Hanse 1380 - A learning game for the German Maritim Museum

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Abstract

In an one year lasting project at the University of Applied Sciences in Bremerhaven a digital learning game for the German Maritime Museum in Bremerhaven was developed. It is targeted to school pupils in the age between 10 and 14 and should explain the importance of the cog for trading activities between Hanse cities in the 14th century. More detailed learning objectives were defined through a survey with history teachers from Bremen. The historical research was done in cooperation with the museum. Another key-interest was the design and building of an easy-to-use and attractive computer terminal including a special control-interface for the game. The resulting game is evaluated in an user-test with 29 school pupil. It shows that the game makes fun and is easy to understand. Approx. 50% of the pupils achieved all learning objectives.

Introduction

Historic exhibits are dead objects, they are no longer in use nowadays. It is hard to imagine, why certain objects were important in times which are completely different to the present. The conserved cog, which is the main attraction of the exhibition about medieval ships in the German Maritime Museum (GMM), is more then 500 years old and destroyed to a large extent. No doubt that it has an enormous historic value, but without the context of how it was used in the past it cannot be fully understood.

Within a game the museum visitor can be enabled to experience the past and learn about the context in which the shown exhibits were used.

Interactive Exhibits

Traditional museum exhibits show parts and aspects of the topic the museum or the particular exhibition is dealing with. The visitor has a passive role and no possibility to "respond". Interactive exhibits, in contrast, enable the visitor to participate and explore actively the information provided by the museum. **The learning effect can increase with interactive exhibits in so far that exhibitions can be more "entertaining"[1] as well as "inspire and provoke exploration ... and to tempt people to look more thoughtfully at traditional museum displays"** [2]. Anne Fahy described it like that [p. 89][3]:

Interactive Devices have an active and important role to play in the communication process. This is emphasized by research carried out by the British Audio Visual Society which showed that whilst we only remember 10 per cent of what we read, we remember 90 per cent of what we say and do (Bayard-White 1991).

Game–based Learning

Game–based learning means that learning content is embedded within a game. In the last years a lot of researches have shown that learning through games can have various advantages. Richard van Eck points out one advantage of games [p. 4][4]:

Games embody well-established principles and models of learning. For instance, games are effective partly because the learning takes place within a meaningful (to the game) context. What you must learn is directly related to the environment in which you learn and demonstrate it; thus, the learning is not only relevant but applied and practiced within that context. Learning that occurs in meaningful and relevant contexts, then, is more effective than learning that occurs outside of those contexts, as is the case with most formal instruction.

Team

The project presented in this report, was carried out at the University of Applied sciences Bremerhaven under the guidance of Prof. Ulrike Erb. The project organisation, though, was done by the students itself—therefor the level of self-responsibilty was very high.

6 Students were involved, each one from a different country—almost every continent was represented.

Methods

Needs for a Terminal Game in a Museum

As the game should be played on a computer terminal within a museum, it must be easy to understand. A quantitative study by Fleck et al.[6] has shown that a **typical museum visitor spends 1-2 minutes at a museum object. However, if the visitor is engaged within that time, the time at one exhibit can increase to 10-15 minutes.** The same study has shown that labels and **instructions for interactive exhibits are usually not read.** Interactive exhibits are tried out directly and people just refer to the instructions if they fail.

To summarize, these three requirements were defined:

- The game should **start immediately.**
- A **tutorial** should make it possible to explore the game step by step.
- **Intuitive hardware controls** should make the controlling as easy as possible.

Game vs. Historical Facts vs. Learning Content

A learning game which should transport historic facts tries to combines 3 sometimes contrary ideas. Firstly a game concept must be developed which is consistent and makes fun. Within this game, learning content must be integrated, without loosing the character of a game. Finally, the whole game must based on historical facts.

Historical research

As a basis for creating game ideas and learning objectives a profound historic research is needed. The historic facts are the material which the game is made of. For creating a game idea it is also a source of inspiration. This research was done by regular meetings with scientific stuff from the GMM and additional study of adequate literature.

Learning Objectives

In parallel to historic research concrete learning objectes need to be defined. They specify which learning content should be transported through a learning game. Also they are a basis for evaluating if a student has reached the learning goals. Learning objectives were defined based on our historic research, they were discussed with the museum and finally also a survey with 11 teachers from Bremen was done. Here are some learning objectives that were chosen:

1. Explain the purpose of a cog.
2. Know the purpose and advantages of the trading union Hanse.
3. Know the century when the cog was used.
4. Name at least 5 Hanse cities in the area of the North Sea and/or Baltic Sea.
5. Discuss the difficulties and roughly the method of navigating a cog.

Fig. 1 - The Sailing Tutorial. Small chunks off information appear when needed.

Results

In the final game the player takes the role of a young captain of a cog, based in Lübeck, who has to sail and trade goods in the North- and Baltic Sea. **So, one part is a sailing simulation which considers the special way of sailing in the medieval time (Fig. 1).** The player has to follow landmarks in order to find the next city, he can be attacked by pirates, and he depends on wind from the back, as cogs had a yardarm sail which required exactly that.

In the second part of the game the player has to show his skills as a trader, by selling and buying goods (Fig. 3). In order to show the devoutness of people in medieval times, it is also possible to donate money to the church. As the player donates more money his influence in the city increases, which has a positive effect on his final score. Also, if he donated enough money, the gods might help him when pirates attack.

There is also a high score list of the ten best players, which should be a motivating reward.

The game time is limited to 5-10 minutes which correlates to one sailing season within the game.

Direct start of the game and the tutorial

The game can be started very quickly—instead of presenting long instructions at the beginning, small junks of information are presented step by step (Fig. 1). After the player successfully finished one step in the tutorial the next step is shown. **Therefor the new knowledge is connected to the current situation in the game and thus should be remembered easier.**

Computer Terminal

To control the cog in the sailing simulation **the player uses a miniature model of a capstan and a rudder.** The design of the controls is connected to the real look of those instruments. Firstly, the mental mapping of the control to its corresponding function should be supported by that. Secondly, due to this similarity to the real instruments, the player also gets an impression how these instruments look like on cogs. Also, the whole terminal design looks like a small cog, which creates a more interesting atmosphere and invites people to use the terminal. Additionally the game uses a touchscreen for user-input.

User Test

With an unfinished prototype of the game **a user test with 29 pupils** fitting the target group was conducted. It tested if the pupils are able to **understand the game and control the cog,** if they **like the game** (and which parts of it) and if they **achieve the learning objectives.** Additionally it included questions about general usage of computer games, which showed that the all pupils in the test-group play games several times per week.

Usability

In general the usability of the game was good. All of the pupils understood how to control the cog (Fig. 2) and they **rated the difficulty of it with 2,21** (On a scale from 1 to 4, where 1 is too easy and 4 is too difficult). On the question **how much they like the game** and single parts of it (graphics, sound, dialogue, overall) **an average of 2,16** (on a scale from 1 to 5, where 1 is very good and 5 is very bad) was achieved.

Fig. 2 - Understanding of the game

89 % 72 % 96 % 85 %

Task of the Game   Cog damage   Indication of Wind   Landmarks

yes
no
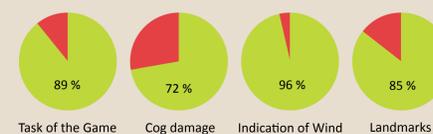
Learning Objectives

In general **not all children achieved the learning objectives**, which were requested in the post-interview. **89 % of the pupils remembered at least one hanse city.** The naming of correct products was more difficult, but the trading feature was not fully implemented in the test-version of the game. **44 % of the pupil could name the correct duration of a trading season,** but again the prototype was not finished regarding that aspect, so it is not a surprise to have this result.

The century in which this game takes place was not remembered well, just 41 % did so. The same percentage of pupil could name the trading alliance, this game is dealing with. As this knowlegde is not needed within the game, it supports the hypothesis that factual knowlegde, which is not applied in the game, is not remembered very well.

Conclusion

Learning objectives need to be integrated strongly within the game. Information which is just provided but not needed to successfully finish the game will not be remembered. Roughly two different ways to integrate learning content can be observed. **Firstly, content can be transported via rules.** For example if the objective is that the player should know how long a trading season is, then the according game rule can stress that the player has to finish a task within one trading season.

Another way to integrate a learning objective into a game is via a feature. An example used in this game are pirates. The according learning objective is to show the danger of pirates in the medieval time. It is implemented in a way that on special routes the players cog might be attacked by pirates. To survive the attack of pirates the player then has various possibilities which correlate to the possibilities that seamen had in medieval times.

At the same time it got clear that information which is not directly integrated into the game is not remembered. Our tests have shown that not many children could remember the name of the famous trading union ("Hanse") although textual hints refer to it multiple times and also the name of the game itself "Hanse 1380" which is very prominently placed.

Fig. 3 - The harbour of Lübeck, where the player can buy goods.

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