

Serious Game as Educational Tool for Safety and Prevention

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Abstract

This document summarizes the research, remarks and conclusions of the ESF-project (European Social Fund) “Serious game as educational tool for safety and prevention”. An online playable version of the game can be found at <http://sggo.howest.be/>

The ESF-project was started at the AZ Groenighe hospital of Kortrijk, in cooperation with Howest university college. The main objective of the project is the creation of a serious game to reinforce fire prevention programs. In addition, our experiences were summarized in a roadmap for the development of serious games.

One of the main challenges is the vast diversity of the staff, whose technological literacy varies greatly. During the project, we used personas as a tool to map the varying needs and skill levels of the different groups. This was necessary in order to create a game that is appropriate for the majority of our users.

Target audience

Mapping the target group is the foundation of persona creation. In our case, this started with observations during the current fire prevention classes. Shadowing daily work routines was not allowed due to privacy concerns. These privacy concerns proved to be a recurring hindrance during our work at the hospital. For instance, no persons could not be recorded on video and observations had to be done with notes and audio recording only.

Based on quantitative (i.e. statistical data) and qualitative (i.e. interviews, personal surveys) research methods, six personas were created. These personas represent the main six user groups that emerged from our data. We selected eight persons per user group, for a total of 48 key users. These key users were involved in the next phases of the co-creation process.

The first test verified the computer competence and consisted of three levels of different serious games the subjects had to play. Redundant questions were used as a means of verification. In addition to the play test, interviews and surveys were taken. A neutral observer remained present during play tests and follow-up interviews to log the actions and reactions of the participants.

Co-create concept development

After processing the data, we gathered our key users for a co-creation session. This session consisted of two workshops, based on the model of Bergeron (WS1: storyline and gameplay, WS2: visualisation and interface). The key user groups sketched storyline and gameplay elements (i.e. in game reward system, extra scenarios, positive score system) and designed an interface using paper prototyping. Data gathered during these sessions was used to create the blueprints of the game interface. During the sessions, all information was logged using methods described earlier (anonymized video, audio

recording, in situ transcribing). During this phase, paper prototyping proved to be a valuable tool because of its accessible, low-barrier nature. Data analysis of this phase consisted of an evaluation by the game design team, taking the persona impact factor into account.

First playable prototype

The first gameplay tests with key users were combined with a before-after survey in order to measure the impact on fire prevention knowledge. Participants were given two identical surveys to measure knowledge of fire prevention, one before the play test and one afterwards. Participants were not given any right/wrong answers or scores, in order to prevent learning through the surveys, so only game impact is measured. Questions concerning topics that are handled in the game score remarkably better in the second survey, while there was no notable increase in the other questions.

During play testing, both screen- and audio recording software was used, resulting in a combined data stream that visualizes player remarks. We mapped gameplay bottlenecks by measuring the time it takes for players to complete each sub-objective. The participants' remarks were then clustered into three groups, frustration, motivation and ideas. Similar remarks within each group were counted, in order to derive a priority list for the game development roadmap.

Lessons learned

Our project's hospital context posed a number of unique challenges. Firstly, privacy concerns severely limited the extent of data we could gather. We found that a clarifying conversation, in addition to the informed consent forms, is very helpful to explain the goals of the research to participants and to answer any privacy concerns they may have.

Another issue we encountered has to do with the wide skill range of the target audience. Maintenance and kitchen personnel typically thought that their in-game score was part of a job performance assessment, and that poor game performance could negatively influence their jobs. Doctors and upper management typically associate games with recreational use, and therefore did not take our game seriously as a fire prevention tool. Therefore, the use of other terms (e.g. "training tool" or "simulation") instead of "game" would be preferable. With all types of users, we found that involving the same group of participants in multiple tests is beneficial, as it increases the users' participation, motivation and emotional investment in the project.

We found that paper prototyping greatly facilitates the co-creation process because of its accessible, quick and low-barrier nature. Finally, we encountered some problems with internal disagreements concerning the use of personas: some team members questioned the added benefit of a persona's fictional biography, and struggled with the subjective nature of the technique. In our case, we dealt with this problem by switching from narrative-form personas to more condensed, bullet point summary personas based on project data.

Figures



Een persona is een beschrijving van een fictieve gebruiker. Een gebruiker die niet bestaat, maar die wordt beschreven zodanig dat de lezer de beschrijving zal herkennen en geloven dat deze kan bestaan. Een persona is geschreven met behulp van gegevens van potentiële en feitelijke gebruikers en is samengevoegd uit de kennis over echte mensen. Nielsen, L. (2013), Personas.

De witte kaders zijn opgebouwd aan de hand van het 'Role based' perspectief van Nielsen.

De grijze kaders zijn opgebouwd vanuit de kwantitatieve en kwalitatieve data die verzameld zijn tijdens de gebruikersgroepstesten en de observaties tijdens de bestaande brandopleiding.

Figure 1. Persona sheet



Figure 2. Co-creation workshop visualization and interface

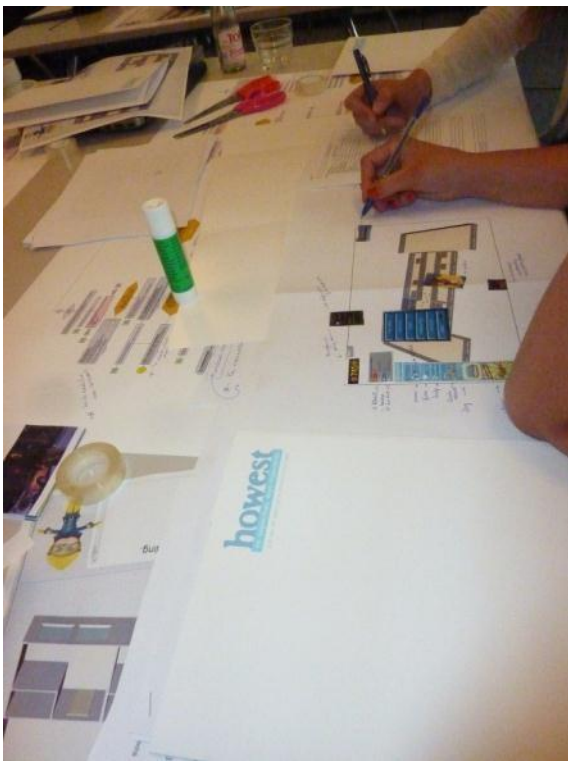


Figure 3. Paper prototyping



Figure 4. An output of a co-creation session



Figure 5. First build

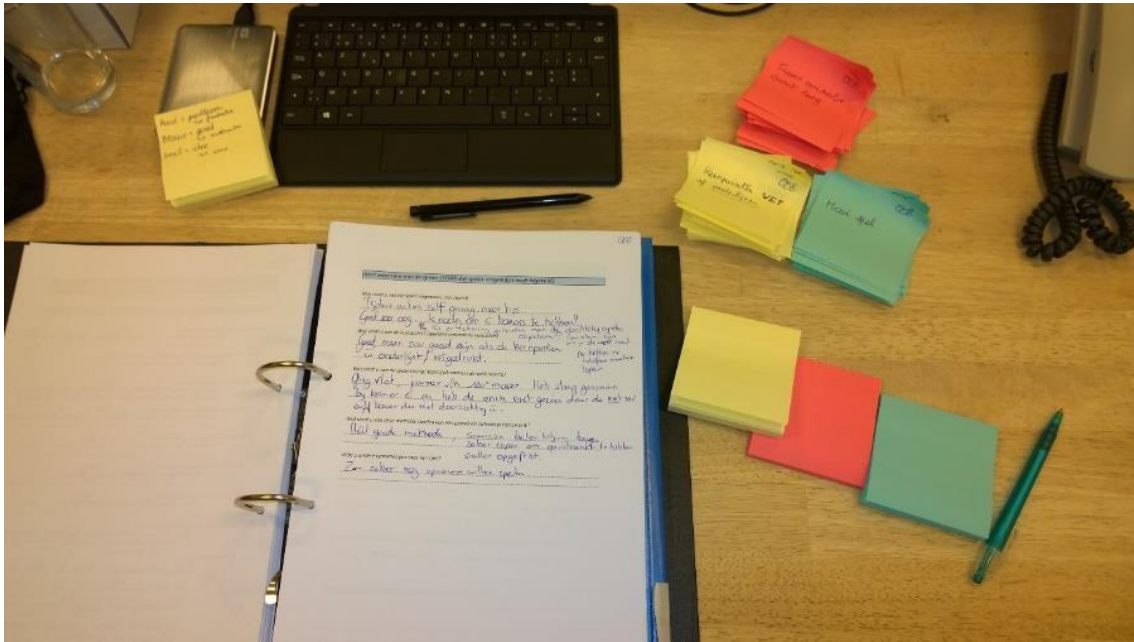


Figure 6. Data gathering by theme



Figure 7. Frustration priority list

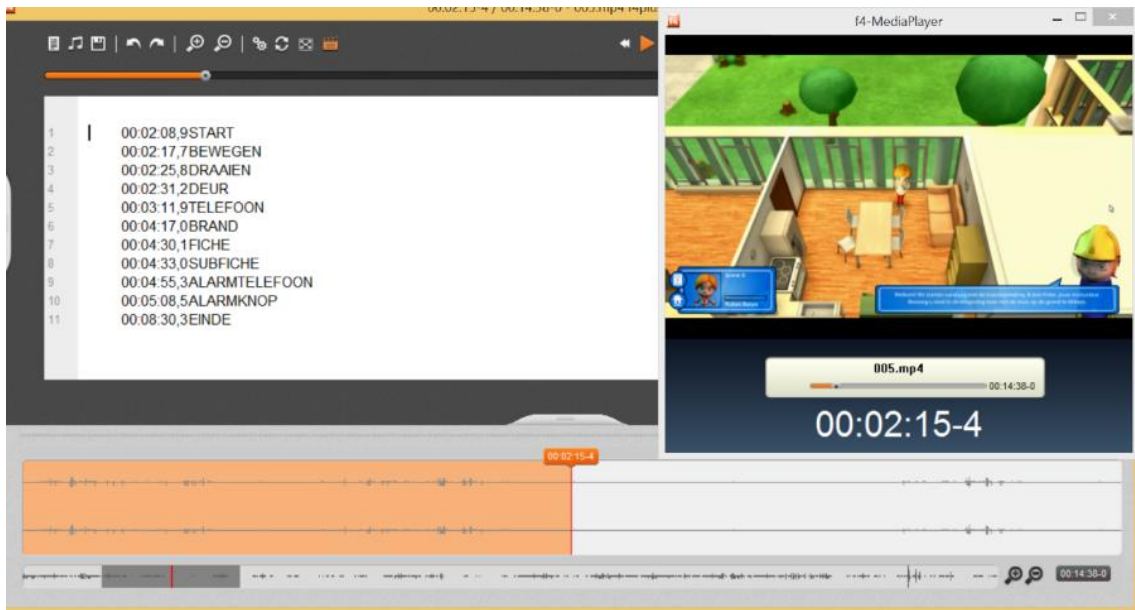


Figure 8. Adding time stamps as game analysis



Figure 9. Final build