

A virtual tour in Ancient Worlds

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Abstract

The use of video games or 3D virtual worlds in the production of animation projects is a very common practice. However, there is limited research on investigating the impact of a theoretical framework of Digital Storytelling on a machinima production. This paper aims to establish the connection among virtual worlds, machinima and digital storytelling and recommends a method for using them as learning tools. In order to achieve this, we guided high school students from Turkey and Greece, who participated in a e-twinning collaboration project, to produce a short animation film about a local ancient monument of their area using the aforementioned tools. In this work, we present the outcome of the Greek students, who created a machinima film, using Opensim virtual world platform. The approach was evaluated using a theoretical framework for digital storytelling and indicated positive results.

Keywords: virtual worlds, machinima, digital storytelling, collaboration.

1 Introduction

Virtual worlds have been utilized as educational platforms for over a decade attracting the interest of the educational community (Barab et al. 2012; Connolly et al., 2012, Tüzün & Özdiñç, 2016; Vrelis et al. 2016). The main advantages of 3D environments are their participants' high level of motivation and engagement combined with the authentic and collaborative learning. Moreover, a captivating aspect of virtual worlds is the utilization of the 3D environment in order to narrate stories and to produce short animated films known as machinima.

The purpose of this paper is to present the experience that Greek 16-year-old students had in a project combining 3D virtual worlds, digital storytelling and machinima and their learning outcomes. In this project the main concept was based on a virtual journey in 3D simulated ancient worlds. The 3D platform was the infrastructure, where students from Greece and Turkey who participated in an e-twinning¹ collaborating program were gathered together. Students were taught how to build 3D

¹ <https://www.etwinning.net/en/pub/about.htm>

simulations and representations of ancient monuments from their countries. Therefore, an online virtual world called GEA (Global Educational Area), was implemented on the Opensim platform, which is an open source software for creating 3D virtual environments. In GEA both groups of students were able to experiment and construct any part of the chosen monuments. After constructing the 3D content, students were asked to write dialogues in order to create a role-playing game simulating a story that had taken place in their country's monument. The whole activity of the Greek partner was recorded and used for producing a short-animated film with titled "Odysseus visits Nekromanteion ...the Oracle of the dead"². The main concept of the film was based on Homer's rhapsody "λ" in which Odysseus descends to Hades. In an effort to combine the myth with reality we decided to place Hades in the Nekromanteion³.

All students worked in groups, collaborating with each other in order to complete the project. Students from both countries were in contact and exchanged ideas during the whole project, which lasted approximately 4 months. The main objective was for students of one country to experience different aspects of their local history and to inform their peers from the partner country about the local monument.

At the end of the project, students of one country evaluated the digital story of the other, using an assessment tool that was based on a digital storytelling rubric (Barrett, 2006). The results depict an overall satisfaction regarding the quality of the content that was created by Greek students.

During the whole project, we confronted technical problems, such as performance issues and interface difficulties, similar to those cited in the literature (Gregory et al. 2015). However, the overall experience was positive. Students from both countries had the opportunity to unleash their creativity, to gain and exchange knowledge in an experiential way through the dialogues they wrote and the role-playing game they created and to participate in the virtual environment.

In the following section, an overview of the concepts of virtual worlds, digital storytelling and machinima is performed. In section 3 we provide details on the design and implementation of the project. Section 4 contains details of rubric evaluation. Finally, section 5 summarizes our conclusions.

2. RELATED WORK

2.1 Virtual Worlds

The educational aspect of virtual worlds was highlighted early on, almost with the emergence of this technology. The 3D content design flexibility, the ability to construct cognitive artifacts, the realistic representation, the virtual meetings and collaboration offer a great learning potential to educational community (Dede et al., 2004; Dieterle & Clarke, 2007). Virtual worlds have also integrated gaming characteristics, which enrich and enhance the learning process (Konstantinou et al., 2016,). Although virtual worlds did not reach the initial prediction (Wagner, 2007), they

² <https://youtu.be/iNB2Y2cajwI>

³ http://odysseus.culture.gr/h/3/eh351.jsp?obj_id=13721

are still being used by thousands of users⁴, while the overall virtual reality application users have reached a huge number of 170 millions⁵ showing a global and constant interest in this field.

According to modern pedagogical methods, instructional design in virtual worlds focuses on active and student-centered learning. Teachers play the role of facilitator, thus intervene only when necessary, giving learners more freedom to develop new forms of creative expression and experimentation. Participants feel free to express themselves using avatars (Sung et al., 2011), they experiment safely, solve problems, understand concepts, interact with the environment and cooperate through role playing (Kamel Boulos, et al., 2007; Ketelhut, et al., 2010).

Undoubtedly, educational activities in virtual worlds need to be carefully designed, following modern teaching strategies in order to establish an interactive, collaborating, creative and productive learning environment.

However, an interest regarding the utilization of virtual worlds over time has emerged showing that this technology has not been mainstream mainly due to the lack of funding in educational institutions, as well as in the absence of technical and teaching support (Gregory et al. 2015).

2.2. Digital story telling (DST)

DST is a combination of telling stories by using digital technology such as graphics, text, video, audio and images. Digital stories can be categorized into: personal narratives stories, historical documentaries, stories that examine dramatic events that help us understand the past, and stories designed to inform or instruct the viewer on a particular concept or practice (Robin 2006).

DST can be an effective tool in the hands of a teacher. It can be used as an engaging mean to present new ideas and attract the interest of students. It can be also an effective tool in students' hands. Based on constructivism theory, students can express their creativity and enhance their knowledge construction by researching a topic, choosing a particular point of view or answering to a dramatic question. At the same time, students who participate in a DST project develop their communication skills as they need to organize their ideas and compare opinions in order to conclude to the final stage, which is the digital story's script. Another advantage of DST is that it can help students present their creativity to an audience or to public through the Web, which means that they commit to a carefully designed and serious presentation. Furthermore, students working in groups can share their digital stories and can be asked to evaluate each others' work. According to social constructivism learning theory this is a valuable learning process in which students construct knowledge being influenced by their peers' work (McKinley, J., 2015).

However, research on the educational utilization of DST shows controversial aspects. Teachers and instructional designers should avoid an uncritical use of digital storytelling (Stocchetti, 2016). Both students and teachers should take into

⁴ <http://dwellonit.taterunino.net/sl-statistical-charts/>

⁵ <https://www.statista.com/statistics/426469/active-virtual-reality-users-worldwide/>

consideration some specific criteria when using DST, for example the Dramatic Question (a question that must be answered by the end of the story). Furthermore, they must take into consideration what type of technology is needed and if that technology can be accessed and can be used by everyone. It is worth noting that there might be copyright issues when students use digital files. They should be informed about copyright licenses and should be encouraged to use free and open access files.

2.3. Machinima⁶

The use of 3D game technology in the production of short animation movies is an old practice that goes back to the 90s. It was established as a culture of using videogames in order to promote players into performers (Lowood, 2006). One of the first known attempts was the “Diary of a Camper” on October 26, 1996, a short animation film based on Quake game. This practice is called Machinima which is based on the phrase *machine cinema*. Machinima has advantages and disadvantages when compared to other styles of filmmaking. First of all, it is a simpler way to make an animation movie compared to other more advanced and complex animation software, which means that almost anyone can produce a low cost and low effort animation movie. Of course, the simplicity has drawbacks such as the limitation in the available characters’ expressions and movements, which are poorer in comparison to more specialized animation tools. However, today some game companies have developed dedicated software in order to endorse people’s machinimas.

3. IMPLEMENTATION

Our project was based on the combined use of the three approaches described in previous section. We decided to use the Opensim 3D virtual world platform as an infrastructure, and digital story telling practices supported by machinima in order to produce a short animation film.

The sense of «presence» (like I'm there) is a major advantage of a 3D virtual environment. Students during the construction of virtual monuments were able to feel the coexistence of their peers (from the other country), to solve problems together in real time, to share opinions, to interact with each other, to make jokes and anything else, which describes the meaning of collaboration. The sense of this coexistence in the virtual environment enriched the experience of collaboration between students from the two partner countries and evolved in a form of "virtual hospitality". Consequently students had the opportunity to feel closer and cooperate with their foreign peers. The main objective was students to learn about local monument and history utilizing 3D virtual worlds, machinima and digital storytelling trying to apply the Seven Elements of DST. Some supplementary learning objectives for students were to:

- browse and use basic elements of a three-dimensional virtual world and construct 3D digital objects,
- store, retrieve and organize digital files,

⁶ <http://wiki.secondlife.com/wiki/Machinima>

- cooperate in order to solve problems,
- develop their critical ability through interaction with the environment and others,
- write the dialogues for the digital story according to specific DST criteria,
- communicate and cooperate with their fellow students from the partner country,
- interact with local authorities (Archaeological Service, Municipality) for the collection of information.

At the beginning, the Greek students were assigned to gather information online about Nekromanteion, the monument they had chosen to represent in the 3D environment. As part of this first step, we organized a visit to Nekromanteion and a discussion with a representative of the local Archaeological Service about Nekromanteion's operation during Antiquity.

Then the next step was to provide our students with the necessary instructions in order to get familiar with the virtual environment and construct virtual items in order to build the virtual monument. Within the environment, the students from both countries were able to participate in virtual meetings (using voice chat), doing small construction steps and gradually completing the final structure of the overall monument.

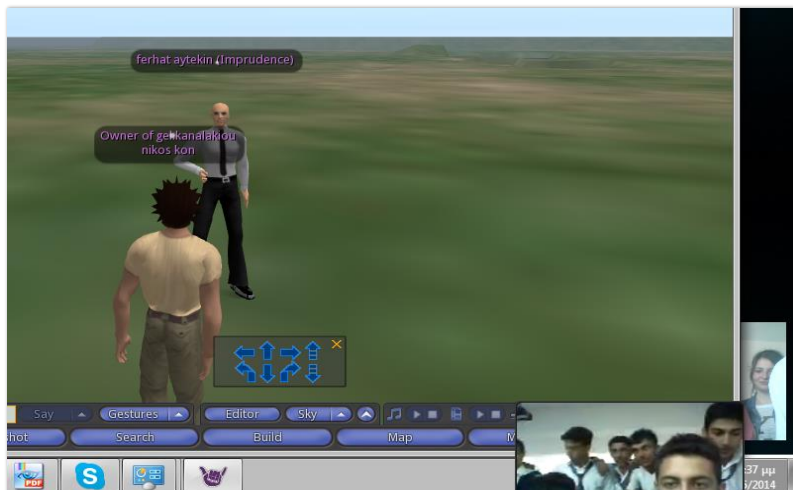


Figure 1. Virtual meeting with Turkey partners

The students worked in groups building 3D objects one or two hours per week for the second and third month. Subsequently, they thought of an imaginary event, which would have taken place in the authentic environment of the monument during the era of its operation and they wrote the dialogues that were used for a role-playing game and the digital story. The students spent one to two hours per week during the fourth month in order to write the dialogues for the story. All the material that has been produced during the program was gathered in a digital archive. The final stage was the role-playing game, where 8 students impersonated persons of that time that have been engaged in an imaginary event. The final product was the role-playing game, which was filmed as a digital story and machinima.

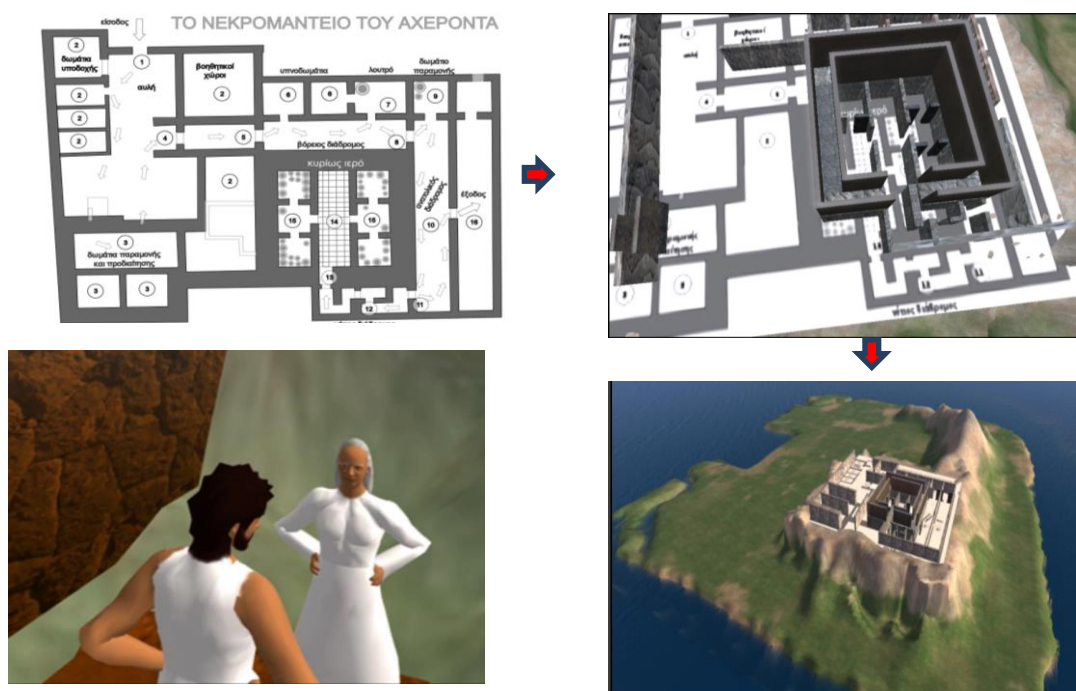


Figure 2. The process: A top view of Nekromanteio, was imported as jpeg image in the 3D virtual world. Based on this image the students with the help of their tutor, built part by part the whole monument. On the right is the machinima “Odysseus visits Nekromanteion ...the Oracle of the dead.

During the project, students had to search for dialogs from the script of Odyssey, more specifically from the L rhapsody, in which Odysseus travels to the underworld to meet Teiresias (the blind prophete) in order to take his advice on how to return to Ithaki. So, they adapted the lyrics of Odyssey in order to create the imaginary story. The story played in the 3D simulation of Nekromanteion combining the myth of the descent of Odysseus in Hades with the historical hypothesis of the operation of the Necromantion.

4 EVALUATION

At the end of the project, students of one country evaluated the digital story of the other country using an assessment tool based on a digital storytelling rubric (Barrett, 2006). The purpose of this evaluation was to highlight how well students applied the Seven Elements of Center of Digital Storytelling in Berkley, California (Robin, 2008) as described below:

1. Point of View:	If there were a clear point of view in each part of the whole story.
2. A Dramatic Question	If there was a central dramatic question and if it was answered.
3. Emotional Content	If there was content that contributed to creating an atmosphere.
4. The Gift of Your Voice	The quality of voice in narration of the story.
5. The Soundtrack	If the music and soundtrack was fitting with graphic and the story.
6. Economy	The balance of details in the story, the right amount is demanded.
7. Pacing	How the rhythm of voice and punctuation helps or bother the audience.

For each one element, Turkish students were asked to evaluate Greek students' digital story by using the evaluation rubric. They rated Greek students' work in scale from one (worse,) to 4 points (best) using an online questionnaire created in Google Forms. In order to present an example of the evaluation rubric the questions-criteria were formulated as follows:

Point of view

- The point of view is well developed (4 points)
- The point of view is stated but does not connect with each part of the story. (3 points)
- The point of view is stated but no attempt is made to connect it to the overall meaning of the story. (2 points)
- The point of view is only hinted at or is difficult to discern. (1 point)

Table 1. The evaluation of the DST-machinima animation film (1:worse – 4:best)

...	Min	Max	Mean	Stdev
The point of view is well developed.	1	4	3.05	0.79
A meaningful dramatic question is asked and answered within the context of the story.	2	4	3.45	0.67
Content create a distinct atmosphere or tone that matches all parts of the story.	2	4	2.82	0.85
Voice quality is clear and consistently audible throughout the presentation.	1	4	2.36	1.00
Music stirs a rich emotional response that matches the story line well. Graphics coordinated with the music.	2	4	3.05	0.65
Economy: The story is told with exactly the right amount of detail throughout.	1	4	3.09	0.87
The pace (rhythm and voice punctuation) fits the story line.	1	4	2.5	0.74

Relating to the question if students followed successfully the seven elements of DST the results of evaluation rubric are in general satisfactory. Results indicate that Turkish students evaluate the 1st, 2nd, 5th and 6th element with high rates.

More specifically “The point of view” was considered as well developed (3.05), which means that (audience) students understood explicitly the (authors’) students’ perspective. “The dramatic question” also was rated with 3.45 meaning that a key question was clear and answered by the end of the story. In our case the dramatic question was “how Odysseus and his partners can return back to their country Ithaki”. Music and soundtrack were rated with 3.05 indicating that music supported the DST and contributed to make the corresponding atmosphere. Finally, “Economy «was rated with 3.09 showing that the digital story was presented with adequate details without overloading the audience.

On the other hand, the elements 3, 4,7 had a total score less than 3 points indicating a slight weakness. The “Emotional Content” was evaluated as the content didn’t match all parts of the story. The “Voice Quality” was considered to be not so clear with the lowest score of 2.36 points. Obviously, the pronunciation of English and the narration skills of Greek students wasn’t clear throughout the story and could be improved in another attempt. Finally, the pace was rated with 2.5 indicating that rhythm and voice punctuation could be further improved.

The learning outcomes of our project indicate that the students expressed their creativity and completed the learning objectives, although we confronted many difficulties (performance, connectivity, familiarity with the platform). The majority of Turkish students evaluated Greeks' machinima film mostly with 3 to 4 points based on DST rubric, which satisfied our students as their effort was recognized. Turkish students confronted more difficulties because they were less familiar with this technology.

5 CONCLUSIONS

This article presented our first attempt to combine 3D virtual worlds, with digital storytelling and machinima in order to develop a learning activity for high school students, introduce them to the tools and have them evaluate their own result. For this, they developed the Virtual Tour in Ancient Worlds project in which they worked on a standalone Opensim virtual world, practiced with the Seven Elements of Digital Storytelling and employed the machinima technique for presenting their collaborative project.

The results of the evaluation rubric, that the Turkish students completed for the work of their Greek teammates showed a general success. The main objective was for students to attain knowledge for their local history by constructing a simulation of a local monument using historical facts and information they gathered both online and from local authorities. They recorded the whole process as an animation movie and presented the result to their peers in a short film that demonstrated the monument, its history and its role in local community.

Despite the difficulties, we would state that it was a successful project, or a success (digital) story, but it wasn't a success due to the quality of 3D content or the artistic level of the film, the success was about the communication and collaboration. Turkish and Greek partners worked together distantly, became virtual friends and they realized that we are not so different, we are close enough to work together.

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