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***Stories from the History of Czechoslovakia*, a serious game for teaching history of the Czech lands in the 20th century – notes on design concepts and design process**

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Abstract. In the context of curricular history education both commercial entertainment games as well as serious games specifically tailored for educational purposes were employed. Especially the latter types of games were reported as being promising concerning instructional effectiveness. Still, there are not many complex serious games for history education, particularly in the secondary schools context. In this work-in-progress paper, we report on the progress of project *Stories from the History of Czechoslovakia*, a serious game for teaching history of the Czech lands in the 20th century. We introduce main game concepts, describe two main design challenges we have been facing during the development and how we have addressed them and overview our feasibility study on 71 high-school students. This paper can be informative for researchers and designers working on similar projects.

1 Introduction

Digital game-based learning refers to employing a videogame as an educational aid. In the context of curricular history education, both commercial “off-the-shelf” entertainment games as well as serious games specifically tailored for educational purposes were employed and their learning effects empirically examined. While usage of commercial games turned out to be problematic in this context (e.g. [4, 14]), the studies of serious games, such as various 3D virtual reality cultural heritage games [10] or *Frequency 1550*, a mobile city game [6], reported more promising results (see also [12, 15]).

In the Czech Republic, descriptive methods, the focus of which is the reproduction of extensive knowledge, still prevail in the teaching of history. However, the recently introduced curricular reform puts an emphasis on the development of key skills and competencies [7]. At the same time, history textbooks which shall be in accordance with the reform are largely not available. Serious games are oftentimes based on the knowledge of factual account of events. More importantly, they aim to develop skills and abilities of students to comprehend, compare and analyze sources of facts and

create their critical judgments. Serious games thus arguably provide an alternative teaching aid to traditional history textbooks in accordance with the above-mentioned curricular reform.

In this paper, we introduce a complex educational serious game which is currently being developed at the Faculty of Arts and the Faculty of Mathematics and Physics of the Charles University in Prague and the Institute of Contemporary History of the Academy of Sciences of the Czech Republic. The main target audience is 13 to 19 years old high-school students. The general educational objective of the game, developed under the working title *Stories from the History of Czechoslovakia* (SHCS), is to present to the students the key events of the history of Czechoslovakia in the second half of 20th century (to 1989) and to enable them to “experience” these events from the perspective of different actors. By doing so, the game aims to develop deeper understanding of the complex and multifaceted political, social, and cultural aspects of this time period. Emphasis is given on the diversified historical experiences of various segments of the population.

The game is a single-player dialog-based adventure game with a strong narrative, featuring interactive comics and authentic audio visual materials. Importantly, the content of SHCS is based on personal testimonies of eyewitnesses of the respective periods. The player assumes a different role in individual modules and interacts with the eyewitnesses in the present and “travels” back in time on memories of the eyewitnesses yielded during conversations. The educational methodology also supports in-class discussions concerning the given periods and events.

The purpose of this paper is to introduce game concepts, main design decisions (Section 2), describe two main design challenges we have been facing during the development and how we have addressed them (Section 3) and overview concept evaluation (Section 4). This paper can be informative for researchers and designers working on similar projects.

2 Game concepts and background historical research

The main educational goal of SHCS is to develop deeper understanding of the complex and multifaceted political, social, and cultural aspects of the key events of the history of Czechoslovakia between 1938 – 1989 by presenting these events from a perspective of multiple actors. At present we plan to develop 4-5 different historical modules, each covering a different chronological period (1938 – 1945: The dissolution of Czechoslovakia and establishment of the Nazi Protectorate of Bohemia and Moravia; 1945 – 1948: The immediate postwar era, including the reconstruction of Czechoslovakia, the expulsion of its German-speaking citizens and the rise to power of the Communist Party; 1948 – 1960: The radicalization and then stabilization of the communist regime; 1960 – 1968: The gradual liberalization of the regime, or “Prague Spring,” and Soviet occupation in 1968; and 1969 – 1989: The restoration of a hardline Communist regime and the so-called “Normalization,” which led to the “Velvet revolution” in 1989). At the time of writing this paper, the first module and the game engine are half finished. The whole game should be finished before 2013.

On the level of content, the game stems from applied historical research of the possible manifestations of experiencing the history of the 2nd half of 20th century in Czechoslovakia. This research has been conducted at the Institute of Contemporary History of Academy of Sciences of Czech Republic. The research a) focuses on mapping the personal histories of the citizens of Czechoslovakia between 1938 and 1989, b) explores the key events of the above mentioned period, and c) analyzes their broader social, cultural, and political impact. At the same time, the content of SHCS is based on personal testimonies of eyewitnesses of the above-mentioned periods, collected by the nongovernmental organization Post Bellum [9]. Nevertheless, SHCS does not adapt these real stories in a literal fashion; rather it uses them as source for constructing realistic and appealing narratives (note the target audience appreciates this concept - see Sec. 4). By doing so, SHCS enables us to produce appealing stories with a number of authentic details without “gamifying” the real-persons’ – oftentimes emotionally and ethically loaded – testimonies. Yet, the game is enhanced by a multimedia encyclopedia which presents to the students both with additional factual information as well as authentic testimonies of real people from the above mentioned period.

On the level of structure, the game is organized hierarchically. It is divided into individual modules, which could be accessed independently. Each module covers one historical period, accessed through a key event or series of interlinked events, from a perspective of multiple actors. Correspondingly, each module is divided into blocks which are dedicated to memories of particular persons. Furthermore, each block is divided into scenes which present the player with separated, yet interlinked “micro-stories”. Scene is thus a molecular unit of the game. From a designer’s perspective, there are four types of scenes in the game: animation, interactive comics (Fig. 1), interactive game, and video interview. Each type utilizes different graphical style and design concept. Simultaneously, it provides different educational possibilities for the teachers and different affordances for the players. Essentially, animations and interactive comics serve as vehicles for “pushing” the story forwards and providing the player with real-world background, including multimedia and textual materials. Every module features several interactive games, each of which can be based on a different game genre, including point-and-click adventure, logical game, simple strategy game, or action game. Yet, each interactive game is intertwined with learning outcomes of the scene and these two do not constitute separate elements, which turned out to be problematic in previous studies [8, see also 5]. Finally, video interviews represent the core element of the game, i.e. an interactive interview with the “real” protagonist, whose memories the player just followed in the interactive comics and interactive game. Each block contains all of the above mentioned types of scenes, effectively combining them and utilizing their full potential.

SHCS deals with topics of Czech and Central European modern history which are often subject to discussion and debates in the public space. Given the design of the game, every student can progress through it via different people’s stories and ask these people different pre-scripted questions, including ethically and emotionally contested issues. Every student can choose different path in the interviews and thus has to a certain extent unique gaming experience. Importantly, the students’ in-game experience is then subject to debriefing, an important part of the educational methodology [10]. Not only serves the game as a data source in itself, it also naturally

stimulates debates in a framework of multi-perspectivity. Following the ideas of pedagogical constructivism, students are taught that “history is neither a closed past nor a collection of events and definite conclusions, but rather a platform for questions to be asked” [11].



Fig. 1. Screenshot from *Stories from the History of Czechoslovakia* (Charles University in Prague, 2012). Graphic design by Petr Novák and Richard Alexander.

3 Design challenges

The development team comprises about 20 people, including game designers, historians, educationalists, programmers, and artists. The team’s roles are more diverse than in a typical entertainment game development team. Therefore, we have faced a challenge how to organize the teamwork so that the game content can be produced with minimal communication overhead. This includes bridging terminology used by team members with different background and reconciling their sometimes contradictory requirements and expectations, e.g. on entertaining elements and game flow (a game designer’s perspective), the amount and character of learning content (an educationalist’s perspective), and historical accuracy and possible schematizations (a historian’s perspective). In addition, we faced a challenge to obtain authentic materials, such as photographs or radio recordings, to build the game’s narratives around real personal stories, and finally, to mediate this realness to players.

We addressed the first challenge very early in the preproduction phase by several means. The most important turned out to be development of a rigid formal structure for specification of modules’ scenarios. Essentially, the structure organizes modules’ elements described in Sec. 2. into a two-level hierarchical finite state machine (hFSM), in which some of the lower level states comprise dialog trees for capturing dialog possibilities with individual characters. This structure is formal yet simple enough to enforce a common design language among all team members, which has allowed us to do two things. First, we have employed a top-down design process,

during which designers refine incrementally the game scenarios together with historians, educationalists and artists. Second, we have completely separated game content data from the engine, exploiting benefits of the data-driven software architecture. Consequently, it has become possible to develop an authoring tool, StoryBuilder, in the preproduction phase. Because StoryBuilder structures game content data in the same way as designers and historians do when they specify the scenarios, these team members can encode the resulting scenarios using StoryBuilder themselves. Although we still do need the role of a level designer, who maintains the flow of the game play, the direct involvement of historians in the process eases keeping the historical accuracy and avoiding schematizations.

The second challenge is addressed by creating semi-real stories, based on authentic personal testimonies as has been described above. Due to our collaboration with historians, we can also capitalize on results of their applied research and the use of archival materials.

From the technical perspective, we have chosen to use Adobe Flash platform utilizing Adobe AfterEffects for creating visually appealing animations, including videos, and Adobe Flash Pro for sequencing them. Animations are then imported into StoryBuilder forming some of the game scenes. Other scenes comprise dialogs with game characters or interactive games. Together, these scenes serve as states of the game hFSM. StoryBuilder is then utilized to provide conditional transitions between these scenes thus providing means for plot formalization. Each module can be separately exported and interpreted by StoryEngine.

4 Concept evaluation

In past, our team developed several different educational games for secondary education and conducted empirical research on their acceptance in the context of curricular schooling and their learning effects, e.g. [2, 3]. From our previous experience, we know that acceptance of a new educational game is far from guaranteed and many students are skeptical towards games in the formal education (cf. [4, 13]). At the same time, our experience suggests that at least above-average students understand that the quality of graphics of serious games will be lower than that of AAA entertainment games, and our empirical data support the idea that real-world grounding of a game's content is of crucial importance, e.g. [3]. With these facts in mind, we have conducted a small scale feasibility study with two questions:

1. Would the concept of an adventure game combining comics-based graphics and videos be appreciated by students in the context of history education?
2. To which extent should the game's content be based on real stories?

The study had two parts. First, questionnaires accompanied by demonstrations of example graphics were administered in two above average high-school classes (n=44; m=20; f=24). Second, slightly modified questionnaires accompanied by demonstrations of example graphics were administered in another above-average high-school class (n=27; m = 14; f = 13), students of which then participated in group interviews. In the questionnaires, mostly Likert items with 4-point scale were used (1 = strong yes; 4 = strong no). The questions of present interest were: 1) "Would you

accept the following game genre should you play a serious game in history classes”? 2) “Would you like to play such a game when the module concerns the following historical period?” (cf. Sec. 2); 3) “Would you accept the following graphical style for such a game?”¹ In addition, we asked them 4) whether “Stories of the in-game characters should...” a) “exactly correspond to real stories”, b) “be based on real stories”, c) “be specifically fabricated for the educational purposes”, d) “does not matter”. The results are depicted in Tab. 1.

Tab. 1. The questionnaires’ outcomes (means and standard deviations for Questions (1), (2), and (3); numbers of answers for Question (4)).

Question	n						
1	44	Adventure 2.02 (0.87)	Logical 2.05(0.9)	action game 2.35(0.95)	detective 2.21(0.83)	RPG 1.84(0.92)	multi-player 1.89(0.87)
2	71	1939 – 45 1.71 (0.91)	1945 – 48 2.11 (0.96)	1948 – 62 2.28 (0.9)	1962 - 72 2.2 (0.89)	1972 - 89 2.1 (0.87)	
3	44	Comics 2.4 (0.87)	Video 2.23 (0.95)	3D VR 2.03 (0.84)			
4	44	a) real 10	(b) semi-real 26	(c) fabricated 5	(d) doesn’t matter 2	no answer 1	

We see that the concept of adventure game scored relatively well, though a multi-player RPG might be a better genre. We see that students tended to prefer 3D graphics, but a comics and video-based styles were also accepted. These two outcomes are actually in line with our observation stated above. Finally, students’ attitude towards any of the time periods was positive. Not surprisingly, the most positive attitude was towards the 2nd World War period. Note however that this period is already well covered by existing educational materials in the Czech Republic. Finally, students strongly preferred stories that are based on real stories, but are not necessarily exact copies of real stories. This agrees with our previous results [3].

Thus, concerning our first question, quantitative data suggest that students do not have insurmountable issues with our game concept. They would perhaps appreciate more a 3D multi-player RPG, but the development of such a game is an order of magnitude more expensive. Concerning our second question, our concept of semi-real stories seems to suit perfectly for our purpose.

Detailed analysis of students’ preferences of different comics styles revealed large between style differences, which is not very surprising. This suggests that graphics evaluation with the target group of users is vital during the production of the game.

The qualitative data from interviews supported our caution concerning students’ acceptance of serious games in general and history education in particular. Majority of students is mildly skeptical towards usage of games in formal schooling system and detailed analysis of their statements supports the idea that games should be used as a supplement only and that the teachers role and consecutive contextualization of the

¹ The following demonstrations were used for the comics, video and 3D virtual reality, respectively: Aqua (Games Distillery, 2010), The Curfew (Channel 4, 2010), Fahrenheit (Quantic Dream, 2005).

game play and discussions are vital, cf. [1, 10, 13]. Representative sample of citations of high-schools students 18 or 19 years old:

“Simulations [in education] are fine, but it depends on teachers how they will use them.” (girl)

“We want a discussion, not a game.” (girl)

“Simulations [in education] are not just games. We do have computers so why not to use them?” (girl)

“I more or less agree with [usage of educational] games, but everything in moderation.” (boy)

“A good teacher will be always better than a simulation.” (girl)

“[Serious games] can make education more engaging.” (girl)

“[Serious games] can help a below average teacher to increase quality of education.” (boy)

This is in line with previous data, e.g. [4]. The notable limitation of the present study is relatively low number of students and the fact that all of them were from above average high-schools. It would be useful to supplement these results with data from average and below average schools, which is one of our on-going efforts.

5 Conclusion

In this paper, we have reported on progress of the project *Stories from the History of Czechoslovakia*, a complex single-player serious game for teaching history of the Czech lands in the 20th century. The main target audience is high-school students and the primary objective is to develop deeper understanding of the complex and multi-faceted political, social, and cultural aspects of respective time periods. The main elements of the game are video-dialogs with eyewitnesses of the given time periods, through which a player can “travel” back in time, and animations, interactive comics and interactive mini-games, through which the player can perceive the respective historical periods from the perspective of the eyewitnesses. The game offers every player to a certain extent unique gaming experience, which helps a teacher to set-up consecutive in-class discussion. The game is to be enhanced by a multimedia encyclopedia, enabling students to study the topics at several levels of details.

Development of such game would have been impossible without having not only game designers, programmers, and artists, but also historians and educationalists on board. Our main challenge to organize teamwork and to enable people with various backgrounds to understand each other was addressed by imposing a rigid formal structure for specifying the game scenarios, which became a ground for a shared “language” among all team members. Our main design decision that the game content will be based on personal testimonies of eyewitnesses of the respective periods but not appropriating these real stories in literal fashion, has been supported by outcomes of our concept evaluation with the target audience. At the same time, the evaluation has suggested that we may not need a cutting-edge 3D graphics to engage students in playing the game; nevertheless, the above average high-school students might be, no

matter the graphics quality, mildly skeptical towards the idea of using games in the context of formal schooling system. This suggests that the game should be designed from the beginning with the idea that it will be later integrated within the formal schooling system. Designing supplementary activities and supporting teachers is vital.

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