How to Kick Off the Development Process of a Serious Game?

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ABSTRACT

In this paper, we discuss issues encountered in the early phase of the development of serious games against cyber bullying. The goal was to develop the scenarios based on output from plenary sessions involving people from different disciplines. These sessions have provided us useful information on the role of this first phase of the development of a serious game. We also discuss a tool that we are developing based on this experience to aid collecting the required information and help with decision-making.

Author Keywords

Serious game development; ideation tool; structured mind mapping; Guidea; GuideaMap.

ACM Classification Keywords

H.5.m.

General Terms

Human Factors; Design; Documentation.

INTRODUCTION

Friendly ATTAC [1] is a research project that has the aim to develop digital games to modify behaviour patterns associated with cyber bullying. Cyber bullying (bullying via electronic communication tools [2]) is a relatively recent phenomenon that especially occurs among early adolescents. As cyber bullying may have a serious impact on the mental (and physical) well being of victims it is important to develop interventions against cyber bullying. Therefore, the initiators of the project developed the idea to create serious games to make youngsters more aware of the consequences of certain behaviors (as bully or as bystander) and help them to prevent becoming a victim.

The scenarios for the games will be based on theoretical and empirical knowledge regarding personal and contextual determinants of cyber bullying that will be obtained during the project by using a well-established protocol for developing theory-based and evidence-based health promotion programs, i.e. Intervention Mapping [3]. The challenge is to integrate this knowledge into attractive game scenarios. The goal was to develop the scenarios based on the research performed and output gathered during plenary sessions involving people from the different disciplines involved: social scientists, health psychologists, computer

scientists, people working in the field, and game developers. During the preparation of the project proposal, we already decided to opt for a single player game that could be personalized. We opt for a single player game mainly for two reasons: (1) to offer an environment where a youngster can try out alternatives in peace, and (2) to avoid that the game would become an environment where players start to bully for real.

In this paper, we reflect on the process of collecting information during plenary sessions for defining the scenarios, and how we plan to improve this process in future. In the next section, we summarize the outcome of the plenary sessions. Next, we discuss the lessons learned. Subsequently, we present a tool that we are developing to improve this early phase of the development process.

THE PLENARY SESSIONS

Different plenary sessions were held over a period of 9 months. Some sessions (4) were held only with the members of the Friendly ATTAC team consisting of researchers from social science, health psychology, computer science, and teachers/researchers in game development (11 to 12 participants). Other sessions (2) were together with members from the user advisory board (18, respectively 26 participants), which includes different types of stakeholder: educational/youth stakeholders, e-safety stakeholders, heath promotion stakeholders, and technological stakeholders.

During those sessions, many different ideas and issues were raised. We discussed (mostly plenary; 2 times with buzz groups) about the age range of the target users; gender issues; on which role to focus (victims, bullies, or/and bystanders); the platform on which to offer the game (PC, tablet, smartphone, the Web); the availability of the game (only in class room, in closed environments, or publicly available); the embedding of the game in learning environments and other learning materials; the embedding in social networks; the involvement of teachers, parents, friends during playing, and coaching issues; issues about risks (not being inspiring for bullies) and privacy; the duration of the game; the genre of the game; the use of mini games; the combination of the game with real life assignments; the use of a scenario dealing explicitly with

cyber bullying versus a scenario that is not directly related to cyber bullying (i.e. using the entertainment education principle [4], which hides the pedagogical message inside entertainment); learning styles of children; type of feedback; motivation for playing the game; and much more.

As far as it concerned the actual content of the scenario or the storyline, only vague directions were obtained from the sessions: The storyline must appeal to the target audience, to boys as well as to girls; the player should be able to experiment with different behaviors; it must be possible to obtain information about cyber bullying when needed but the game should not focus on knowledge acquisition. It was also suggested to ask youngsters to elaborate a storyline.

At a certain point in time, the research team decided to ask a professional scenarist to propose a story for the game(s). The preparation of the call for tender let to some new discussions. How much information should be provided to the scenarists? On the one hand, we did not want to limit the creativity of scenarists by giving too many constraints, but on the other hand we were also concerned about still having enough possibilities to integrate the intervention methods that were developed in the meantime using the Intervention Mapping method. For instance, if we would want to incorporate one of the recommended intervention methods for changing attitudes, i.e. shifting perspectives, the story should allow this. In the context of cyber bullying, shifting perspectives could for instance be realized by letting a bystander take the perspective of a victim and experience the world through his eyes in order to decrease moral disengagement.

We decided to communicated the following decisions (taken by the research team) to the candidate scenarists:

- Target audiences are 13 to 14 year old boys and girls (a critical age for (cyber) bullying).

- Role-playing will be used as game genre, as it would allow to incorporate the typical roles (victim, bully, and bystanders) in cyber bullying and the integration of these three roles should be possible in the story.

- The story should support social interaction between the player and the non-playable characters (face-to-face, via e-mail, social network sites, SMS…), thoughts and emotions.

- The story should support the integration of methods to gain knowledge and obtain change in attitudes, social norms and behavior, such as changing perspective, using of analogies, or giving the possibility to practice behavior. A document with all intervention methods identified was provided.

At the time of writing this paper, the call for tender is still open. Therefore, we cannot report on the type of stories received and to what extent they meet our expectations and whether they are appealing to our target audience.

LESSONS LEARNED

Although the plenary sessions were quite successful in generating a lot of interactions and issues to consider, we also learned a lot about the process of kicking off the development of a serious game.

- Some issues were repeatedly discussed during the sessions. A possible explanation could be the changing composition of the group of participants in some of the sessions. As such, people (especially the stakeholders) were not always aware of the fact that some issues had already been discussed in a previous session. A better focus for the sessions and better communication, especially about the issues on which a decision had been taken, could solve this to a certain extent.

- The involvement of technical as well as social-oriented people made the discussions very open-ended. Game developers brought in discussions on concepts important for the success of games, such as game genre, game modes, levels, rewards and penalties, winning, motivation to keep playing, while the other participants were more concerned about social aspects, such as the acceptance of the game by the youngsters, protection of the privacy, possible abuse of the game, the need to embed the game into a broader context. In addition, the technological concepts discussed were not always familiar to the other participants and sometimes considered as "details". Also implementation issues popped up very early in discussions.

- An important lesson learned is that a thorough problem analysis is needed before defining the scenario for the game. Creating a serious game is not only about defining an attractive scenario. Before this can be done, you have to decide or clarify a lot of other issues that could (or not) influence the scenario. This can be done in plenary sessions but some guidance is needed. Although a lot of relevant information can be found in different publications, as far as we known, a concrete list of issues and alternatives to decide on is not readily available. Such a list could have made our discussions more focused and efficient.

- A last note that we want to make is on defining the scenario itself. The sessions were not very successful in generating concrete ideas for scenarios (or story). This could be due to the fact that the process of creating attractive scenarios is a creative process that requires out of the box thinking. Maybe the people involved in the sessions were just not the right people for this. Maybe, it is indeed better to leave this to professional storywriters. In the coming months, we will be able to evaluate this decision and probably also learn some lessons from this outsourcing. For the moment, we think that it should be possible that a storywriter provides the main line of the story and we fill in the details (i.e. specific cyber bullying situations). But this approach has to be evaluated in the future.

TOWARDS MORE SUPPORT

When outlining a serious game, in the first place, a number of decisions needs to be made regarding the purpose and characteristics of the game. In that respect, we were missing a concrete list of issues to consider during this process. In addition, we experienced a lack of guidelines on how to do this and criteria that could help us taking the decisions. Therefore, we decided to develop a tool that could assist us, and in general an interdisciplinary team developing a serious game, in this process. We formulated the following requirements for the tool:

- The tool should *guide* the user, using a predefined set of issues, through the problem analysis process.

- The tool should *provide explanations* for the different issues. This is necessary as not all people involved will be familiar with games or serious games.

- The tool should distinguish between *issues required to consider and issues that are optional* because some issues may not be applicable for the case at hand.

- The tool should provide *the possible options and alternatives* when decisions need to be made for an issue and should provide explanations for these options and alternatives. Again, this is necessary, as not all people involved in the process will be familiar with games or serious games.

- The tool should allow *motivating choices and issues* considered. This will allow documenting the process.

- The tool should *indicate the impact of choices*. The choice of an option or alternative may have an impact on the options and alternatives available for other options, e.g., the choice for a certain pedagogical approach may limit the choice for the game genre.

- The tool should *visualize* the choices made and capture the motivations for the issues considered in an easy to use graphical user interface.

- The user should be able to *change decisions* already made and view the alternative choices again.

- The tool should allow exporting the results in a *textual and readable form*.

- The tool should be *usable in meetings and by different types of people* (i.e. casual users).

Before starting the development of the tool, we searched for existing or related tools. First, we looked for brainstorming tools, but these tools are very general in nature and cannot be customized to provide guidance in decision-making. The brainstorming technique is also not quite applicable for our purpose as it is more directed to gathering a list of ideas and then selecting the most appropriate ones. This would be useful for supporting inventing the actual scenarios, but with the tool we want to focus on the phase before this step.

We also looked to tools for creating mind maps, but these tools are also too general, cannot reflect optional issues, there is no way to define and select predefined alternatives and options, and they do not allow to show impact of decisions. Mind maps are more suitable to structure ideas and concepts. Although mind maps are not suitable for our purpose, we found the tools very inspiring from a visualization point of view.

We also investigated whether ideation tools could provide a solution, but little was found in the context of (serious) game development. We came across [5], [6] and [7]. In [5], game sketching is proposed as a way to explore new ideas in a fun, cheap, and risk-free manner. This approach is focusing on the ideation of the gameplay and not useable for our purpose. In [6], idea generation games, to be used by game designers, are introduced to enhance the creative process by immersing people into a playful activity. A similar idea was proposed in [7]. The refQuest game is proposed to structure the ideation process in the very beginning of an innovation process. The game is based on the Synectics method [8] (the process is very similar to brainstorming) but presented as a game. Although using game principles for supporting the ideation process is interesting, at this moment we did not opt for this direction. It may be interesting to consider it in future work.

We have opted to develop a tool that can be positioned as a structured mind-mapping tool where the mind map has a predefined structure. By providing an easy to use "point, tap, and drag" user interface on a tablet, any user with limited exposure to computer software should be able to work with the application.

The structure of the mind map is defined by means of a feature model [9]. A feature model is used to express the common and variable features in variable software, as well as dependencies between features. Features can be decomposed into more fine-grained features and can be mandatory or optional. It is possible to specify different options for a feature. A cardinality constraint is used to indicate the number of options that can be selected. As such, a feature model perfectly fits our requirements. However, as our target audience does not consist of software engineers, we do not use the term feature. We invented the term "guidea" (a portmanteau word for "guided" and "idea"). And because our representation is based on mind maps, we create "GuideaMaps".

We are still improving the tool, but Figure 1 shows a screenshot of the current prototype. It shows an example of a (limited) GuideaMap for serious games.

The guideas are represented as rounded rectangles. There is one root (here named "My Serious Game" and colored violet). The optional guideas are connected by dotted lines, the mandatory guideas by a solid line. The arrows on the lines point to the children. Children can be parents of other

children. Guideas for which options can be selected are (currently) colored yellow and marked with "????".
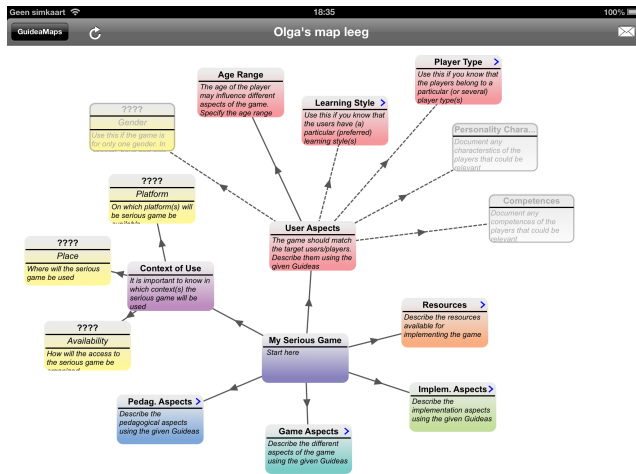

Figure 1: Screenshot showing a GuideaMap

The children of a guidea can be collapsed and unfolded. The guideas can be moved by dragging them. Moving a guidea with two fingers will also move all its children. Resizing is also possible.

Double tapping on a guidea will open the guidea and allow the user to enter comments. The comments are used to document decisions taken or to write down things that need to be remembered.

Tapping on a guidea will show some small buttons at the edges of the rectangle (figure 2). Which buttons are shown depends on the type of the guidea. Using one of these buttons, the user can choose the color of a guidea. Different colors can for instance be used to group related guideas.

An optional guidea can be deselected using the 'x' button at the bottom edge of the guidea. When deselected, its border becomes gray (see figure 1 for two examples), but the guidea itself is still visible so that the user can still change his mind. To allow this, the 'x' button changes into a '√'.

Tapping the button at the top of a guidea that allows options will open a pop-up window to select an option (see figure 2). Options that cause a conflict or require the selection of other options (for other guideas) are marked with a red icon and the required and/or forbidden options can be shown in a pop-up. The '+' button at the bottom edge will be available if more than one option can be selected. Options that are already selected will be grayed out. The 'x' button at the bottom edge allows removing the option again.

The feature model behind the GuideaMap can be loaded dynamically, which means that different maps for different purposes or types of serious games can be created. For the moment, we are still completing the feature model to be used in the context of our project Friendly ATTAC. As we were still working on the tool, it was not yet possible to validate the tool. We will report on this in later work.
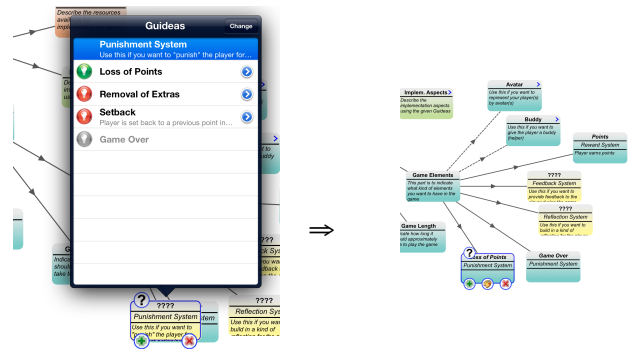

Figure 2: Selecting an option

REFERENCES
1. "Friendly ATTAC". http://www.friendlyattac.be/en/.

2. Q. Li (2008). "A cross-cultural comparison of adolescents' experience related to cyberbullying", *Educational Research*, vol. 50, nr. 3, pp. 223–234.

3. L. K. Bartholomew, G. S. Parcel, en G. Kok (1998). "Intervention mapping: a process for developing theory- and evidence-based health education programs", *Health Educ Behav*, vol. 25, nr. 5, pp. 545–563.

4. Singhal, A., & Rogers, E. M. (1999). *Entertainment-education: A communication strategy for social change*. Lawrence Erlbaum Associates Publishers.

5. Agustin, M., Chuang, G., Delgado, A., Ortega, A., Seaver, J., & Buchanan, J. W. (2007). Game sketching. In *Proceedings of the 2nd international conference on Digital interactive media in entertainment and arts*, pp. 36-43, ACM.

6. Kultima, A., Niemelä, J., Paavilainen, J., & Saarenpää, H. (2008). Designing game idea generation games. In *Proceedings of the 2008 Conference on Future Play: Research, Play, Share*, pp. 137-144, ACM.

7. Duin, H., Hauge, J. B., & Thoben, K. D. (2009). An ideation game conception based on the Synectics method. *On the Horizon*, *17*(4), pp. 286-295.

8. Gordon, W. J. (1961). Synectics: The development of creative capacity.

9. Abo Zaid, L., Kleinermann, F., & De Troyer, O. (2010). Feature assembly: a new feature modeling technique. *Conceptual Modeling–ER 2010*, pp. 233-246, Springer Verlag.