

PAPER

Immersive Learning through Virtual Reality Documentaries: Enhancing Engagement with Historical Narratives

Sohail Dahdal ,
Hala Nasar 

American University of Sharjah,
Sharjah, UAE

sdahdal@aus.edu

ABSTRACT

Virtual reality (VR) enhances engagement by creating a sense of presence that allows youth to interact more meaningfully with content. This study explores the use of immersive VR documentaries as educational tools for teaching history to young audiences. Using a comparative methodology, the research examines differences in youth engagement when historical content is presented in traditional formats versus VR documentaries. Two versions of the same documentary were developed and shown to university students, who were interviewed before and after viewing. Findings indicate that the VR format fosters a stronger sense of presence and is preferred by students for both engagement and retention of historical narratives. The paper argues that immersing users in factual stories through VR cultivates a learning environment where deeper connections form between the viewer, the virtual setting, and the subject matter. In conclusion, VR documentaries show strong potential as educational tools, particularly for historical content, offering an immersive experience that surpasses traditional documentary formats in effectiveness.

KEYWORDS

virtual reality (VR), immersive learning, educational technology, historical narratives, documentary engagement

1 INTRODUCTION

Since the beginning of time, oral storytelling has been an important part of retelling history. Just a few generations ago, our grandparents gathered around a fire and listened to stories about the past from their parents and elders of the village. With the advent of television and radio, the idea of listening to oral history slowly disappeared, and the only source of history for youth became history books in schools. With this, a persistent problem emerged that youth were not as engaged with history when presented as factual printed content. The introduction

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of both of these mediums created a rapid decline in traditional oral narration and dissipated the potential for increased literacy while simultaneously giving television a platform to replace oral storytelling [1], [2]. There is a plethora of research on increasing youth engagement in learning history, both in an educational setting and at home. There is a great concern about rehabilitating how history is being taught in educational systems. Moreover, in the case of students learning about historical narratives at home, there is a lack of reinforcement of these narratives in schools [3], [4]. Unfortunately, the problem of engaging youth in history remains unsolved, even with the advent of media and the emergence of new forms of telling history through traditional documentaries, web documentaries, and social media platforms. Scroggie [1] argues that storytelling has been rapidly declining as a practice within communities. This decline poses a threat to losing one's communal identity and can potentially erase global societies as a whole.

The *Once Upon a Time in Palestine* is a virtual reality documentary that aims to engage Palestinian youth with their heritage by reimagining the oral history of Palestinian villages and retelling it in an immersive virtual reality environment. At the same time, it aims to examine the potential of immersive media and historical documentaries in engaging youth in learning history. The project is practice-led participatory action research [5], [6], where the researcher is also the creator of the virtual reality documentary. The project aims to reimagine the oral history of Palestine into an immersive virtual reality documentary and compare youth engagement with the content in its original form and within the immersive virtual environment. The process involved taking actual interview footage of elders in Palestinian villages telling the oral history of pre-1948 Palestine and editing them into mini-factual traditional documentaries. Once edited, the stories are then reimagined as mini-scripted stories that include the factual content yet are scripted in a way that also acts as a fictional narrative. A virtual Palestinian village and a section of the old city of Jerusalem were then constructed in 3D, and the final virtual reality documentary was then published on the Oculus Go virtual reality (VR) headset, where the user would see volumetric videos appearing within the virtual village, re-enacting the actual oral stories told by the elders. The process requires the user to wear the Oculus Go headset to be immediately transported into a 3D Palestinian village made to look realistic with special atmospheric sound and physical representations of objects you would find in a Palestinian village pre-1948. The user can then maneuver and click on certain objects to activate mini-stories, which were shot with real actors using a volumetric camera. There are also several mechanisms to transport the user to a 3D constructed part of the old city of Jerusalem, where they can access more stories. In total, there were seven stories loosely based on seven oral stories told by elders. Half of the participants were exposed to traditional mini-stories that were, in essence, an edited video interview with an elder. The other half were exposed to the VR documentary and instructed to click on all seven mini-narrated stories that had the same content but were within the 3D village and the old city of Jerusalem.

The paper poses several questions about the power of using VR documentaries as a tool for the immersive education of historical content [4]. It will also question the implication of reimagining this factual content using VR and its effect on the enjoyment and retention of education. Twenty-eight university students were asked to watch the traditional documentary, while nineteen students were asked to experience the immersive documentary. The research used a combination of methods, including an ethnographic observation of the students interacting with the two documentaries. The methods used were a combination of participatory action research [5] and ethnographic observations, which can be referenced as ethnographic action research [7].

The results of the observations indicate that the students enjoyed and engaged more with the immersive documentary and that their retention was significantly greater when the content was presented to them in an immersive VR environment.

2 LITERATURE REVIEW

The idea of using technology to mediate educational content is not a new venture. Owusu-Agyeman and Larbi-Siaw [8] argue that the process of mediating educational content and the introduction of technology-based learning systems crucially transformed the scope of learning and teaching. The process of using mediated content as a tool to educate has taken quantum leaps with the rise of digital media and the accessibility of mediated forms of delivering content. Immersive technologies like VR/AR/XR promise another major milestone in mediating content delivery in the field of information, entertainment, and health, but also education [9]. Since virtual reality has evolved over the years, its use has gradually become a prominent and essential addition to the education sector. According to Freina and Ott [10], VR is based on three principles: “Immersion, Interaction, and User involvement with the environment and narrative,” which inherently opens doors for the education sector to expand its territory of improving students’ learning experience and motivating them to engage in their academics.

In order for students to engage with VR, they have to maintain a level of fascination and willingness to work with the intricate technology. At the same time, they also must recognize that VR is a tool for facilitating a visual-based learning environment, which helps with understanding complex subjects. However, while that environment can produce an immersive experience, the interaction between the user and the technology is an essential component to achieving high learning rates. This level of interactivity can be created through serious games (SGs), which are activities intended to provide a degree of entertainment to users while educating them on subjects and specific tasks in a learning environment. These games are designed to be learner-centered, unlike traditional teacher-centered learning environments [11]. In this case specifically, historical content lends itself well to being mediated through interactive technologies that frame the content in a serious game such as *Peacemaker (2007)*, an award-winning government simulator focusing on the Palestinian-Israeli conflict. Aiming to promote peace, the game gives players the option to represent either side of the conflict to make “social, political, and military decisions” to teach them about a complex situation [12]. Although VR isn’t as widely adopted as traditional forms of teaching yet, there are constant advancements in using VR for making immersive historical documentaries. Some promising results include the *Once Upon a Time in Palestine* VR/AR documentary, which utilizes videos and image restoration techniques to bring old archives into a 3D VR/AR environment, effectively telling the stories of elders in Palestinian villages and highlighting the Palestinian history before the Nakba [13]. Similarly, the immersive VR/AR documentary *Common Ground* discusses the “history and legacy of social housing in the UK,” and won the Best Immersive Storytelling award at the Sandbox Immersive Film Festival for its impactful historical storytelling through the medium of visual technology [14].

There is already a lot of evidence that virtual reality technologies have the potential to evoke a sense of presence for audiences when they are presented with content within a compelling virtual environment. In the context of virtual reality, “presence” is a term used to describe the degree to which users perceive a mediated experience

to be non-mediated. This ability to transform the perception of mediated experiences into non-mediated experiences creates a relationship to the content that puts the user in an imaginary shared environment that has the potential to connect them with the content on an emotional and personal level [15]. Still, the idea of using immersive virtual reality in education remains hotly debated. According to a survey conducted by Freina and Ott [10] investigating the advantages of using immersive VR in education, VR use in education is found most commonly in pre-university/university learning and adult training. The results indicate that training required from certain real situations can be unattainable due to their highly dangerous nature or lack of access, such as for combat or medical training. While immersive VR can solve problems of physical inaccessibility and safety, it has also proven to be essential in solving time and location problems. Using immersive VR to take students through history by providing them with an authentic environment to experience different historical periods and locations creates an impactful, visually and intellectually stimulating learning experience [10].

On the other hand, Ahn et al. [16] argue that VR can inadvertently cause lower learning outcomes due to its possible distracting and overwhelming effects on the user. While the information presented can be helpful, users can easily get caught up in extraneous factors that deter them from focusing on learning goals. Moreover, users can find difficulty differentiating between relevant and irrelevant information when experiencing spatial presence. When experiencing “high presence,” users tend to be distracted by various sensory cues (hearing, seeing, and feeling), which can limit the user’s processing quality and capacity for the information. This can negatively impact the user’s cognitive and perceptual understanding of the information [16]. Nevertheless, there is strong evidence that leads to showing that the use of VR can create a presence [15]. This spatial presence, which inadvertently forms the perception that the body is present within mediated conditions, has the potential for stronger engagement [16]. Lombard and Ditton [15] state that “one of the most interesting aspects of the present phenomenon concerns the physiological and psychological consequences of the perceptual illusion of nonmeditation.” At the core of this research is the idea that if we can take historical narratives and reimagine them in a mediated virtual reality environment, such that the user preserves non-mediated narratives within a historical virtual environment, then this user will feel present, and their experience will be enhanced by a presence that makes the narratives more plausible [17].

The Once Upon a Time in Palestine VR documentary [13] practice-led research aims to explore the value of making such an immersive mediated historical content project and compare it to a traditional version of the same content to measure the engagement of youth with the content and their retention of the historical information, thus examining the value of immersive VR documentaries as a tool to educate youth on factual historical content. Using VR technologies is very suited to the reimagination of oral history due to the idea that factual narratives told as folk stories can be enhanced greatly when placed in a virtual environment that places the user back in time when the story happened. This method creates a presence that can be temporal, which effectively takes the user back in time, thus enhancing the experience of reimagining oral history. Similarly, passing traditional folklore from generation to generation has always played an important role in cultural preservation. Brown et al. [18] suggest that the passing of traditional folklore can be enhanced by VR technologies. In addition, museums are frequently challenged to present culture in a dynamic and animated way. To this end, the use of VR to portray traditional storytelling experiences holds great potential for museums and cultural

preservation in general. It is therefore important to investigate ways in which the user's understanding and appreciation of the experience may be enhanced [18].

This study employs a comparative approach to assess the effectiveness of reimagined mini-narratives in a VR environment to create immersion and presence among participants. A sample of 47 undergraduate students was randomly divided into two groups: one watched an immersive VR narrative, and the other watched a traditional media video of the elders' interviews. The study relied on a mixed method [19] of participatory action research [5] and pre- and post-experience surveys to gauge engagement, enjoyment, and content retention. Descriptive statistics and comparative analysis are used to interpret the data. Limitations encompass a relatively small sample size and potential contextual biases. The results of the survey were then combined with the researcher's observations and discussed below.

3 RESULTS AND DISCUSSION

The project was created in three phases over the span of five years. In the first phase, youth from Palestinian villages were trained in the art of videography and taught effective techniques to interview elders. In the second phase, the youth were asked to interview elders from their local villages and cities. This proved to be effective because the youth were closely familiar with their villages and elders best, and that led us to be able to record the micro-history of local regions in Palestine. Additionally, this ensured that the youth were engaged in the content and immersed in the creative process. After this phase, the content obtained was given to university students in the UAE who were tasked to extract some of the best stories told, research their authenticity, and write scripts that reimagine those stories with a certain degree of creative freedom that allowed engaging language but preserved the historical facts of the story. The final phase was given to another group of university students, who were tasked with shooting volumetric videos of those stories and constructing a 3D Palestinian village along with a smaller part of the old city of Jerusalem.

Following that, the stories were then placed in the 3D villages using the *Unity* 3D engine, which was also programmed by university students. The final result was a VR documentary that can be played on the Oculus Go headset. The result of engaging the process of creation is discussed in previous papers by the author, showing that the youth were indeed more interested in their heritage post-involvement in the project. In this paper, we focus on the results of presenting this VR documentary to a group of university students and the level of immersion and retention that they had of the oral history stories when presented in both traditional documentary forms and as part of the VR documentary as mini-stories within the reimagined 3D space. The paper argues that with historical factual content, the use of VR technology will enhance immersion as stipulated in the presence theory, which describes the state of experiencing the transformation of virtual objects into real objects through being immersed in either a sensory or non-sensory manner [20]. This is demonstrated through the post-exposure survey conducted on students who watched the documentary. In order for presence to be enhanced, it was essential for the *Once Upon a Time in Palestine* VR documentary to be reimagined as the first voice narrative. This narrative was then made as a volumetric video and placed in a reimagined plausible environment. This allowed the audience to feel as though they were talking to the narrator and that their presence was in a shared environment, thus establishing a higher connection, which allowed them to connect on a cognitive, personal, and intellectual level with the content [21], [22].

Creating a strong presence in VR requires that the audience have a plausible experience in terms of the virtual space and audio, such as “3D visual imagery, spatialized sound, and force or tactile feedback” [23]. However, once presence is established and the audience is engaging with the content that is mediated by the VR technology, the interaction with the content can be considered as near non-mediated if the presence is strong. In this case, it is important that this content is reimagined such that it holds the suspension of disbelief and thus sustains presence. This means that if the environment promotes a strong presence and the content is not engaging enough, then the final result will be detrimental to the content and will produce a negatively jarring effect of oscillating between presence and disengagement. In that case, technology becomes a hindrance to the delivery of historical facts. In this project, we made sure to stay true to the historical facts while also being deliberate in reimagining the narrative as such to make it engaging. This extra level of mediation of content added a conceptual mediative layer in addition to the mediation already necessary by the limitations of the VR delivery technology. Ultimately, this can add value to the historical content and make it more digestible to a younger audience while also making it easier to engage with and retain, thus enhancing the educational experience.

The idea of reimagining the past through VR has been done before. A notable example of this is *Eva: A-7063*, which tells the engaging story of Eva Kor, the Auschwitz survivor, through a 360-degree experience of the four camps she was held in and how she was able to heal after her journey. The unfolding of the historical events of the Holocaust, paired with the personal perspective of Eva and videos from the time, provided a fully immersive experience that received several awards [24], [25]. Comparably, the *Once Upon a Time in Palestine* VR documentary goes one step further by reimagining the oral history and creating fictional mini-narratives based on it while also combining it with a visual reference of an archival photograph of similar stories from the same period.

One of those stories was the return of Khalil Sakakini from his American sojourn in the autumn of 1908, which was an occasion for contemplating the creation of a new kind of cultural space: the literary café, a public meeting place to accommodate his newly formed circle of literature enthusiasts, the “Party of the Vagabonds” (Hizb al-Sa’aleek). One of the elders from Jerusalem told us that as a child he used to see Khalil in the Vagabond café in Jerusalem in the 1920s. As a result, we researched the story and found it as an entry in Salim Tamari’s magnificent book, *Mountain Against the Sea* (2008). Among the most famous of all Jerusalem cafés was Qahwat al-Mukhtar, later christened as Qahwat al-Sa’aleek (Vagabond Café) by Khalil Sakakini and his intellectual circle. By the mukhtar of the Orthodox community in the Old City, Issa Michael al-Tubbeh, lay an enclave inside the Jaffa Gate, which became known as the Mukhtar’s Café in 1918. The café started as a stopping place for “Greek, Cypriot, and Russian Easter pilgrims,” as well as a consultation office for the Orthodox community in the Old City [26]. Thus, we authenticated the story and started researching visual references. We were able to find an archival image of the exact café in Jerusalem, and in addition, we found a diary entry from Khalil himself talking about the café:

Tomorrow is my last day with the age of idleness, and what a magnificent period it was. Tomorrow the Vagabond Café will be deserted. Our fabulous sessions will meet no more. The Brotherhood of Amity will seek me and not find me. Who will inherit me as the champion of idleness in [Palestine]? [26]

Our next step was to recreate the actual café and part of the old city of Jerusalem near the Damascus Gate, where the café was located. We also made a 3D environment of the location in *Unity*. Next, we found an actual audio recording of a soundscape from the area to enhance the presence, and we shot a mini-narrative of Khalil in his voice, talking about his time in the café. Thus, the original narrative from the elders' story was mediated by our research and our reimagined 3D environment and mini-narratives. Staying true to historical facts and creating narratives that are authentic but loosely based on the stories is a powerful mechanism to retell a story, much like the old oral storytelling tradition, *Hakawati*, where people would gather around in public spaces before the existence of digital forms of media to listen to the *Hakawati*, the tale-teller, tell an engaging story to the eager audience [27]. Through that, we see great value, and based on the observations of the undergraduate students who participated in the study, those arguments were validated by both the survey results, our observations, and the qualitative feedback we received from the participants with comments such as "I felt as if I was there," "I don't want to leave," "I love being here," and "Thank you. With this, I feel like I have been to Jerusalem." However, there were some negative results where some participants found the experience uncomfortable and overwhelming, providing comments such as "I feel dizzy," "It flickers a little," "How do I go inside this door?" and "I'm stuck."

It is important to note that in the comparative study of the two groups, where one was watching the traditional raw footage interviews of the elders telling their stories versus the participants watching the reimagined mini-narratives based on those stories and experiences in the VR environment, the results of the survey showed that only 20% of the participants who watched the traditional raw footage "enjoyed" or "enjoyed very much" the experience, while 60% "enjoyed" or "enjoyed very much" the experience of watching the VR documentary. Furthermore, in terms of content retention. The results of the survey showed slightly more retention of content from watching the VR versus the raw footage. However, the difference was not significant enough and could be a result of the small sample of 47 participants, with 28 of them watching the VR and 19 of them watching the traditional footage.

Additionally, another limitation of this research is that most participants who were exposed to the VR documentary in this study had never used a VR headset before, and as such, the novelty effect could have contributed positively to their enjoyment and engagement and negatively to their retention of the learning outcomes [28]. The researcher observed that the students interacting with the VR headset showed engagement and sustained attention, which indicates that the participants were in flow. However, those findings are preliminary, and more measurements with quantitative and qualitative data are needed to validate those observations. Lastly, one consistent comment given by the participants was that they were expecting a better resolution and higher-quality graphics. This is due to the low CPU power of the Oculus Go and the environment needing to be built at lower resolutions so the OG can cope. However, the technologies are rapidly improving already with the release of the Oculus Quest and other new high-resolution headsets currently in development. Consequently, this study can serve as a blueprint for future studies, requiring more participants and better technology to create a more plausible VR experience. It is also essential to note that the participants should be familiarized with the VR technology first and trained on how to navigate the VR documentary as an initial preparation step before they are asked to experience the VR documentary. This approach will eliminate the novelty effect and enhance the chance of enjoyment

while also providing a more accurate measure of retention in VR versus traditional documentaries.

4 CONCLUSION

This paper discussed the power of reimagining historical factual narratives into mini digestible volumetric videos within reconstructed 3D spaces that require the user to interact with the content physically and spatially, which can present filmmakers and educators with powerful mechanisms to engage the younger generation in the content they would otherwise find dull. While the participants of this study were engaged with the VR documentary at a higher level than that of the traditional documentary, the results of their retention of the historical content, as compared between the VR and the traditional documentary, were inconclusive due to the novelty of the use of new technologies. Thus, the study had two major limitations: one being that the sample was small, and the other being the fact that the participants were not already familiar with VR headsets, which created a novelty effect that was a major factor in affecting the final results of the study. The value of this study is to serve as a blueprint for future studies where historical content can be presented in a traditional linear documentary format and an immersive VR environment to measure flow and, ultimately, the retention of content. Moreover, it is essential to examine the power of immersive media as a storytelling tool and a mechanism to reimagine historical factual content to make it engaging and digestible for a younger audience, thus enhancing their learning experience of this content. The paper concludes that while VR technologies provide a powerful tool to reimagine factual historical content to make it more engaging for younger audiences, more research needs to be done to improve the experience for the user. In addition, the novelty effect factor needs to be eliminated to generate more accurate results, and the technology has the potential to be improved to enhance presence to a level that is able to create a plausible experience that suspends the audience's disbelief in which the mediated content is perceived as non-mediated. In the case of the audience being familiar with the VR technology, the mediated content is devised to be engaging within the immersive VR environment so that the participants can engage positively without the novelty effect, thus enhancing their learning experience of the historical factual content.

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6 AUTHORS

Sohail Dahdal is with the American University of Sharjah, Sharjah, UAE (E-mail: sdahdal@aus.edu).

Hala Nasar is with the American University of Sharjah, Sharjah, UAE.