

Serious Educational Games and the Study of the Military Historical Heritage

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Abstract. The report examines the issue of serious educational games in the field of military and historical heritage. The world-wide research experience in the field of serious educational games has been studied. The uses of games in the learning process and the impact effects of information and communication based teaching methods on learners have been examined. The factors and the contribution of the games to improve the interest and the activity of the students and to get better results from the training are analyzed. The report presents a specific model of a serious game in the field of military-historical heritage.

Keywords: Serious Games, Gaming Training, Cultural and Historical Heritage, Military and Historical Heritage.

1 Introduction

Serious educational games (SEG) are increasingly entering formal and non-formal learning. For educational purposes, SEG models are being developed with applications in various fields, including in the field of cultural and historical heritage (CHH). In the present work we will look at the concept of a specific model of the SEG in the field of military and historical heritage (MHH) under the project “Models and Concepts of Serious Educational Games through Connected Multimedia Resource of Military Historical Heritage”¹.

For the purposes of the project, the following tasks will be carried out:

- Studying the world's scientific and research experience in the field of serious educational games and their application in the cultural and historical heritage;
- Researching the approaches, tools and methods for creating and modelling contextual related multimedia resources;

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- A concept of a model of semantic-based connection of digital multimedia cultural resources for a specific area is developed;
- A model of a serious educational game is built using the multimedia resources of the cultural heritage.

In the present study, we will look in more detail at the study of world-class scientific and research experience in the field of serious educational games and their application for training purposes in the field of CHH. We will examine the concept of a specific model of SEG in the field of MHH and the influence of factors on the personality of the player. Some basic components of the model and the content of the game are presented.

2 World-wide research experience in the field of Serious Educational Games and Their Application

Over the last few decades, computer games have entered in the everyday life of consumers, especially in the younger part of the world's population, introducing them into a fascinating virtual world, filled with adventures, emotions and strong passions. Video games today are extremely popular and have a great impact on a large number of internet users. Every year, a huge amount of financial resources are invested in hardware and software for computer games worldwide. The video game creates a virtual environment for action in which challenges are balanced in actively achieving clearly defined goals. A good user feedback is developed to show the effect of meeting the goals set by relevant virtual prizes. A feature of video games is the full engagement in certain virtual actions, where there is a complete detachment from the real world.

2.1 Types of video games

The game is an activity that adheres to certain rules, played by one or more people, primarily for fun. M. Zyda defines certain games such as: “Physical or mental competition, which is played under certain rules for fun or prize for the participants” (Zyda, 2005). The components of the game are storyline, transmitted through a narrative; obstacles; awards in the gaming situation; basic characters and their distinctive individual traits and skills; and competitive situations.

According to their development goals, video games are divided into several main groups:

- Entertainment Games – This category includes all video computer games that are designed to entertain and attract the user to a different world. Entertainment games can be divided into separate groups by the way they play, the virtual reality they are building, the purpose to be followed, and so on;
- Simulations – The main purpose of this category is to achieve maximum realism in the virtual world in which the user is placed. Often there is no specific goal in the game and the action is not of a competitive nature. Computer video simulations are primarily used to train and develop possible scenarios of a situation. For example, computerized flight simulation, etc.;

- Learning games or SEG – In this category, the main task of the games is to transmit specific knowledge to the user, with the entertainment element often absent.

Examples:

- Entertainment Games: League of Legends (Games, 2018), Imperia Online – Multiplayer Medieval Game (Online, 2018), Overwatch (Entertainment, 2018);
- Simulations: The Unknown Heritage (Georgieva, Petrakiev, & Sabev, 2015), Civil War Simulator (Game, 2018);
- Serious Educational Games: Napoleonic Uniform (Planet 42, 2018), Historical Games for 6-8 grade (Planet 42, Historical Games for 6-8 grade, 2018), Historical Games for 9-12 grade (Planet 42, Historical Games for 9-12 grade, 2018).

The creators of serious games use the fun of computer games by creating a video learning platform. Corresponding with lifelong learning and “learning by doing” ideas, SEGs are oriented towards a large group of consumers with a broader age range. Their main characteristic is the usefulness for users, raising their level of knowledge, skills and competences through game situations, which facilitate easier, rich with pleasant emotions learning new knowledge (Ulicsak & Wright, 2010). Combining personal experiences, entertainment, and ambitions for better performance, the video game helps build the qualities of users such as: motivation, coping in conditions of tension and competition, creative approach, interaction with other players, etc. All of these factors increase the performance of in-game training, especially when the video game ends with a test of what happened during the game.

According to Zyda, serious games are games similar to interactive systems developed with game technology and design principles with purpose such as learning, advertising, habits. Serious games can be of any genre, use every game technology and be developed for each platform. (Neittaanmäki, Kankaanranta M. and P. Neittaanmäki. Design and Use of Serious Games, ISBN: 978-1-4020-9495-8 Vol. 37, 2009).

2.2 Main features of video games

The main features of user interaction with the video game have several important aspects:

- Psychological aspect – An important issue, as it becomes an essential part of the lives of gamers, video games begin to determine the behaviour, reactions and psychology of the users. They challenge the players with very strong feelings, which are both positive (delight, joy in the game) and negative (aggression, fear, depression at frequent loss);
- Social aspect – The people who play get acquainted with new people and even make friendships with them, which can be transferred to real life under the right conditions. Players are encouraged to learn the language they interact with in the game, deepen their knowledge of computer technology, and often aspire to work in the field of information technology;
- Pedagogical aspect – Acquiring, validating and testing knowledge, acquiring and consolidating skills, deepening vocational training, etc.

Undoubtedly, video games change the way players think, improve their adaptation and thinking, speed up their physical responses, and create new patterns of behaviour. These factors can have a positive or negative effect on the players.

3 Serious Video Games in the Field of Military and Historical Heritage

In the scientific literature, there is no uniform definition of what is the SEG. Authors exploring serious educational games designate them as games used for education, vocational training, communication, health, public policy, business training, advertising, and helping develop consumer creativity. According to Abt (Abt, 1970), serious games are an effective means of educating users of different ages; they are very motivating and efficiently present concepts and facts on a number of topics, and offer gameplay opportunities for exploring different intellectual and social issues. The use of serious games for the purposes of the educational process relies on aim: the interest in the material of the learners to be increased by the pleasure experienced during the game. The use of serious games for the purposes of the educational process relies on aim: the interest in the material of the learners to be increased by the pleasure experienced during the game. According to Prensky (Prensky, 2003) video games are a good opportunity that can be used to engage students in the real-life learning process. Games can be created that allow learning to produce new ideas through information exchange and problem solving (Pivec & Pivec, 2009).

3.1 Serious games in the learning process

Some of the important strands of the SEG research are their applications for education purposes and the influence of SEG on the personality of the player. SEG in Bulgaria are relatively recent, almost lacking data on their use in our education system, so collecting data on their impact on learning processes is a priority.

Modern information technologies provide an opportunity for the lecturers and learners to interact with each other and find information in shared databases. These new technologies facilitate remote and e-learning. Serious games can be seen as part of e-learning, as stand-alone programs or as modules to support school education.

There may be a number of questions to be explored in the field of the application of serious educational games. According to Peña-Miguel Noemí (Peña-Miguel Noemí, 2014), the need to define the target audience and what time players have available for the game what skills and competences should be encouraged. The use of SEG for training purposes should be done under the guidance of teachers, engaging teachers who believe in the benefits and success of educational games. It is important for the teacher to look for feedback after each game. The work of the participants in the training is the key to leadership of the learning process in serious games.

The work should include the following specific key points:

1. Drawing up a list of goals to be followed in serious games.

2. Develop a learning guide to determine what concepts need to be reinforced by serious games.
3. Determine a plan that the teacher will follow with a check on the objectives. Make feedback.
4. Create a possibility of comparability of the results.
5. Assessment of the possibilities for interaction.

Successful examples of SEG in the learning process are: A Smart Phone Application of Bulgarian Iconographical Digital Library (Luchev, et al., 2016) and Virtual Encyclopaedia of Bulgarian Iconography (Pavlova-Draganova, Georgiev, & Draganov, 2007).

3.2 Characteristics of user interaction with the SEG and influence factors

The interaction of the user in the SEG in the field of military and historical heritage has some peculiarities and specific factors of influence. Impact factors can have a positive or negative effect on the overall personality of the user. It has a strong positive psychological effect on behaviour, as the military-historical area causes strong emotions and a feeling of affection for military and historical events (positive feelings of delight, joy in participating in the historical event and victories in the battles) and negative (aggression from participation in military battles and events, fear and anger at defeat in battles). They contribute to the socialization of players who get acquainted with new historical facts in a community of other players. Video games also change the way players think, improve their adaptability in an unfamiliar environment, accelerate their physical responses, improve their thinking processes, and create new patterns of behaviour.

An important positive pedagogical and educational effect is building new knowledge in the area of military-historical heritage and learning to acquire new knowledge and skills in the field of information technology. Military games are a valuable tool for implementing innovative learning strategies and building strategic thinking.

3.3 Model and Influence of SEG on Military Historical Heritage

We will look at the concept of a particular SEG model in “Models and Concepts of Serious Educational Games through Connected Multimedia Resource of Military Historical Heritage” project and the influence of factors on the personality of the player. For this purpose, the world-wide scientific research experience in the field of SEGs (see section 2) and their application in the cultural and historical heritage were first explored.

Approaches, tools and methods for creating and modeling contextually related multimedia resources have been explored. The concept of a semantic-based connection of digital multimedia cultural resources has been developed for a specific area. A model of a serious educational game has been built using multi-media related resources from the area of cultural heritage. Ontological and semantic annotations of content and multimedia resources in subject area “Historical events” and additional knowledge about “Locality” (place, location) and “Armament” (accoutrements, clothing, etc.) were developed.

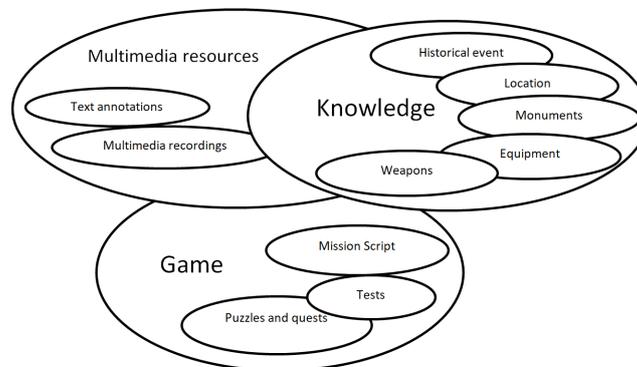


Fig. 1. Content of SEG.

For the purpose of building the game, the following are developed: model of the game; data model and a plan for several scenarios on which the action of the game will develop; and other building components. Key scenarios are “Mission “Opalchenec””, scenario “Battles and Strategies”, scenario “Monuments in Bulgaria from the Russian Turkish War”, etc.).

In the third scenario the monuments in Bulgaria are tracked and the user will follow the path of the bells donated and iconostases on the route from the Danube to Shipka (Bogdanova, Todorov, & Kancheva, 2017). For the purposes of the scenarios, the relevant multimedia resources of various types are included: text, photo images, audio recordings and video clips. Several separate parts are being progressively deployed on the content of the script: narration, tests, logical games, and puzzles.

The approaches envisaged in the model give new opportunities to illustrate and absorb the presented knowledge in the game for the specific historical event - the Russian-Turkish Liberation War (RTW). Besides learning of additional information with a historical focus, the game helps for interactive learning and “experiencing” the “boring historical facts”. The interaction of the user with the particular SEG for RTW is expected to have an impact on the SEG in the field of military and historical heritage. This game will bring a positive psychological effect from the feeling of experiencing military and historical events during the Russian-Turkish Liberation War, acquaintance with new historical facts, battles, strategies, monuments related to RTW. The expected outcome is to improve the thinking processes of the playing users and to create new patterns of behavior in them. There is a strong pedagogical and educational effect of new knowledge gained in the area of military-historical heritage for RTW, as well as the acquisition of new knowledge and skills in the field of information technologies. The ontological and semantic annotations featured in the game model will contribute to the easier and intuitive learning of the new knowledge of the player. The game model is suitable for both formal and non-formal learning.

It is planned that the game will be tested with students from secondary schools in Veliko Tarnovo with an online feedback poll developed and a system for assessing the influence of the game on the playing users.

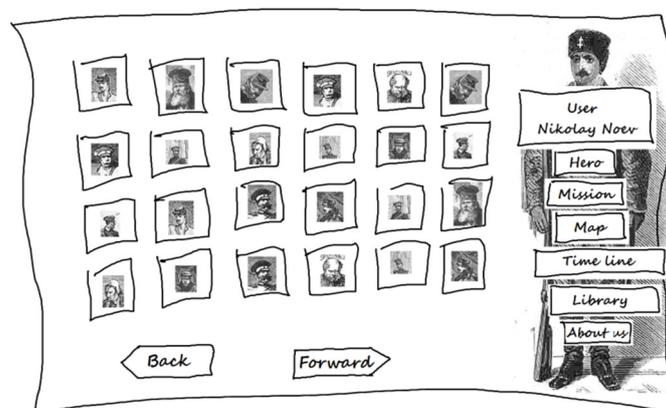


Fig. 2. Mind game in SEG.

4 Conclusion

A review of the SEG and of the military-historical heritage has been made. The influence and the effects on the players are analysed.

In order to improve the efficiency of knowledge acquisition, approaches and innovative additions to the training methodology are sought, as well as ways of enhancing learner motivation. Along with other pedagogical approaches, they are a valuable tool for implementing innovative learning strategies. ICT-based teaching methods contribute to motivating and stimulating the interest and activity of learners and, consequently, to better learning outcomes.

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