Collaborative Authoring of Serious Games for Health

Florian Mehm, Sandro Hardy, Stefan Göbel, Ralf Steinmetz
TU Darmstadt, Multimedia Communications Lab - KOM
Rundeturmstraße 10
64283 Darmstadt, Germany
+49 6151 16 {Florian Mehm: 6885, Sandro Hardy: 75164, Stefan Göbel: 6149, Ralf Steinmetz: 6150}

{florian.mehm, sandro.hardy, stefan.goebel, ralf.steinmetz}@kom.tu-darmstadt.de

ABSTRACT
The efficient production of Serious Games typically requires the collaboration of technical and game development experts, i.e. game developers and domain experts such as pedagogues or sports experts. For the use case of exergames with educational aspects, we demonstrate how an authoring tool for Serious Games can be specialized for collaborative authoring by defining roles of users and providing different views on the created game to each user group carrying out different tasks in the production of the game.

Categories and Subject Descriptors
H.5.3 [**Group and Organization Interfaces**]: Computer-supported cooperative work

Keywords
Serious Games, Exergame, Authoring Tool, Collaborative Authoring, Multi-User Software

1. INTRODUCTION
Serious Games, i.e. games not only intended to entertain but to fulfill another primary purpose, can be differentiated from regular digital games by the increased need of collaboration of technical experts with experts in the target domain of the game. We have previously presented the authoring tool "StoryTec" [1,3] for non-programmers as a possible software solution to this process. In the present work, we expand upon the collaborative aspect of StoryTec by providing specialized views (comprising different tasks to be carried out in the authoring tool) to different user groups of the authoring tool. Note that in the context of this paper, we are not using the term "collaborative authoring" as indicating real-time interaction.

The research project Motivotion60+, into which the presented concept was integrated, targets at incorporating a motivational way of being active in the daily life of older persons. Sensors, web-technologies and communications technologies are combined with a game-based multimedia system. The resulting exergame combines physical exercises in the form of small games with an educational part involving multimedia presentation of information and associated quiz elements.

2. RELATED WORK
In the field of authoring tools for games or similar multimedia applications, few tools offer collaborative features. Among those are the TLTCS system [2], which is comprised of a set of different tools for different author groups and a version control system or the Narratoria system [4], which introduces collaboration by breaking storytelling applications down into small parts which authors can work on simultaneously.

The need for authoring tools for exergames which allow collaboration between different groups of experts can be observed by the growing interest in the field, exemplified by the submissions to the Game Days 2010 conference which was centered on exergames [5].

3. COLLABORATIVE AUTHORING
3.1 Basic Approach
The basic approach to authoring in StoryTec is discussed in detail in [3]. For an impression of the user interface see Figure 1. Authors define the overall structure of the game by decomposing it into scenes and transitions between these secenes, which are visualized in the Story Editor component of StoryTec. Authors define the actual gameplay for a specific scene (i.e. what the player will experience in this scene, including the game type, rules and parameters) by choosing what we refer to as interaction templates Authors can choose from various templates and fill the scene with content, using the WYSIWYG Stage Editor. More advanced possibilities such as player modeling are covered in detail in [1].

3.2 Involved User Groups
In the following the user groups found in the production of an exergame such as the motivotion 60+ game are described with the roles they have in the authoring process. Note that this list extends the one provided in [3] and that not all groups are necessary for the creation of a Serious Game for Health.

Domain experts, in a first step, formulate the requirements for the games, e.g. the training effects to be achieved.

Game designers formulate ideas and designs for configurable, re-usable interaction templates for games based on these requirements.

Game programmers are only indirectly involved in the authoring process, since they are tasked with implementing the game designs which includes the implementation of interaction templates which are run on the target platform of the game.

Authoring tool programmers are responsible for creating implementations of the interaction templates inside the authoring tool, which support the WYSIWYG authoring approach. This group as well as the previous one is supported by a component-

based software engineering approach in StoryTec, which is outside the scope of this paper.

Expert authoring tool users are able to control the authoring tool and configure the domain-specific views for the domain experts by specifying which parts of the game they will be able to change and which parameters are displayed to them.

Domain experts in a final step become active again to fill the game with content according to their expertise. These experts do not require the same level of knowledge of the authoring tool as the previous group; they are only able to make changes in those areas designated to them which require their specific expertise. In the example of Motivotion 60+ these could be content providers tasked with entering the quizzes and the associated information such as texts or images.
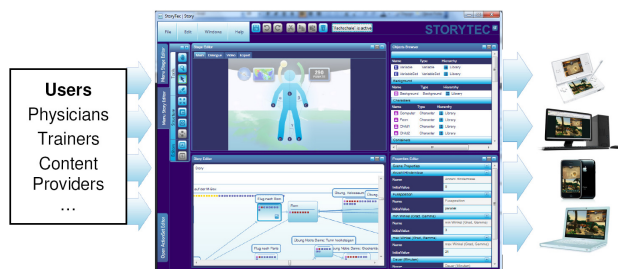
Figure 1. The authoring tool StoryTec in the version used to collaboratively author the motivation 60+ game. The Stage Editor (upper part) shows the parameters to be set for the exercise in the specified scene. Games can be exported in various formats.

3.3 Interaction Template Creation

A player application is required to interpret the data entered by the authors into an interaction template and realize the gameplay of the template. This can mean interpreting user input, rendering graphics, playing sounds and other multimedia aspects. This implementation of an interaction template is carried out by game programmers, since they are familiar with the target machine/environment and the implementation of games.

For the visualization of the interaction template in the authoring tool we implemented to variants. The first is a specialized view, which is provided by authoring tool programmers and allows very specific WYSIWYG editing of the interaction template. The alternative requires no programmers but an advanced user of the authoring tool. This user can create new interaction templates by specifying the parameters that are used to configure the interaction template and build a visual representation of the interaction template from basic multimedia objects found in StoryTec such as images or text labels. The implementation of this interaction template then uses these parameters as input. This is especially useful for rapid prototyping when no full implementation of an interaction template yet exists.

In the described use case, a specialized authoring view could use a modifiable 3D character for setting the correct poses of the player directly in the authoring tool. On the other hand, an advanced user could create an interaction template in the authoring tool, specifying fields for parameters such as the angles between the joints of the player.

3.4 Domain-Specific Mode

A user who is tasked with creating a serious game using StoryTec is provided with the interaction templates described above as well as structural templates which provide useful structures to be inserted into a game, for example a structure for branching between different story paths in the game.

This user can enter the basic structure of the game as he or she sees fit. After this structure and the interaction templates have been assigned, the user can specify user groups which are responsible for subsequent tasks.

The game in the basic form is then distributed to each of the user groups. Upon opening StoryTec, they are only able to change those parameters that they require for their work. For example they might be not able to add new scenes or transitions to the game. When opening a scene containing a physical exercise, the physicians are only presented with the parameters for configuring this exercise. The content providers are only able to change the content of scenes which are marked as quizzes, adding content such as images or the questions and answers for multiple choice quizzes.

4. CONCLUSION

We have shown how an authoring tool specifically designed for the creation of games can be augmented with mechanisms which allow collaboration between different user groups, supporting the domain-specific workflows of each of these groups. While the work presented here shows the technical feasibility of this approach and previous studies have investigated the usability of StoryTec, the extensions supporting collaboration presented herein have to be evaluated in detail, including acceptance tests which will be carried out in the context of the described project.

5. ACKNOWLEDGMENT

6. REFERENCES

[1] Göbel, S., Hardy, S., Wendel, V., Mehm F., and Steinmetz, R. 2010. Serious Games for Health - Personalized Exergames. *Proceedings of ACM Multimedia 2010*. ACM, New York

[2] Johnson, W.L., and Valente, A. 2008. Collaborative Authoring Of Serious Games For Language And Culture. *Proceedings of SimTecT 2008*

[3] Mehm, F., Göbel, S., Radke, S., and Steinmetz, R. . 2009. Authoring Environment for Story-based Digital Educational Games. *Proceedings of the 1st International Open Workshop on Intelligent Personalization and Adaptation in Digital Educational Games*, 113-124

[4] Velsen, M.V. 2008. Towards Real-time Authoring of Believable Agents in Interactive Narrative. *Proceedings of the 8th International Conference on Intelligent Virtual Agents*. Springer-Verlag Berlin, Heidelberg

[5] Wiemeyer, J., Göbel, S. (eds.). 2010. Serious games for sports and health. *Proceedings - Game Days 2010*. Technische Universität Darmstadt / Institut für Sportwissenschaft, Darmstadt