

Story Creation in **VIRTUAL GAME WORLDS**

Allowing young people to create computer games they will ultimately want to play not only offers key educational benefits but builds self-esteem and teamwork skills.

The fact that children spend considerable amounts of their time playing computer games is a

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phenomenon that has not gone unnoticed by educators [5].

In addition to the obvious motivational effects of games on young people, research has begun to look at the actual learning that can occur in game-playing settings, for example, logical reasoning and teamwork skills [9].

Much of the research examining games in educational settings looks at children playing games designed by professional software developers, with little focus on children creating their own games. Some work investigating this issue (for example [7, 8]), looks at how the process of game creation fosters children's programming skills as, until very recently, it was impossible to create a game without some knowledge of programming. In the case of 3D virtual environment role-playing games, it has required both advanced programming and mathematical skills.

However, technology has reached the point where these skills are no longer always necessary: more commercial games are shipping with game-editing tools to encourage skilled members of their user communities to develop further (free) content.

A good example of this phenomenon is Bioware's role-playing game, *Neverwinter Nights*, released in 2002 with the *Neverwinter Nights* toolset that can be used by nonexperts to create characters, settings, and interactive plots. No knowledge of 3D modeling is required, and basic tasks can be accomplished without any programming skills.

Given these developments, we can now begin to explore how children use game-creation toolkits to build sophisticated 3D-interactive games that their peers can play. This new ability to produce a finished product of commercial quality is important, as children have high expectations for games in terms of quality of graphics, among other features. If we are to use games in education, and expect them to motivate and interest children, they must be of similarly high quality, otherwise their effect will be lost [4].

Additionally, with the decreasing focus on programming skills, at least for designing games within a game-creation environment, computer games can be integrated more tightly with specific domains within the curriculum, for example, literacy and narrative development, the subject of this article.

Literacy Development in Virtual Environments

Literacy development, particularly the improvement of writing skills, is a high priority for many educators, as a number of children lack motivation for writing, and experience writing apprehension [10]. This is unfortunate, given the central importance of narrative as a mode of thought [3]. Although many children have a wealth of creative story ideas, written language may act as a barrier to expressing these ideas [1, 10]. If children could develop their creative ideas in a nontextual medium, they would be able to share them with others more readily, which could have positive effects on self-esteem.

We believe the toolsets included with 3D-interactive role-playing games offer a unique opportunity for doing so. Because creating a high-quality game using these toolsets no longer requires programming, interactive 3D audiovisual narrative can be created through user-friendly interfaces and minimal scripting. This allows children to focus on literary concepts such as creating gripping plots, believable characters, and compelling settings.

Additionally, these toolsets allow children to experiment with a type of fiction with which they may have little experience, namely interactive fiction, which offers the reader a choice of paths through a story. This type of fiction has been realized in various formats, such as early text-based computer adventure games, and research has shown that having children create these types of games has a positive effect on their writing skills [2, 11]. More recently, 3D virtual role-playing games embody interactive narrative. Players choose their own path through the virtual world by deciding how to respond to the situations they encounter.

This article considers the benefits to be gained from enabling children to create stories in the medium of interactive 3D virtual reality computer games. We describe a study in which 10 teenagers created their own stories using the *Neverwinter Nights* toolset, describing the games creation process, the main findings, and their implications.

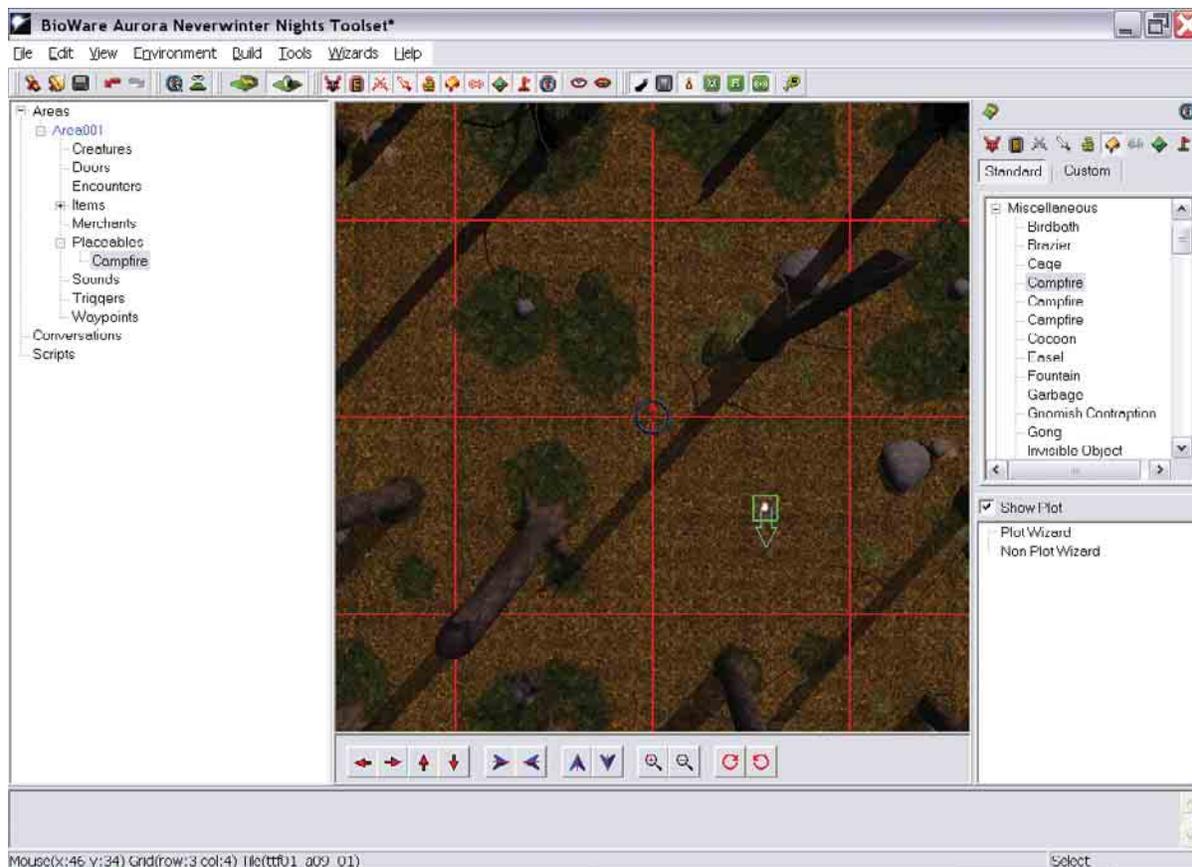
The Game Maker Workshop

The Game Maker workshop was a week-long summer workshop open to all secondary school pupils (ages 12–15). Its aim was to:

- Give young people an opportunity to tell their own stories through computer games;
- Explore computer games creation as a method for developing literacy skills; and
- Discover the strengths and weaknesses of the *Neverwinter Nights* toolset with a view to developing a custom made educational games authoring tool.

The workshop participants included nine boys and one girl, and were self-selecting, since participation in the workshop was voluntary. The workshop leaders were the first author, a visual artist, a professional storyteller, and an experienced amateur games designer with considerable experience using the *Neverwinter Nights* toolset.

The workshop was organized around a series of activities, described here (with approximate times indicated in parentheses).



Group discussion (30 minutes). The discussion focused on participants' preferred games and game characters, and was followed by a general introduction to the workshop. The discussion was lively, and worked as an effective icebreaker.

Initial trial of Neverwinter Nights game (30 minutes). Participants played the tutorial level of Neverwinter Nights to become familiar with the game. This led to a critique of the tutorial and a discussion of principles for good game design.

Character design (30 minutes). The young people drew pictures of their characters' physical appearance, and wrote notes describing their backgrounds, motives, personalities, and missions.

Character model making (4 hours). Once characters were designed, the artist explained how to make 3D character models by layering plasticine onto wire skeletons prepared by the artist based on creatures available in the Neverwinter Nights toolset. The artist then facilitated the creation of three sets for storyboarding: a river, castle, and a graveyard.

Plot planning (40 minutes). On day two, half of the participants planned stories in the morning and created games in the afternoon, while the other half did the opposite. Each participant wrote down the first plot episode in a game, that included the charac-

ter they had created. Participants helped each other brainstorm by adding plot episodes to each other's plots.

Storyboarding with digital cameras (20–60 minutes). Character models were posed in the stage sets to represent each plot episode. Digital photos were then taken of each scene and imported into Microsoft Powerpoint where they were arranged into a storyboard with captions explaining each scene.

Game authoring using the Neverwinter Nights toolset (10–13 hours). The participants explored the Neverwinter Nights toolset at their own pace, with the games expert available to answer questions. Participants tended to first explore the facilities for creating areas and characters before moving on to more advanced tools, such as joining two areas using portals or doors; making interactive conversations; making merchants sell items to a player; and using the plot wizard to make quest storylines.

The figure shows the Neverwinter Nights toolset. The area in which the story will take place is represented as a view from above, with a superimposed grid. The game designer can choose from a range of objects on the right-hand side and place them in the

Inserting a campfire on an area using the Neverwinter Nights toolset.

The Game Maker workshop was **THE FIRST STEP TOWARD UNDERSTANDING THE EDUCATIONAL BENEFITS** to be gained from enabling young people to create stories in the computer game medium.

area. In this case, a campfire has been placed (outlined in light green).

Reflecting and planning (20 minutes). On day three of the workshop, participants reported on their progress. Half of the participants estimated they spent the most time creating areas, while the other half focused on a range of other aspects.

Participants then planned out their remaining time. All expected to spend the highest percentage of their total time creating areas, although some considered creating conversations and characters almost as important. In all cases, the young people designed on their own, rather than in groups, although they often consulted each other.

Interview Analysis

On the last day of the workshop, the participants were interviewed individually. These interviews lasted approximately 15 minutes and were videotaped, and later transcribed. The interviewer asked a series of questions relating to the participants' computing background, their opinions of the workshop activities, and their experiences with the Neverwinter Nights toolset. We focus here on the latter two issues, as this data is useful both for developing future workshop activities, and for evaluating the features of the Neverwinter Nights toolset.

Workshop components: Plasticine model-making. Reactions to building wire frame and plasticine character models were primarily positive. Some participants found the experience useful for visualizing their characters, although others were forced to abandon their character models because physically similar characters could not be found in Neverwinter Nights. One participant noted that although the physical appearance of his model did not make it into the game, the character's mind and personality did. This suggests the inclusion of pregame design activities that focus on the personality and motivations of a character.

Workshop components: Game design. When asked which aspect of game design they enjoyed the most, "creating the characters" was most popular, with "creating areas" being second favorite. This encouraging find suggests that participants enjoyed those aspects of game design similar to aspects in the design of plays and other types of drama.

The plot wizard (which guides users through the creation of the story by having them specify dialogue

between the character and player) was the least favorite game-design feature. Although not difficult per se, most participants felt it was tedious to plan out the conversations, and click through all of the wizard's various screens.

Use of the toolset. Feelings about the toolset were positive overall. All of the participants found the toolset easy to use once they became familiar with it.

The most difficult part of the toolset was the portals, which can be placed within an area, and allow separate areas to be linked together. The difficulty with defining portals appears to stem from the need to have a unique identifier for each portal in order to specify which location should be reachable from which portal. Furthermore, this task requires scripting, and many participants needed help with this. They suggested the toolset could be improved by having it automatically generate unique identifiers, or by having a drag-and-drop interface for portal creation rather than a wizard.

One of the biggest issues targeted for improvement concerned the characters. Specially, young people want the ability to do full character design, for example, to include oneself in the game; and an increased ability to modify features of existing characters such as facial features and clothing.

Other suggestions for improving the toolset included:

- Make the inclusion of sound recordings possible; for example, include key phrases for characters;
- Increase choice of objects;
- Provide more options for present day scenarios (as opposed to "medieval" ones);
- Include the toolset as part of the game itself (currently, it is necessary to quit out of the toolset and launch Neverwinter Nights in order to view one's game); and
- Allow the use of icons within the plot structure representation to represent things like quests or conversations.

Discussion

The Game Maker workshop was the first step toward understanding the educational benefits to be gained from enabling young people to create stories in the computer game medium.

The most important benefit was, as anticipated,

the strong motivational effect this workshop had on the young people who took part. They all reported they enjoyed the experience and would continue to use the Neverwinter Nights toolset if they had access to it. They became engrossed in the games design task and it was very difficult to persuade them to stop working and take breaks.

A related benefit of the workshop was bolstering the self-esteem of the participants, who were eager to show off their games to other workshop participants, and to friends and family members at the Edinburgh International Games festival, which took place one week after the workshop. One parent commented that her son didn't like writing stories at school, yet he spoke with great pleasure about the game he created in Neverwinter Nights. She encouraged him to develop his interest in computer game design, and perhaps even study it in further education.

The Game Maker study also answered some open questions about the feasibility of computer game authoring for young people. Although the Neverwinter Nights toolset simplifies the game design process, there are some difficult concepts and complicated procedures involved in creating interactive narrative. These include planning an interactive plot; understanding how interactive dialogue is represented in the interface; and ensuring that objects such as portals have unique tags. In spite of the complexity of the games-creation task, all of the young people managed to create a game to their satisfaction. The games varied in sophistication, but this would be expected when the authors have varied computing backgrounds and are of different ages.

Although the young people were able to use the Neverwinter Nights toolset to express their story ideas in game form, some toolset features were difficult to use, such as the plot wizard. In addition, the software has no facility for visually representing multiple plot threads.

Finally, Neverwinter Nights has a number of features that make sense in the context in which they were designed, but may not be desirable in terms of game design for educational purposes. For example, characters and settings are confined to the Dungeons and Dragons genre, and have a pseudo-medieval appearance. Allowing for a wider range of settings and characters would similarly expand the types of stories which young people could create.

Additionally, the characters possess inherent features, such as skill and ability in different types of combat. Ideally, a game author should be able to create a character as a blank slate, and add personality features that go beyond the typical combat-oriented scenario, for example, compassion or trustworthiness.

We are currently working on a purpose-built tool

(AdventureAuthor) for creating stories in the games medium, designed to directly support story construction. The AdventureAuthor prototype addresses the limitations of Neverwinter Nights by providing a visual representation to support plot planning and interactive dialogue, as well as guides the user through the game creation process [6]. It will also allow for a broader range of settings and characters with more fully developed personalities.

More research is required to identify how the game-making process could be integrated with the curriculum in a classroom context. In addition to the general storytelling skills common to all storytelling media, such as developing coherent plots, motivated characters and convincing dialogue, game authors are likely to develop medium-specific storytelling skills. Learning how to express the emotional content of stories using sounds, music, and lighting effects is a valuable part of becoming literate in the medium of computer games. ■

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