

The Submarine Crew - A Serious Game relating to the German Movie "Das Boot"

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Abstract: This project is based on the movie "Das Boot" by Bavaria Filmstudios, Munich. The resulting application is a mobile Serious Game that tells the story about a German submarine crew and their mission during World War II. The purpose of the Game is to convey key aspects of different tasks on a submarine and the interplay of the crew members as seen in the movie. The player starts in a scenario that takes place in 1941. Five different roles with different responsibilities need to be managed. Each task depends on information of other crew members, simulating a realistic submarine work flow.

Keywords: SeriousGame; DasBoot; BavariaFilmstudio; SubmarineCrew; WorldWarII

1 Introduction

It's the year 1941.

The German Submarines have the order to scupper merchant ships that deliver Great Britain with important goods for war affairs.

The fight is getting harder because these ships are guided by destroyers more and more.

In this situation, the German submarine U96 was instructed to sail. The crew celebrates its last night ashore with a coltish feast in a French brothel in La Rochelle, before it finally sails out from Saint-Nazaire. [Da]

This quotation is taken and translated from the introduction sequence of this game. It introduces the background story of the game to the player. This way, a cinematic sensation should emerge since the game is based on the German movie "Das Boot". The game tells the story of four young boys on their first mission during war as submarine soldiers, led by

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an experienced and sincere captain.

It is named *The Submarine Crew* and will be called by this name in this entire report for consistency.

However, the story is only a side phenomenon. The main purpose of *The Submarine Crew* is to teach knowledge about the processes and needed skills during a dive with a submarine of World War II.

The Submarine Crew is the result of a request of the *Bavaria Filmstudios*, Munich, who wanted to have a game helping their first high-flying movie "Das Boot" to be more present again. After all, this project rose from this request but later headed into a self-organized and -designed direction.

This report describes the process of the development of this Serious Game. It begins with the origin of the game: the Bavaria Filmstudios and their already mentioned movie, followed by a broader research of related work.

The subsequent chapter describes the work flow of the project, from the beginning to the final concept which is presented bit by bit, as well as the educational benefits of this Serious Game. Overall, the design-related questions are answered here.

Right after that the mechanics of the specific mini-games are shown. This associates the implementation of the aforementioned design decisions.

In the remaining chapters, the outcome of the conducted user study is evaluated and with it this Serious Game as well. With the insights of the users, some ideas for future work were drawn which are presented at the end.

2 Game Design

2.1 Basic Concept

Being a Serious Game, the basic idea of this game is to convey knowledge about a variety of content. On the one hand, the game is based on a movie. Hence, it should introduce the movie characters and follow the story of the movie at least loosely. On the other hand, it should still be a game and thus have playful challenges that teach certain aspects regarding the movie and real submarines. The game would basically be about specific functionalities and every day life as part of a submarine crew.

A solution that covers the characteristics above is to design different roles. Each role represents a character from the movie and realizes his tasks on the submarine as mini-games. These tasks were selected not only for entertainment reasons, but also educational means. They had to be essential in running a submarine but be fun to play as well. Since this game is based on a movie, it should cover the story of this movie at least partly. This was realized as simulation of a dive with given occurrences related closely to the movie.

The player is navigating a similar route than the movie characters. The events that occur are altered only slightly from events in the movie. Considering the length and depth of 'Das Boot' it is no surprise that the game ended up covering only a small scope of the movie's

spirit. *The Submarine Crew* however is not mainly a cinematic game but a game that is supposed to teach occupational techniques.

2.2 Learning Aspect

Because *The Submarine Crew* wants to teach the player about the work flow on a submarine, a separated learning part is required. The learning aspect covers the whole game since every role involves tasks among the crew, that need to be taught to the player before he can start the campaign. Here, the player receives all information he needs in text form with supporting pictures.

It is divided into four topics: description of the role, task description, object of this task and movie context. These are partly very general descriptions of the duties on a submarine or used objects during the work, but also specific descriptions about the movie characters and what the player actually has to do in the game. After the player feels well prepared, he will start the campaign and apply his knowledge about the roles he has learned about.

2.3 Different Roles

The individual roles are chosen and designed in order to maximize the learning effort. What decisions are made to guarantee this is explained in the following.

2.3.1 The Captain

The Captain takes control of the submarine's crew. He supervises the activities inside and the events outside of the submarine. This means that all important information goes right through him. Having an overview of all crew members and events, he is the responsible person to decide which action has to be executed next.

Being such an important role on the submarine, the character in the movie is one of the main characters, maybe even the most present one. Thus, the question how to integrate his role in our game is very important and quite difficult. First, we wanted to have a leading player. This player was supposed to guide the group through the simulation. He would have had to gather information and order actions that would be done by the other players. This way, he would have been the pivotal point of the game.

In addition, he can recalibrate the submarine's current position based on the star constellation using a sextant. The sextant was an important tool in former times to calculate the position at open water.

His functionality as a central person who receives all information from the other crew members is realized with a log book. In this screen the player gets a summarization of events and advice for consequent actions.

2.3.2 The Radioman

The radioman is an expert on the morse alphabet. He is able to send and receive morse messages at very high speeds. Fast morse listeners could reach speeds up to 2500 shorts per minute or 250 words per minute. At that speed a short signal lasts for 20ms. In the game a short is slowed down to a length of 300ms (15 times slower) to make the game accessible for a morse beginner audience.

2.3.3 The Decrypter

The Decrypter knows how to operate an Enigma which is a decrypting and encrypting device used by the Germans during World War Two.

The Enigma itself was one of the safest de-/ and encrypting machines at the time. The system behind the Enigma was so complex that even the best mathematicians tried to solve the algorithm. They found an approach only through a repeating mistake that later led to the solution.[Enb] The Enigma was handed over with a so called 'key table' which contained combinations of three letters or numbers.[Ena] These 'key tables' were totally secret. The combinations of letters or numbers were generated once for every day in a special period. Each letter/number represents the position of the related Enigma rotor at the top ("Walzensatz").

The Enigma owner needs to look in the 'key table' for the related date and turn the rotors so that the combination matches the date. After the setup the user is able to de- or encrypt the message by pressing the letter on the keyboard ("Tastatur") and the associated decrypted or encrypted letter will be highlighted at the display right above the keyboard ("Lampenfeld").

The Decrypter needs to be cautious not to accidentally press a letter on the keyboard, as the rotor will automatically increase by one, making the rest of the decryption/encryption false. If the user pushed a wrong key he has to reset the Enigma and start the encryption from the start.



Fig. 1: Enigma[Di].

2.3.4 The Cartographer

The cartographer is the member of the crew that plans the course of the submarine. With decrypted information about hostile ship and plane positions he tries to plan and maneuver the submarine through a safe route. The longer he takes the worse the submarine condition might get. That's why he tries to calculate the safest but fastest way. He provides the classical game view.

2.3.5 The Machinist

The Machinist is responsible for the most important thing in an submarine, the engine. Without a functioning engine a submarine is not able to emerge from the devouring depths of the sea. If the engine in a submarine fails and the submarine is far beneath sea level as shown in the movie the crew is trapped without escape.

In the game the player takes over the role of the machinist and tries to keep the engine repaired as much as possible. If the engine is damaged the speed of the submarine drops significantly.

2.4 Interplay of the Roles

The Cartographer and the captain's logbook are tying the whole game together. The map as the only physical representation of what is actually happening in the game world and the logbook as a helping hand to guide the player if he gets lost and does not know what to do next.

Through the logbook the captain is able to reconquer his central role. Every single other game mode is using the logbook to recap the games actions. On the other hand every mini game influences the game play in the Cartographer game. The Captain is able to confirm the correct position of the ship, the Machinist is responsible for the ship speed and the Radioman and the Decrypter are used to progress story wise. That means they activate certain checkpoints directly in the Cartographer's map.

Like this the separate roles are working in unison as it is expected of a submarine crew.

3 User Study

More than half of the testers already saw the movie 'Das Boot'. Every information about the different mini games and the according movie backgrounds were given in the learning mode.

The graph in Figure 2 shows how much of the given information they remembered after playing the game.

Most of the testers read at least the mini game instructions. The others started to fail at more difficult and less intuitive mini games like the enigma and heavily depended on special introductions.

They realized that they would have been able to solve the puzzles on their own if they would have read the learning texts at all or more carefully. Some of the testers had general interests in or even wrote scientific papers about some of the covered topics like the morse mini game or the enigma mini game and already knew very well how to use them.

After the information part the main campaign started. The most popular game modes were the Enigma, the morse and the captain mini games. The logbook often was mentioned as

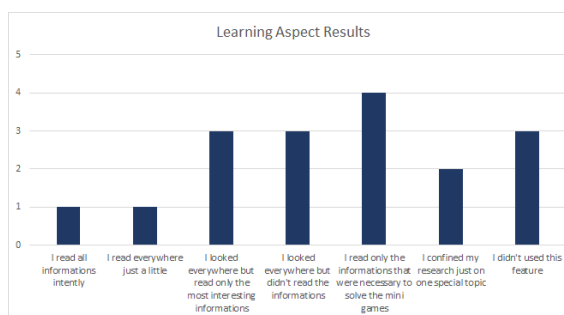


Fig. 2: Distribution of how intense the testers studied the information texts.

especially helpful.

Some players expected more of an cinematic kind of game approach were teaching submarine history would have been the most important aspect. Others expected the game to be more like the popular board game 'Battleship'.

The results of the user study strongly implies that testers with musical backgrounds had an easier time to write down the correct signals of the morse mini game. Tone-deaf testers had to listen to the morse message multiple times to get it right.

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