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Interactive storytelling for History Education in a Metaverse virtual workshop

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Abstract

This study explores the use of an interactive electronic book that incorporates the victims' experiences from the Minor Asia Catastrophe as the focal point of an immersive workshop on a social virtual reality platform in the Metaverse. The primary emphasis was to introduce an alternative method based on storytelling in the context of History education and to assess the effectiveness of this methodology. A series of workshops was conducted with thirty-four educators. At the conclusion of the workshops, qualitative evaluative feedback was collected from participants through unstructured interviews. The study's findings suggest that the adoption of interactive digital resources and social virtual reality platforms in the Metaverse can enhance history teaching methods. By inviting students to participate and explore historical events in a more immersive way, these technologies can help to foster their engagement, autonomy, and understanding of history.

Λέξεις κλειδιά: Interactive storytelling, Metaverse, Social virtual reality, History education

Introduction

Technology has slowly immersed itself into our daily lives to the extent that we have implemented it in every sector of our lives. One prime example would be education. Whether through videos or interactive whiteboards, classrooms in various countries have been transformed into an oasis of technology-enhanced learning. We have evolved from decorating caves and have access to multiple ways of expressing ourselves. Especially after the COVID-19 pandemic, educators have begun brainstorming creative alternatives that are bound to defeat the known phenomenon of Zoom fatigue, which correlates with turned-off cameras, and muted microphones (Wiederhold, 2020). By creating fully immersive settings, these technologies allow real-time communication between instructors and students, regardless of their physical locations (Meccawy, 2022). The capabilities of AR and VR are fused into one integrated Immersive XR solution to improve collaboration, address issues with remote communication, and create a rich learning environment (Koutromanos et al., 2024).

In the realm of education, course books assigned to History classes have long been renowned for their weightiness regardless of the level of education; there are not few people who have characterized them as bricks-laden with the weight of historical insights and facts (Pokhrel, 2022). Despite their voluminous content, these tomes are often reluctantly cracked open by students across the educational spectrum. Whether at school or tertiary levels, the allure of history lessons can occasionally pale in comparison to their more immediately applicable counterparts in science or engineering (Fragkaki et al., 2020). Nevertheless, the undeniable truth remains that history serves as a potent compass, guiding us away from the pitfalls of repeating the mistakes of the past. The emergence of immersive technologies, notably Virtual Reality (VR), Augmented Reality and the Metaverse, presents a tangible opportunity to breathe new life into the teaching and learning of humanities subjects and

language courses (Fokides & Chachlaki, 2020; Voreopoulou et al., 2024). These technologies that can be summarized under the umbrella term of extended reality (XR), while capturing the imagination, are not mere novelties; they can serve as powerful tools in an instructor's arsenal, enriching the educational journey in ways that were previously unattainable by applying learner-centered active learning methods (Mystakidis & Lympouridis, 2024).

In all educational levels, XR is growing into an emerging everyday experience for a variety of subjects. It's intriguing to note, nevertheless, how little XR and technology are applied in history classes in diverse contexts. In other words, as Thorp & Persson (2020) argue, XR can accommodate into the battle of a plethora of challenges including:

- Content overload: History is a vast and complex subject, spanning centuries and covering a wide range of topics. It can be difficult to select the most vital and relevant content to teach, especially within the constraints of a school curriculum.
- Multiple perspectives: Historical events can be interpreted in different ways, depending on the perspective of the historian or the reader. This can make it challenging to present a balanced and objective account of the past (Thorp & Persson, 2020).
- Student engagement: History can be a challenging, overwhelming and abstract subject for students, especially during the earlier years of education. It can be difficult to keep them engaged in learning about historical events that may seem remote and irrelevant to their lives.
- Resourcing: History education can be expensive, requiring access to a variety of resources, such as textbooks, primary sources, and technology. Schools may not have the necessary resources to develop and implement effective history programs (Baglione & Sullivan, 2016).

Adopting virtual, computer-generated immersive environments in education, particularly in History education, can offer many benefits. That is to say, VR-based learning environments not only capture the student's attention and motivate them to learn, but also appear to foster a deeper and more spherical understanding of cultural worldviews by placing learners directly within those contexts (Chrysanthakopoulou et al., 2021; Petersen et al., 2021; Clerici et al., 2022; Hutson & Olsen, 2022). In other words, it is repeatedly underlined that the transformative and interactive nature of VR in History teaching is a key factor in improved comprehension (Hutson & Olsen, 2022). The integration of 3D elements promotes active learning and creative discovery, which results in better memorization across all age groups (Petersen et al., 2021). In a similar way, immersive storytelling fosters critical thinking and problem-solving skills. By urging students to make decisions and navigate challenges within the narrative such as solving historical puzzles, these experiences encourage active engagement with the learning material (Chrysanthakopoulou et al., 2021; Petersen et al., 2021; Clerici et al., 2022; Hutson & Olsen, 2022). This active engagement leads to deeper understanding and the development of transferable cognitive skills (Fragkaki et al., 2022).

Immersed within this study's fabric is a profound dedication to commemorating the stories of those caught in the tumultuous tides of the Minor Asia Catastrophe. This study is firmly grounded in the belief that these stories, woven into the fabric of History, deserve a platform that transcends the confines of traditional teaching methodologies (Exertzoglou, 2016). By leveraging the potential of an interactive course book, learners are granted the unique opportunity to craft an immersive, multidimensional portal to the past. This digital experience becomes a gateway through which the legacy of the victims can be apprehended, their experiences and struggles seen through better lenses than those of the traditional mediums. To encapsulate, the combination of a virtual meeting space and the interactive book is to

empower and equip the learners with tools to engage actively with history, to interact with their roots, and to weave themselves into the tapestry of remembrance.

The primary sources of these captivating narratives that form the foundation of this immersive educational experience were thoughtfully gleaned from a deeply significant and poignant repository; the very descendants of those who bore witness to the harrowing events of the Minor Asia Catastrophe. The stories echo across generations as a testament to the enduring legacy of historical events that have left an indelible mark on the collective memory. Rooted in the oral traditions passed down through family ties, these accounts radiate with authenticity, carrying within them the weight of lived experiences and the narratives of resilience that have traverse time itself, and need to be showcased in any given moment as a form of tribute to the victims of the Minor Asia Catastrophe.

Building up on the results of a previous exploratory study (Papadopoulou et al., 2024), the main objective of this work was to assess the audience's engagement, understanding, and emotional connection by the immersive and interactive nature of both an e-book and a Metaverse workshop space.

Materials and Methods

In this intervention, two main materials and environments were used: a digital, interactive, immersive storytelling book and a virtual three-dimensional space in the Metaverse. Regarding the former, when teachers are tasked with creating an immersive teaching environment, there are many factors that should be considered, and the most important ones: cost and time of preparation. In the current educational landscape, a dearth of available immersive textbooks has created a notable gap in fostering active student engagement. Consequently, the need for a user-friendly application development tool becomes paramount. In this context, the online tool Twine emerges as a compelling solution due to its intuitive interface and ease of use (Roine et al., 2021). The learning process itself for the instructor is as easy as one can take the plain text from a textbook, dissect it and then add cognitively challenging questions and meaningful choices for their students to engage and allow them to self-assess their progress and comprehension.
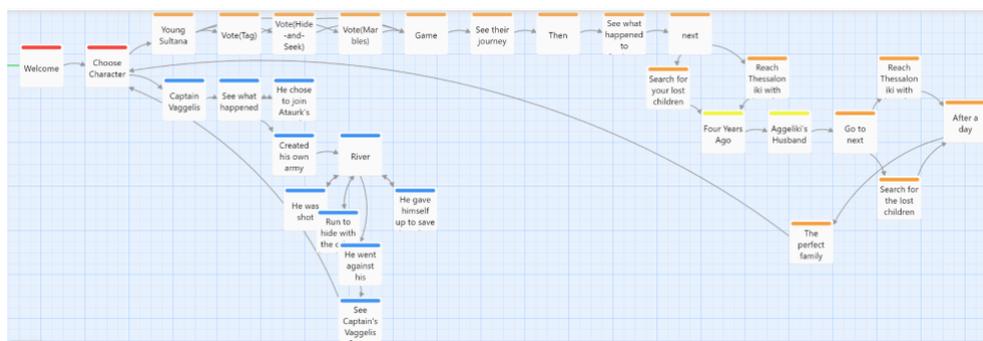

Figure 1. Depiction of the e-book's structure

To illustrate, by following the blue lined boxes (Figure 1), and in particular the page named "See what happened", the reader is presented with two alternatives, "He chose to join Ataturk's army" and "He created his own army". In the case of selecting the wrong option,

which in our example is the first one, a pop-up box appears, and another chance is given to the reader/student. On the contrary, if the reader selects the correct option, they are rewarded with a pop-up box, "Good Choice, Default Name".

Through this simplified method, teachers are not only given the chance to animate the rather passive and flat narrative prominent in text but also can assess their students' understanding. The nature of questioning can be altered, offering participants a unique type which goes against the stress inducing weekly or monthly testing. In a similar mindset, these modes of assessment can also facilitate the pupils' learning preferences. To exemplify, Twine's ability to add sound can aid individuals diagnosed with dyslexia or with any other conditions that require an audio description narration. Considering the limited period that educators will dedicate to such interventions, it is safe to point out that applications like Twine can be adapted even be those who are novice users and without a coding or programming background.

At the heart of the book rests a profound exploration centered on the narratives woven through the lives of immigrants who experienced the harrowing events of the Minor Asia Catastrophe. The primary characters are Captain Vangelis and young Sultana, ancestors of the first author. The choice of which story to start first with does not affect the reading. During the reading of either story, the readership is faced with choices and selections that trigger the book, and the correct answer allows the reader to move on with their reading. In a sense, the learning should occur by stepping into the characters' shoes and embodying their experiences (Macedonia, 2019). Another unique feature of this interactive e-book is the personification with the reference to the readers' names. To explain, at the start of the e-book, readers are asked to fill-in their names, and this was done for the core purpose of establishing a connection between the readership and the material. As the user progresses, personalized dialogs use the chosen name.

6Another crucial component of this study was the use of virtual worlds in the Metaverse. As alluded to previously, social VR's ability to transcend geographical limitations and foster synchronous collaboration represents a significant advancement in the educational landscape. This technology empowers learners to convene, engage in idea exchange, and expand their knowledge base, all from the convenience of their personal spaces. In alignment with these objectives, the current study utilized Spatial.io, a freely accessible Metaverse platform. Namely, the developed space (https://www.spatial.io/s/Minor-Asia-Catastrophe-History-Workshop-64a5afb62044c35d4b918bbf?share=7099300977218985086)
served not only as a virtual meeting place but also as a repository for all lesson materials, including the e-book, reflective activities, and the hosting pace of the evaluative interviews of this experiment.

Figure 72. Overlook of the social VR meeting space

As shown, a project displayed a deepfake video created for the lesson (Sannino et al., 2022). To be generated, HeyGen, an online tool, was employed, and it requires only photographs and a short script (authored by the researchers). While the process was relatively simple, a significant limitation of Heygen emerged: the free version restricted video length to 30 seconds, as further video creation beyond this limit necessitated a paid subscription.

This study investigates the impact of immersive applications on education. Its guiding research question is: How does the immersive and interactive nature of both the e-book and the Metaverse meeting space affect the audience's engagement, understanding, and emotional connection? A qualitative research design approach was adopted examining participants' evaluation of a digital interactive history book, and their perceptions of the interactivity in history workshops in the Metaverse. These immersive tools are hypothesized to enhance pedagogical methods by fostering deeper student engagement and enhanced comprehension of complex subjects like in the case of genocides. Data was collected through unstructured interviews after each workshop ended in the summer of 2023. Each workshop had a duration of 30-45'. Each interview was conducted by the first author and lasted around ten to fifteen minutes. Through thematic analysis of interview responses (Braun & Clarke, 2006), the research aims to illuminate the potential benefits, challenges, and broader implications of integrating immersive storytelling into educational practices across various levels. By delving into participant perspectives, the study seeks to generate valuable insights that can inform educators, curriculum designers, and policymakers.

To facilitate readers' understanding and for them to visualize how the material was implemented, an overview of the workshop plan is provided:

Table 1. Overview of the workshop plan

Aims of the workshop:

By the end of the workshop, learners will have the opportunity to:

1. Be able to identify and explain the historical events of the Minor Asia Catastrophe.
2. Explore the impact of the implementation of immersive technologies every day.
3. Develop their critical thinking and get accustomed to not being a pathetic receiver of information.
4. Expand their emotional intelligence by sympathizing with the characters of the book
5. Improve their English skills and get familiarized with literary writing.

Lead in / Warm-up	• The teacher welcomes the students and informs them of the topic	5-7′	Teacher to Students
To introduce the VR workshop topic and provide incentive for the class tour. Present findings	• Then the teacher asks them to brainstorm/share any pre-existing knowledge on the topic.		Students in groups
	• Students report back to the class their predictions.		Students to teacher
	• The teacher accepts all answers, but s/he does not provide any feedback.		
Reflection	Each group will be responsible for confirming/providing feedback to all the brainstorming, but they should all go through all the stories inside the book and then report. The group formation depends on the availability of the participants, hence there are no criteria for diving participants for each session.	15-25′	Students
	This will be done after the end of the workshop. It is crucial to discover their opinions on the material and the learning conditions which differ from what has been defined as known.	5-7′	Students

Results & Discussion

The following section of this study describes the results that researchers received after the History workshops in the Metaverse. In a general manner, the memoir, organized in an interactive storytelling experience appears to have been a powerful tool. While many had prior knowledge of the historical event, the memoir effectively raised awareness and evoked strong emotional responses. The main insights from interview can be summarized as follows:

Personal Data

In this research endeavor, thirty-four (n=34) participants were engaged with this project. Most of them, in particular 30 participants were of Greek origin while the remaining four participants were from other ethnic backgrounds, including "White", "Mexican/Italian" and "Serbian". Many respondents fall within the age range of 20 to 29, constituting that they belong in the early stages of adulthood, thus, their relationship with technological applications has the potential to be different from older people. Following this, participants aged 30 to 39 account for four occurrences, while those aged 40 to 49 and 50 to 59 represent five and six.

In relation to their educational background, the majority of participants, constituting 28 out of 34 responses, have attained a "Higher level of Education", which can indicate not only they may hold bachelor's, master's, or doctoral degrees, but also that they have experienced a plethora of teaching in their lives and they are familiar with teaching. However, the limited presence of participants with a "Secondary level of Education" does indicate that their answers are less significant than those of higher education. On the contrary, it showcases that

people want to continue learning throughout their lives and move along with the progression of teaching and teaching methodologies.

The immersive e-book as a powerful teaching tool

By experiencing the story through the eyes of a victim, in the case of Sultana through the eyes of a child, readers found the events far more real and relatable (Question 1). To demonstrate, "The initial images and the interactive video not only provided context but also captured my attention instantly, making the workshop feel all the more interactive and informative". Participants appreciated the ability to actively participate in the stories by making choices, guessing outcomes, and even playing through different character options. The multiple choices for story paths and the inclusion of questions after each story were also well-received. By the same token, there were many who characterized the inclusion of photos and the ability to actively build the story as extremely innovative; an element that captivated their attention given that they were entirely integrated. As it's encapsulated in the following comment: "It made the history lesson more engaging, and I was able to better understand what life was like for the victims" (Question 2). The vividness brought by the interactive form enabled them to empathize with the characters and gain a more profound insight into their experiences. Getting to know the characters' daily lives, their courage in the face of hardship, and the human cost of the catastrophe fostered a strong sense of connection. Interestingly, even those who had prior knowledge of the event noted that the immersive book still contributed positively by adding emotional depth and humanizing the historical facts. To exemplify, there were many similar comments that the child's perspective in the story resonated profoundly, rendering the experiences more authentic, raw, and heart-breaking. The interactive nature, character-driven narratives, and the ability to make choices all contributed to a richer learning experience and to the cultivation of critical thinking and evaluation of teaching material (Question 3). Even in the case of some participants commenting that history lessons in school made them uninterested in sustained reading, the interactive nature of the book provided a solution as it allowed for structured breaks without losing interest in the narratives.

Table 2. Summary of Data

1. How did you benefit from the immersive lesson and interactive e-book?	Feeling immersed	55.9%
	Developing critical thinking skills	32.4%
	Feeling empathy and sadness for the characters/ victims	11.8%
2. Please select the expected advantages of utilizing immersive technologies in education? *	High Engagement	80%
	Deep Understanding	76.67%
	Personalized Learning	73.33%
	Collaborative Learning	66.67%
	Accessibility	60%

3. Which elements of the interactive e-book fascinated you the most?	Writing	5.9%
	Impressiveness in Story Building	29.4%
	Characters	20.6%
	Choices	26.5%
	Photos	8.8%
	Questions	8.8%

* This question allowed for selection of multiple answers, thus the percentages shown refer to how often these answers were selected by participants.

Learning Benefits of Immersive Storytelling

Based on the collected data, a clear preference emerges in favor of immersive storytelling. Out of the total responses, twenty seven out of thirty-four respondents indicated that they believe in the substantial benefits of this immersive approach. In combination with what has already been mentioned above, this method can create a deeper emotional connection between material, historical events and learners, providing a sense of presence and participation which are absent from traditional storytelling (Question 2). To compel students to participate in History lessons, teachers are tasked to seek more dynamic and participatory forms of content. Henceforth, interactive Storytelling and Metaverse applications can cater to this demand by offering unique, multisensory experiences that traditional storytelling formats, such as textbooks, cannot match. Alas, it is safe to point out that as technology continues to evolve, the appeal and the perceived advantages of immersive storytelling are likely to grow and shift away from the typical teaching methods, if based on the results of this study.

Conclusion

In a nutshell, this study investigates the potential of immersive technologies, particularly social VR and interactive storytelling, to revitalize historical education. The core argument centers on VR's capacity to transform students from passive spectators into active participants within historical narratives. The findings suggest that Metaverse platforms and interactive e-books can foster deeper student engagement with complex historical subjects, and in particular underrepresented narratives of victims of historical events like Minor Asia Catastrophe. By leveraging the power of immersive technologies, historical education can transcend boundaries, fostering deeper engagement and a more comprehensive understanding of the past. Future studies could explore expanding the repository of immigrant narratives and critically assess the integration of VR lessons and pedagogical methods tailored for younger audiences. This study, a foundational step, paves the way for a more dynamic and inclusive approach to teaching.

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