educational games lack the necessary depth and resources to make them viable alternatives to existing learning contexts. One of the least highlighted problems is the game play aspect although lately some project like Games-to-Teach at MIT and Through The Glass Wall have taken this broader approach to games, where game play is seen as critical for the development of successful educational titles.

One of the obvious problems with the field, even the more serious attempts, is a lack of division between different ways of using games, a weak theoretical knowledge of computer games as such, underdeveloped theory of how learning is facilitated, and a confusion of the terms learning and education. The first step in looking at learning in games should be to distinguish between education being formal, structured and immense induced by school activity, where the term learning should be considered a broader term.

5 Goals of the research project

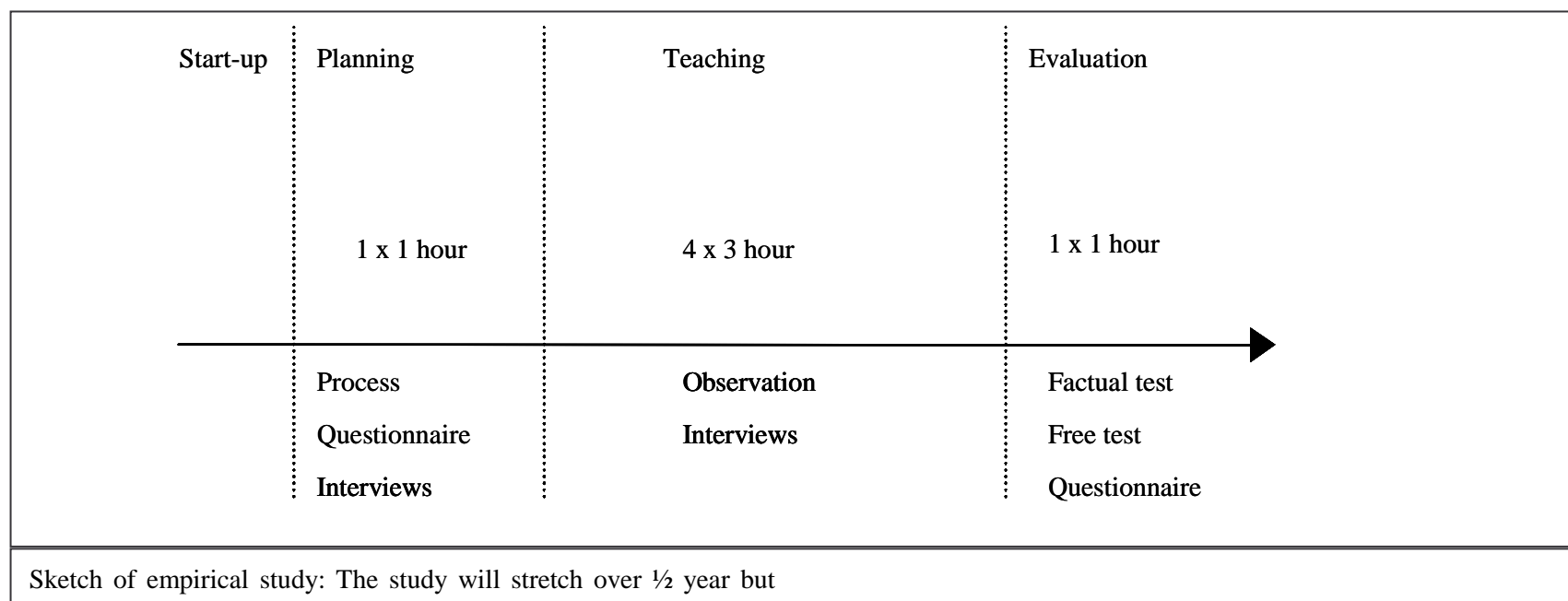
- § **Developing new theory** on facilitating learning through games, where the pivotal point will be the connection between gameplay and learning. Building on theories from psychology, sociology, game design, game research, learning theory and media science. This will especially focus on applying modern learning theories and adjust these to the limits and possibilities of computer games. In this context the relation between realism, simulation, learning and gameplay will be explored.
- § **Establishing a prototype** of a game that facilitates learning in games. The focus will be to establish a game concept that facilitate learning through the use of relevant knowledge treating it as compelling material that work with the game play and not against it. Commercial titles would serve as inspiration and existing educational games would mostly be used as examples of how not to do it. As they have a number of flaws.
- § **Evaluating the potential learning and interactions** in the games, hereby testing the theoretical discussions in an empirical setting. Hopefully contributing to new methodologies for testing learning in games and in general a stronger theory through out the PhD project.

¹ http://www.ioe.ac.uk/playground/frame_f.htm

6 Empirical set-up

The project will involve four classes (students age 15-19) with different teachers, which in collaboration will prepare a theme-based course within European history from 1492-1819. The primary varying variables will involvement of games in course: From no involvement (control group) to high involvement. The premise is that playing computer will not facilitate curriculum relevant learning, unless reflection is a part of the setting. Therefore, all the experimental groups will have some involvement of computer games (except the control group). Initially four experimental groups is planned:

De parameter som der vil blive skruet på i undersøgelsen er inddragelse af computerspil i fritiden, som hjemmearbejde, del af styret gruppearbejde, eller som en valgfri mulighed for eleverne.



Possible games for empirical study

Initially a shortlist of popular historical games is made. Next, the game(s) are selected based on an expert evaluation with a history teacher. The criteria are still expanding, the shortlist and evaluation criteria is still pending.

First, phase selection criteria (short list):

- § Strategy/simulation game
- § Historical content
- § Advanced world depiction – not just war.
- § Bestseller
- § English language
- §

Second, phase selection criteria (game used in study):

- § Complexity in depiction of historical mechanisms: economic, trade, religion, culture, diplomacy, and society depiction, corruption, rebellion.
- § User friendliness
- § Realism
- § Ability to see different perspectives
- § Play different historical scenarios
- § A realistic depiction of geographic world
- § Historical events explained
- §

Short list in prioritised order:

1. Europa Universalis 1-3
2. Civilization 1-3
3. Colonization
4. Age of Kings
5. Rise of Nations
6. Stronghold
7. Hearts of Iron
8. Praetorians

Suggestions are most relevant!

7 Simon Egenfeldt-Nielsen, PhD student, psychologist

Profil	<p>Masters degree in psychology from Copenhagen university. Master thesis on learning, information technology and educational system. Have studied information technology from a psychological perspective throughout the study, and have focused on computer games since the bachelor project.</p> <p>He has worked as consultant for Framfab with responsible for children, internet, entertainment, and games. Furthermore within the areas concept development, target group analysis, quantitative and qualitative statistics, prototyping, flowcharts, and user scenarios.</p> <p>Is currently writing a PhD thesis on computer games and learning potential with special emphasis in the challenges of maintaining a good gameplay.</p> <p>Is co-founder of Game-Research.com – a site dedicated to establishing contact between ‘the art, business, and science of computer games’.</p> <p>Have written several articles on computer games, children, and learning. Is author of two Danish books: ‘Den digitale leg – om børn og computer’ and ‘Digitale udfordringer – informationsteknologi i en skole under forandring’</p> <p>Reviewer på gamestudies.org Reviewer på DAC conference 2003 Reviewer på AOIR conference 2003</p> <p>Board member for Digra.org Editor on Digra column Ivory Tower at igda.org.</p>
Web site	<p>www.game-research.com www.incircle.dk http://www.it-c.dk/people/sen/</p>
Kontakt	<p>Dept. of Digital Aesthetics & Communication IT University of Copenhagen Glentevej 67 DK-2400 NV Copenhagen</p> <p>Phone: +45 38 16 88 93 Mobile: +45 4010 7969 Telefax: +45 3816 8899</p>
Selected publications	<ul style="list-style-type: none">— Egenfeldt-Nielsen, S. (2000). Den digitale leg – om børn og computerspil. København: Hans Reitzels forlag.— Egenfeldt-Nielsen, S. (2001). Digitale udfordringer – informationsteknologi i en skole under forandring. København: Gyldendal Uddannelse.— Egenfeldt-Nielsen, S. (2002). Informationsteknologi i en skole under forandring. <i>Psykologisk Set</i>.— Egenfeldt-Nielsen, S. (2002). Computerspilsforskning. DR.— Egenfeldt-Nielsen, S. (2002). Art, science, and business of computer games <i>Game-research.com</i>— Egenfeldt-Nielsen, S. (2002). The future is now. <i>Game-research.com</i>— Egenfeldt-Nielsen, S. (2002). The Game on conference and current state of research into learning. <i>Game-research.com</i>— Egenfeldt-Nielsen, S. (2002). EU-Commission: Starts the game. <i>Game-research.com</i>— Egenfeldt-Nielsen, S (2002). Survey on online gaming. <i>Game-research.com</i>— Egenfeldt-Nielsen, S (2002). Brave new Entertainment World. <i>Game-research.com</i>— Egenfeldt-Nielsen, Simon (2003). Online-spil: Start the game already. In print.— Egenfeldt-Nielsen, Simon (2003). De voldelige computerspil - Hvor engle ej tør træde. In print.