

Videogame Utilization in the Education Process

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Keywords: videogames, edutainment, critical literacy, identities

Abstract. This paper attempts to outline the field of videogame utilization in education and nominate the field of learning advantages and benefits deriving from such a teaching practice. It also aims at shedding light to the effects of entertainment software and applications not only in regards to knowledge transmission but also to developing valuable skills, shaping multiple identities for both learners and educators. By maximizing new technology potentials in the shaping of virtual environments, via embedment of the basic principles conditioning human cognitive learning, videogames can expand the core potentials of the learning process and be included in the future of education. Thus, this paper is targeted towards presenting to educators a different perception/approach to videogames, as forms of entertainment but also of education, provided they will become trained and able to tell the difference and make responsible choices of material-videogame combined with imaginative learning activities.

1. Introduction

Technological advances have radically changed our everyday lives, our way of thinking, learning and doing. As Rutsky [1] and Davis [2] also point out, in the 21st century we have begun to realize that technology is in the center of critical thinking on culture and nature. New technology embedment in education has inevitably led to crucial changes in the education delivery process.

The introduction of Information and Communication Technology (ICT) in education has transformed the learning philosophy as well as teaching practices, which are now delivered by active engagement and participation of all stakeholders involved in the education delivery process. Recently, new means of teaching and learning have infiltrated education, promising a wide variety of new potentials for educators and students, along with new learning environments, which reinforce a new learning philosophy and establish a new set of relationships among stakeholders. In addition, nowadays technological means, as teaching and learning tools, constitute a necessity in educational activities [3].

Learners' involvement in the education process has been shifted due to the changes learning has undergone in contemporary digital era. The number of educators employing new technologies practices in their teaching is rapidly increasing in an attempt to live up to the sociopolitical developments and aiming towards training future active citizens in a contemporary technological era. Videogame utilization constitutes a highly controversial issue as researchers, educators and parents are quite skeptical on videogame contribution to learning and, thus, to achieving cognitive goals, developing skills and adopting stances and attitudes.

Edutainment is an umbrella term including all these entertainment applications employed in education in order to serve educational/learning needs. Several researchers, exploring the field of coupling between videogames and education, support the view that learning is embedded not only

in the videogame but also in the videogame's surrounding environment. In other words, learning via videogames is a widely acknowledged cultural practice of inclusion. On the one hand, the learner acquires the knowledge related to the functional mechanisms of the videogame and, on the other hand, he exchanges practices with other gamers, he interacts with the videogame content, the manufacturers and their philosophy etc. Thus, the learner acquires and develops multiple identities, which mainly derive from the game's philosophy and reflect complex relations in imaginary/virtual worlds and real life, as well. A basic advantage of educational utilization/engagement with videogames is the fact that each learner-gamer learns how to stand critically against simulated situations, thus improving his judgment, and how to interact with other gamers, with the videogame's virtual environment and with other gamers in reality.

2. Critical literacy and new technologies

By the term *critical literacy* is meant an educational teaching approach which deals with texts as socio-politically and ideologically contextual entities, able to construct knowledge and identities, pass judgment on social reality and ultimately shape the world [4]. According to Luke [5], critical literacy is an overtly political orientation to teaching and learning and to the cultural, ideological, and sociolinguistic content of the curriculum, while Lewison, Flint, and Van Sluys [6] state that critical literacy challenges and questions the conventional, examines multiple points of view, focuses on sociopolitical issues and finally considers and promotes social justice.

The very existence of critical literacy and its development, within the information society educators and trainees are living in, significantly strengthens users, which turn from passive consumers to active knowledge makers. This is due to the fact that these technological tools not only encourage trainees to discover various channels of information but also manage information during their navigation in digital game world.

Virtual spaces and digital environments in general, such is a videogame environment, ought to be approached as critical literacy environments as well. Within this digital environment, students-users are expected to perform a series of diverse activities, during which they recall/use various kinds of skills. While engaging with a digital application, students need to surmount a series of "obstacles"; deciding after critically reflecting on each obstacle is in fact the key to students' empowerment.

Within a videogame environment, students-users approach texts resourcefully; for example written texts (including instructions of a mission, frequently asked questions, help), pictures, videos and sounds. By maintaining a critical approach to interactive multimodal texts, students can adopt and significantly reinforce a critical stance towards virtual and non-virtual reality issues. Through reflective processes, students-users constantly redefine their goals and design the best possible strategy which will ultimately be more effective and bring them closer to their goals.

Another essential characteristic of videogame activity involves identities. Any reference to identities implies the multiple characteristics, stances, attitudes adopted by a student, as a gamer, in technological environments, either pre-designed or constructed and developed by the user himself/herself. Evidently, student identities are quite diverse and are constantly re-shaped whilst engaging in a virtual environment. As social identities are constructed within various social contexts – based on a wide variety and range of choices and selections – it is imperative for students to be able to think, reevaluate and reflect on their personal conception and understanding, so as to reconstruct and update their own image and view of the world [7]. Virtual spaces, also offered by video games, are a diverse context, in which students are able to create another reality, assume multiple roles and identities, frame their own environment and redefine their identity, or identities, through a complex network of relationships and selections.

On the other hand, educators distance themselves from their usual framework and diversify their roles, as they adopt innovative teaching practices, which support experiential learning, promote critical thinking and doing, develop special skills and abilities, thus allowing the creation of new

identities. Therefore, quite often educators are expected or anticipated to provide their students opportunities to work, think, discuss, support, argue and contest on social experiences so as to form their own comprehension of the world and, consequently, actively construct and develop their own identity.

3. Digital storytelling and videogames

Storytelling has always been a special part in human history. Through the centuries, every civilization and culture, by the aid of various means available at a given time, has been related to various forms of narration and storytelling. Digital storytelling is a form of narration highly relative to contemporary digital era. Interactive multimodal texts are constantly been created whilst current citizens-users develop a variety of illiteracies and skills.

Digital storytelling is a process that blends media to enrich and enhance the written or spoken word. Digital stories allow students to take a linear series of events and turn them into a multidimensional experience. They encourage students to communicate, collaborate, and research as well as to infuse media into the process. A plethora of tools exists to create these projects - both in terms of software as well as hardware - and all of them enable students to gain a deeper understanding of history as they explore the most effective way to retell it. Through the use of these tools, students can assume multiple roles, so as to approach their narrative texts through various perspectives.

Videogames are a digital storytelling interactive environment where the student-user actively participates in the plot and the progress of the story. During this process relationships and narrative experiences are constantly redefined as within this virtual gaming environment the user comes across a wide range of socio-cognitive and technical challenges, in order to bring his/her mission to a successful end. According to Barbas and Correia [8], the creator of the narration is often turned into a *facilitator* of the narrative expression and a *drama manager* of the narrative flow. Respectively, the receiver of the narration becomes from a plain *spectator* to a conversational interactor and, at times, co-author of the narrative result, without having any special narrative abilities and skills [9]. Thus, the manner in which students' and educators' roles is revealed along with the dynamics each and every stakeholder assumes during the learning process.

In this light, digital narration implementation in school environments becomes a means of re-shaping school culture and learning process flow. Coventry [10] supports the belief that digital narration offers an authentic educational environment, where receivers and narrators have the opportunity to develop their own personal and narrative speech, image their knowledge, present their story and receive feedback. Students assume the narrator's and receiver's role, as they operate in cooperative environments and adopt multiple roles, in order to critically approach, for various perspectives, a narrative text.

In addition, as Ohler [11] notes, digital storytelling can be employed so as to support the audience's critical thinking development, written and verbal skills and digital literacy. Through active engagement with digital storytelling, students become accustomed to using updated technological means and tools, thus developing useful skills in contemporary digital society. The use of technological environments which allow the construction of digital narrative texts is an activity which simultaneously develops digital, technological, visual and informational literacy.

In conclusion, it could be suggested that digital storytelling utilization could shift and redirect the learning process. Students-users, coming from diverse backgrounds and cultures, can narrate their own stories; produce knowledge whilst making use of contemporary era's technological advances and adopting a picture, text, sound and video culture; all constituent in a videogame.

4. Videogames and learning

Taking into account videogame effects, many researchers, belonging to the education industry and community, have expressed a vivid interest in the results gaming brings upon players, as they

regard some constituent elements in gaming as learning boosters [12]. Videogame integration in the educational process is a teaching strategy which increasingly becomes more popular. As Simons claimed, “if videogames can be transformed so that their users learn, a great many people may come to understand and control dynamic systems” [13].

From the design of a videogame application to its use in the learning process, videogames (and games in general) are amongst the most popular students’ engagements. This fact can be partially if one considers that videogames in fact motivate students through fun, which is an important constituent of a natural learning process in human development [14]. Engagement with videogames offers students the potential of interactive contact with a complete digital environment; in it, various motives co-exist and aim at maintain the students’ interest and engagement.

Starting off with the assumption that videogames can incorporate many educational principles [15], videogame utilizations in the teaching process can greatly emphasize on student-centric teaching strategies, as the educator stops being an authority and the only source of knowledge transmission, as was the case in the traditional school environment. Another important reason why videogames are considered an effective teaching strategy is that some empirical evidence exists that games can be effective tools for enhancing learning and understanding of complex subject matter [16,17].

As previously mentioned, the educator’s role is constantly changing. An essential ingredient of the new role the educator is expected to assume involves the “orchestration” of students’ experiences [18], which will engage him/her even further. This changing educator’s role is highly related to the students’ changing roles, as the educator moves students towards making more decisions, engaging in gradually more elaborate challenges and experimenting with diverse ways of learning and thinking [19]. Participation in such stories can alter the students’ relationship with information, by encouraging representation, experimentation and creativity in findings new ways of approaching a game [20]. Furthermore, videogames are considered a means towards motivating students who have lost interest or trust and regaining or improving self-esteem [21], along with personal development enhancement [22].

Still, according to Clark [23], learning goals might be in terms with the videogame’s goals, as videogames often distract students’ attention from learning, since students tend to concentrate more on videogame ending by scoring and winning, which makes focusing on learning processes rather challenging.

One of the most important elements in videogames is the degree of interaction with the user. Some researchers focus on the most important elements which make a videogame popular and successful in being an educational tool. For Malone challenge, fantasy, complexity, and control are four characteristics of games that make them engaging educational tools, while Gredler stated that the essential elements are a complex task, the learner’s role, multiple paths to the goal, and learner control [24,25].

In regards to videogame design, learning benefits can be numerous. As Baytak and Landb [26] have concluded in their research:

- Designing educational games allows students to represent their understanding in concrete and personally meaningful ways.
- The students learned to ask for and provide help.
- Designing games might encourage diversity of ideas in a classroom community.
- Designing games can lead to meaningful engagement of participants and enhanced sense of classroom community.
- Game design can be highly motivating to students, as evidenced by sustained engagement.
- Learning through design can reflect integrative, authentic, and long-term curriculum units in target subjects.

- Scaffolding occurs throughout the design process by not only teachers but also peers.

Based on the findings derived on learning processes, it could be claimed that the design of a videogame by students, with descending guidance offered by the educator (always taking into account the students' young age and their level of familiarization with technological means), can be an experiential approach to learning. In addition, it can be safely concluded that learning can be fun, as long as it involved games, though most current processes and activities are not successful in this [27]. After all, as other researchers also have remarked, game-based learning is indeed a special case of experiential learning [28,29].

After considerate setting of specific learning goals, 6th grade students of a primary school attempted to designed and play a videogame. This process of videogame designing has been a unique first-time experience for the students, which was enthusiastically embraced.

5. Designing a videogame through Adventure Maker

Students' engagement in videogame design was a means of special digital storytelling. This learning process was implemented in a Greek primary school by 18 6th grade students. Students, divided in diverse groups (in terms of gender, information literacy level and skills, personality traits), attempted to create a simple application, a videogame. The software used is Adventure Maker, which is freely distributed on its official website <http://www.adventuremaker.com/>.

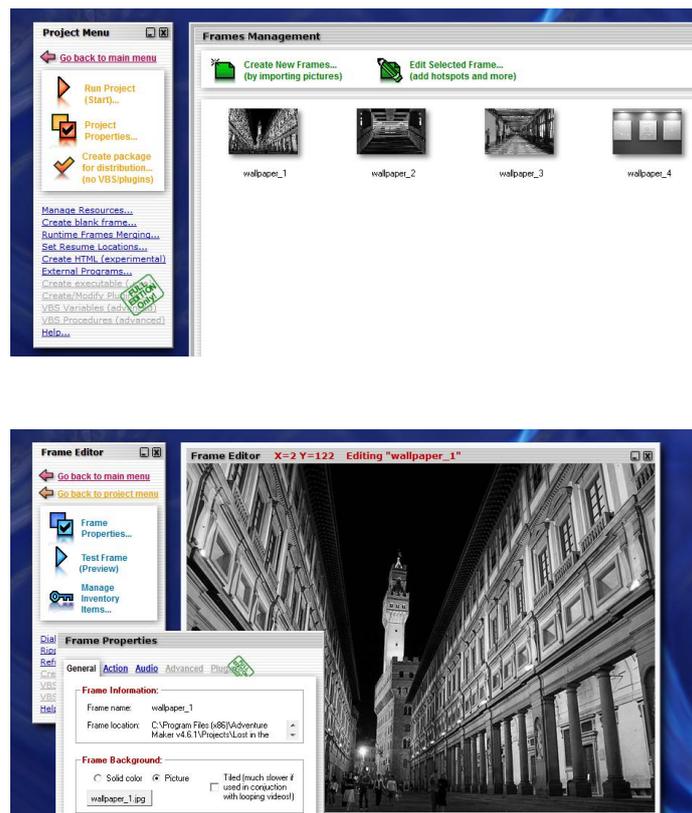


Fig. 1. Snapshots of the application environment

Since the conception of the idea to design a videogame, students had an active leading role. Educators were discreetly coordinating students' actions. Initially, after the idea of the videogame's plot was conceived, students recorded their ideas on the development of their digital story on a storyboard. Students' goal was to create a digital application, which included a quest for significant cultural works, such as famous paintings by well-acknowledged painters. The storytelling takes place in a museum, where application users are called upon to seek significant works of art, so as to discover a painting stolen from the museum.

In Adventure Maker software, students designed a narrative storyboard and selected the appropriate tools-elements to be integrated in their application. In order to create the videogame, each group had to process different digital elements to be used in the final composition of the videogame. One group processed photos and pictures in simple image processing software, another composed original sounds (in free sound creation software available on the internet), which were all used in the digital storytelling. A group had to coordinate all activities, whilst another group was responsible for bringing together all digital elements (images, sounds, videos) so as to compose the videogame.

After processing all digital products, students designed their videogame in Adventure Maker, delineated the hotspots and selected all possibilities available to future application users.



Fig. 2. Frames from the game

As soon as the application design had been completed and a lot of remodeling had been done, students played their own videogame, before distributing it to their fellow-students to play and provide feedback. The class plenary discussed on the digital outcome, its design and implementation process, the obstacles on the way, as well as further potentials, thus approaching their venture from various perspectives.

Through this process, students had the opportunity to engage in technological environments which assist the development and promotion of multiple literacies, whilst they maximized their levels of self-acting, by simultaneously acknowledging that learning can be fun. Undoubtedly, there were many learning outcomes. Students' active engagement in a learning process, their familiarization with technological environments, information quest so as to design a videogame more effectively and "professionally", are some of the most evident outcomes for the students.

To sum up, one could argue that students' and educators' engagement with videogame design, if educationally oriented and directed, is a "modern path" towards vast learning outcomes for all stakeholders. Through constant student interaction with their digital narratives, they all managed to enhance their knowledge greatly, develop skills and create or strengthen their identities.

In a cooperative atmosphere, student groups managed to coordinate and come up with a wonderful result, for which all creators felt proud. Last but not least, educators experienced a quite unique and original educational atmosphere, which was quite diverse from the traditional approach to learning processes. The learning process flux, along with the interplay of relationships in the school classroom, both have resulted in a successful educational cooperative environment.

6. Conclusion

This paper set out to highlight the field of videogame utilization in the educational process. Initially, there was an introduction to new technologies import in education and, specifically, to the term edutainment, which implies that education and learning can, in fact, be fun. Then, there was a discussion on critical literacy and the ways in which various literacies can shape students' identities in and out of technological environments and contexts. Afterwards, digital storytelling became the focus of attention, since videogames are also a form of digital storytelling that combines interactive multimodal texts and can create technological environments, in which the user is able to create virtual realities and assume multiple identities.

Along the way, there was an attempt to present the point where videogames and learning conjugate; thus, the way in which videogames can be utilized in educational realities was depicted. To support the argument even further, there was a brief presentation of a digital application, implemented by 6th grade students via Adventure maker software.

Taking into account a significant amount of scientific resources and other researches and projects implemented in school, personal involvement with videogames, in the learning process, revealed that the goals originally set were, to a large extent, in accordance to the learning outcomes. Students' involvement with a different learning approach showed that there is a common ground of utilization towards this direction.

Still, such an approach remains a sensitive and controversial issue in Greek school reality, as there aren't so many educators convinced that there are indeed valuable learning outcomes which could derive from such a learning process. Educating and training teachers as well as familiarizing them with technological environments, where students are enabled to narrate digitally their own personal stories, could be a step towards adopting videogames in the educational process. Additionally, further videogame incorporation in educational practice and subsequent paper drafting and submission on the field could shed some light on the innovative, at least in the Greek context, field of conjugation between learning and fun, videogames and education.

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