

# Practical barriers in using educational computer games

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## INTRODUCTION

The discussion of the educational potential of computer games have raged for more than 30 years, and even longer if we include non-electronic games. This discussion has been present in the public debate but also with varying degrees of intensity in the research community (Duke & Greenblat, 1981; Dempsey et.al., 1993).

Research has to a large extent ignored the more practical and self-evident problems inherit in the use of computer games in educational settings. Instead computer games have been approached with general questions and assumptions poorly validated in empirical settings. This paper will instead approach the educational use of computer games on a more specific level, describing some of the concrete problems that became apparent in an empirical study.

The empirical study was conducted in a history course that lasted 7 weeks. The study consisted of introducing a historical strategy games in history teaching in conjunction with traditional teaching and student group work. The game used was the quite complex commercial historical strategy game *Europa Universalis II* (Paradox Entertainment, 2001), which all students received a copy of. The study involved two teachers and 86 students aged 15-17 years with a mixed gender. The researcher functioned as technical assistant during most of the 7 weeks due to the teachers' lack of knowledge about computer games. The empirical study is described in details elsewhere (Egenfeldt-Nielsen, 2003a).

## THE EDUCATIONAL FRAME

When researchers and teachers approach computer games several practical questions arise that initially cause concern (Saegesser, 1984; Dorn, 1989). This was also apparent in my case.

In an educational setting the day is split in small segments with each subject having its own allocated time slot. To learn a game, get it started, and get into it you need more than one hour. It is very hard to introduce a game, and then continue the introduction two days later. Most of the students had little

recollection of the initial introduction and started more or less from scratch with the game tutorials in the next hour. This were not limited to the first steps with the game but continued to be a problem in the following weeks. The students played the game on Tuesdays and then were supposed to discuss it Thursdays. This time gap was not feasible as the game experience was too far away for reflection.

The physical frame also caused problems as the school was not adapted to group work, the computers didn't work, and there were too few of them. This was despite a month long preparation, where the computer games had been installed and tested. For the first weeks the first 15 minutes were tight up with login problems, bad cd-rom drives, incorrect wired computers, video driver problems, and other technical issues. These problems could be viewed as temporary and of little relevance if we contribute them to the current limited knowledge and usage of information technology in the educational system. It could also be pinched on this specific school. However, the situation found on this school is consistent with earlier research on information technology in schools, and this leads me to conclude that the school's problems are representative. The lack of computer equipment is commonly reported as a problem in research and it doesn't seem to be about to go away. To see the lack of equipment as a temporary problem is dangerous thinking as this may continue to be the situation for many years onwards (Watson & Tinsley, 1995).

The lack of computers was just one problem. The most severe problem was that the computer support was too weak, and that students vandalised the computers by for example rewiring monitor, mouse, and keyboard to other computers than they were suppose to. It should therefore not be underestimated that the technical problems will always be an important challenge, when using computer games.

## **PREPARATION PHASE**

The preparation for this history course was a little different than preparation for a normal class, as I took an active part in developing the content. This later proofed to be a problem, as the teachers didn't really get into the computer games, and failed to acquire the necessary knowledge to integrate computer game, group work, and teacher talks.

The success of this teaching course was from the start hampered by the lack of deep knowledge of the game. It was not that the teachers didn't play the game because they played for several hours. But they didn't get deep enough into the game to help the students later on. The male teacher did have some experience with strategy games and were more capable of adapting but still he wasn't really able to fit the game, group work, and teacher talk into a coherent whole. Their approach to the game was reactive rather than proactive. They played and learned the game parallel with the students, and it was therefore hard to plan the teaching in connection with the game. This was in the post-interviews recognized by both teachers as a significant problem.

## LEARNING TO PLAY THE GAME

Initially I feared that the computer game would be too hard to learn, and this later proved to be warranted. The game was as complex as strategy games come but this was also the strength of the game. This made it possible to have a richer representation of the historical universe and give the students more options for exploring history dynamics.

With the tutorial the first problems with the nature of computer games arose: First, there were a large difference in how fast the students learned the game. Clearly the students with game experience learned the game much faster, and especially those with prior experience with the strategy genre. Not surprisingly most of these were boys. Some students finished the tutorials within the first hour, whereas other 3-4 weeks later were still struggling with basic concepts from the tutorial. According to the interviewed students up to 1/3 in the class fell into this group. This group never really got involved with the computer game. They found it too hard, and didn't get the game to work at home. The students were expected to play at home to increase their skills, and reduce the span between playing sessions. When the weakest students didn't play at home the discrepancy between strong and weak students accelerating very fast.

Second, a lot of students, especially the less knowledgeable about strategy games, didn't find the tutorials necessary. Contrary to the teachers' advice they quickly jumped into the scenarios in the game, and were quite overwhelmed. This was not like other games they knew, where they could quickly overview the possibilities. They wasted a lot of time, and experienced a lot of frustration and thought they would never master the game. Hardly the best start for a course. You should be careful with, how you tweak the usage of computer games in an educational setting so the game dynamics and the learning dynamics don't work against each other. In this case it was apparent that a defeat in the computer game will not spark curiosity in the students if it comes to early and to overwhelming but rather make the students give up.

Third, the first scenario was constructed in a way that went contrary to normal game experience. The first scenario was intended to show the students that mindless war wouldn't work and of course they throw themselves into fierce battles instead of careful diplomacy, trade, and development of their nation. Therefore most lost with a big bang. This made them very frustrated and unsure of the game. Normally a game is constructed so the difficulty slowly increases to match the players increasing skills. In this case, however the player (students) did not experience a slow increase in difficulty but a very steep learning curve.

We wished to make the students go through a historical learning process where they learned to appreciate other important historical factors than war. This was done through some initial scenarios where they would experience the limits of war. This was somewhat naive and counter intuitive to the game. In the game you start to learn how to wage war, and as the challenges grow you learn to take into account other factors. This is sometimes called a layered approach, and is a characteristic way for computer games to present information to the player. In a layered approach the game presents the necessary information and give the player more options as his skills increase

(Egenfeldt-Nielsen, 2003b). In this course you started with a too tough challenge and never really learn to wage war.

From a teaching perspective this was the natural way to go as you could control what experiences the students had with the game. After the first hours we knew they had tried to play a small nation and experienced defeat in war. This fitted best with the weekly teacher talks that should match the game scenario. If they students were in completely different places in the game, and had experienced completely different things, then how should the teacher be able to make a meaningful and relevant talk.

## **THE TEACHERS ROLE**

The teacher has often been identified as a significant resource when information technology is integrated in schools. But they have also been considered one of the main barriers (Watson & Tinsley, 1995). Dorn (1989) states that the attitude of the teacher towards games influences the outcome, and the teacher's knowledge and skill in using the game is also an important factor.

The two teachers that participated in this study were different on several parameters, and this proved to have significant bearing on the approach to the course. Teacher A were on a technical level much better equipped to approach the game and integrate it in the teaching. He relatively quickly learned the game and found it interesting to play the game for long stretches of time. Teacher B took 5 weeks before saying that: "Ah – I am finally beginning to see, how this game can be used for teaching history". This was when she was familiar enough with the game.

Teacher B was significantly more worried about whether the students received the historical material on a detailed enough level. Her ambitions were higher and her approach more sceptical. This was not in a negative way but rather a healthy approach to a new teaching form. She was very much caught up in a prioritisation problem, where she constantly felt that she had too little time to teach the necessary history to the students. She also had several problems with over viewing the class as she had 28 students compared to 19 in the other class. This was clearly hard to manage when the students played the game. Some students became somewhat stuck in the game, and here the degree of familiarity with computer games became apparent. One of the things that students clearly found very worthwhile was the interaction with the teacher around the computer game. The students would encounter a problem and discuss it with the teacher that would explain background and challenge their assumptions for example the reasons behind religious unrest in southern France during the start of the 17<sup>th</sup> century. Here the students interest and motivation where driven by a concrete experience in the computer game.

The teaching style for the two teachers differed in how well they fitted with the computer game. The more general and overall approach were closer to the game, and therefore to some degree better supported what was happening in the game. On the other hand the more detailed approach was a good supplement to the game that presented the bigger picture. According to the

students the integration of background information (textbook and teacher talk) where not integrated well enough. According to some it might as well have been a separate subject. This was probably due to teacher's lack of knowledge about the game but also a built-in problem of the study. The study was trying to see computer games in school, on the schools premises. This meant that the course used normal textbook and teacher talks, which were not adapted for the game experience. This was clearly not a success.

### **SOME RECOMMENDATIONS AND DIRECTIONS**

One way to minimize technical and practical problems is to arrange the course to stretch over one week. This would have several advantages but would be quite hard to accomplish in many schools. This way each student could work at the same computer, continue a game for a longer stretch, easier built up experience with the game over several hours, and the time cost for starting up each hour would be reduced.

From the outset teachers should be very aware of expectations and control these so the students don't expect the game to be pure entertainment. It should also be considered carefully what genre to use and if you can give the students a choice between different genres or games. This should especially be in relation to gender preferences and differentiation in terms of prior experience with computer games.

The teachers must make sure that they know the game quite well prior to use, and have game examples that can be used in the teaching. The teacher talks should use events and experiences from the game as a focal point. This requires that the teacher plays through some scenarios and picks up interesting examples for the teaching. One example could be to play the troubled years of England in the start of the 17<sup>th</sup> century, where internal unrest made England invisible on the European mainland. The historical thinking in the game and the underlying variables should be made explicit as the majority of students had a hard time recognizing these. This problem seemed to be more severe for the youngest students.

The teacher's talk should be adjusted to the game and reading requirements should be carefully selected so they fit with the game. This also entails that the course will not have the same content as a traditional history course but is allowed to differ.

During the course it should be possible for the students to explore the game universe freely, and learn the game at their own speed. The students should get some victories and confidence in their game skills before you challenge them to reflect on the game experiences. This also entails differentiation so some students will be faster off to more controlled scenarios that fit with history teaching. The students with prior knowledge of computer games will be restless if they have already learned the game and have to wait for weaker students. When the weaker students are pushed forward they will often be pushed in the periphery, and not really participate in the discussion of the game. Some of the group discussions could with some advantage be changed to teacher directed discussion as some students have a hard time getting started with the discussions.

## WHAT YOU WERE AFRAID TO TELL THE TEACHERS BUT THEY STILL KNEW IN THEIR HEART

This article has concentrated on some of the obstacles in connection with using a commercial strategy game in history teaching. A lot of problems were encountered that one should be aware of when considering computer games for teaching.

Using computer games in an educational setting is hard work, and you as a teacher need to know the game quite well. Furthermore you need to learn at least a large percentage of the students how to play computer games or at least a new genre, and this is if not a new language then close to.

You need to rethink your teaching style, and how to put together the material you have taught for years in class with group work, and a computer game that in places simplify, in some places lead to wrong conclusion but potentially also presents information more dynamically. It can all get very confusing for students and teachers.

So one may ask is it worth it? Probably not in the short run but I believe that the computer games have something else to offer than other teaching forms in the long run: Namely, a dynamic and rich presentation of a given subject area that you as a student have a chance to engage and challenge through interaction. This is ultimately the way that you need to teach material if it is to have a real impact on students, and not just become superficial knowledge limited to a school context. In this perspective the participating teachers were also optimistic.

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## **LINKS**

The home page for Europa Universalis: [www.europa-universalis.com](http://www.europa-universalis.com)