Virtual Tours as Emerging Technologies to Engage Children and Youth with their Country's Historical Conflicts

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Abstract—Virtual Reality (VR) is increasingly used for visiting historic places. Research on VR experiences in dark tourism (that focuses on mortality) focuses almost exclusively on adults. No studies were found that used virtual tours to engage children with their own country's conflicts. The present study addresses this gap by designing and developing virtual tours in four cities of Europe with a troubled past. Virtual tours engage children and youth in historical conflicts using multi-perspective storytelling. The aim of this pre-test post-test comparative case study is to examine the change on students' perceptions of their country's troubled past after their interaction with a virtual tour of their capital. A secondary aim is to document students' evaluation of the virtual tour. A questionnaire examining students' perceptions was completed before and after students' individual interaction with a virtual tour. Participants included 360 students (212 from Cyprus, 42 from Germany, 63 from Bosnia-Herzegovina and 44 from Kosovo). Findings indicate a statistically significant positive change in perceptions of troubled pasts for primary/secondary students from Cyprus, Bosnia-Herzegovina and Germany. Preliminary results are promising and indicate the effectiveness of virtual tours as tools that can have an effect on students' perceptions of troubled pasts, particularly for children rather than young adults. Students' evaluation of the virtual tours was positive, irrespectively of participants' age, indicating high acceptability.

Keywords—history, children, virtual reality, troubled past, multiple perspectives, conflict resolution

1 Introduction

Virtual reality (VR) is a field that has received renewed attention in the past few years. VR has been used extensively for educational purposes [1] and is increasingly

used for visiting (historic) virtual places to enhance a visitor's experience by providing access to additional materials for review and deepening knowledge [2], [3]. VR allows individuals to immerse themselves within virtual environments to explore monuments and other cultural heritage sites up close [4].

Virtual tours have emerged as a new form of tourism due to the COVID19 pandemic [5]. Immersive Virtual Reality (IVR) consists of artificial computer-generated environments allowing a user to perceive the sensation of being present and interact in an ambience that convincingly replaces the physical world. When travel is restricted, such visualization power can be shared globally as an essential remote teaching tool for educational institutions through the Internet [6].

The majority of studies in the VR field focused on the development of immersive virtual reality applications, for example integrating 360° panoramic photographs within a virtual environment as a novel and complementary form of visualization [7]. Previous studies used virtual tours for educational purposes in museum education [8], in cultural heritage [9] and in the history domain [10], [11] and examined their usability with university students [12] and their effectiveness in teaching history in higher education [6]. Some recent studies focused on having students create their own virtual tours in secondary education [9] and higher education [13], [14]. The students were first trained to create virtual tours of their hometowns with Google Tour Creator. They then guided classmates on virtual tours of their hometowns in English, using smartphones and mini VR glasses [13]. Google tour creator, which is now discontinued, seemed to be a popular tool, used in several recent studies [13], [14].

A number of existing Virtual Reality (VR) experiences take place at historical sites where pain, suffering, atrocity, disaster, and death have occurred. These experiences are part of what is called "dark tourism", which is defined as tourism that focuses on mortality [15]. The intentions of VR experiences in dark tourism sites are to educate, to encourage empathy and compassion, and to build community [16].

Dark tourism is typically aimed at adults rather than children. With respect to dark sites in particular, the findings of the literature reveal that many visitors are motivated by an interest in cultural heritage, learning, education, and a desire to understand what happened at the dark site, according to [17]. A small fraction of these visitors are survivors or family members, however the vast majority are tourists who have no direct personal basis for their visit [18]. It is therefore not surprising that most studies involving visitors to heritage sites focused on international tourists [19] rather than locals.

At present, dark tourism research focuses almost exclusively on adults and does not adequately explain young tourists' experiences [20]. Children are very much under-represented in heritage tourism studies [21]. [22] Kerr and Price (2018), who reviewed the literature of dark tourism articles and chapters mentioning children, found only a few publications meeting their search criteria and therefore including children. According to the same researchers, possible reasons for the scarcity of research on children in dark tourism may include the legal constraints when researching minors, the academic risk in undertaking a new field of research, and the substantial expertise needed to engage children in studies [22].

Israfilova and Khoo-Lattimore (2019) [23] conducted one of the few studies that focused on children in dark tourism sites with 25 children of the 8th, 9th and 10th grades who undertook a school trip as a one-day excursion to the Guba Genocide Memorial

Complex, in Azerbaijan. The authors used interviews as data collection methods. The findings of their research study indicated that "children's visit to a thanatological attraction filled their knowledge gap and motivated them to study history" [23] (p.478). The children's visit moreover formed a character of patriotism encouraged by their observations at the site [23]. Students' knowledge was not evaluated systematically in this study as its measurement relied mostly on children's self-reports and this study did not involve a virtual tour.

Another recent study with 10th grade students focused on the cultural heritage area of the Kapitan and Al-Munawar villages in Palembang city in Indonesia, which is not a dark site venue, but used a virtual tour as an educational tool. The study showed that the virtual tour was well accepted by students, based on their self-reports [10]. Lastly, a study focusing on one of the most popular man-made dark tourism sites in China, the memorial of the victims of the Nanjing massacre evaluated the suitability of the site for young children, based on a discourse analysis of international tourists' online reviews [19], without therefore involving children as participants in the study and without the use of a virtual tour.

Systematic observational accounts of children at dark sites are rare, anecdotal, and brief [22]. No studies were found that used virtual tours as emerging technologies to influence young children's perceptions about their own country's troubled pasts. Children's encounters at dark sites differ considerably from those of adults [22], therefore they are important to research. The present study attempted to address this gap by designing, developing and evaluating the impact of dark tourism virtual tours addressed to children as young as 11 years old.

1.1 Design of virtual tours as emerging technologies for dark tourism

Virtual tours were created as part of an EU-funded research project (RePAST). This project aimed at investigating how European societies deal with their troubled pasts today through the analysis of conflict discourses rooted in those pasts, with a view on the impact of those discourses on European integration. It studied countries whose troubled pasts sit squarely on legacies that still endanger European integration today. The project established a series of innovative actions for creating participatory and meaningful experiences for various actors (e.g., tourism professionals and tourists, cultural managers, NGO representatives, educators and students), using the latest advances in information technology. These included digital games for renegotiating troubled pasts [24] and virtual tours to discover troubled pasts. This study focuses on virtual tours and the evaluation of their impact on children and youth in four different countries with troubled pasts.

Sources of information for virtual tours included written and oral historical sources, such as interviews and testimonies in order to provide not only an anthropocentric aspect in the tour content, but also to demonstrate how people from both communities of each conflict actually experienced the events approached in the tours. Additional sources of information included press articles, essays, conference proceedings, academic papers, books, archives as well as government reports and legal documents. The goal was to create tours based on high depth research and accredited bibliography for education purposes.

The four virtual tours which were used in this study included the following cities: Nicosia (Cyprus) [https://cliomusetours.com/tours/nicosia-the-worlds-last-divided-capital/], Berlin (Germany) [https://create.cliomuseapp.com/tourExperience/393/2/daily-life-in-divided-berlin], Sarajevo (Bosnia and Herzegovina) [https://create.cliomuseapp.com/tourExperience/386/2/sarajevo-humanity-during-the-siege], and Prishtina (Kosovo) [https://create.cliomuseapp.com/tourExperience/396/2/contested-and-competing-memory-spaces-in-kosovo]. For purposes of illustration the topic and brief description of the tour of Nicosia is presented.

> *"Nicosia: the world's last divided capital": The tour presents Cyprus' past focusing on the historical period before, during and after 1974. The coup by Greek colonels resulted in ousting the Greek-Cypriot leader Archbishop Makarios and Turkey retaliated by invading and seizing a third of Cyprus. Since then, Cyprus is still bristling with troops and Nicosia remains the last divided capital in the world.*

In each virtual tour there are 10 stations that show 10 historical landmarks of each city in 3D format (Figure 1). In each station there are three stories promoting both perspectives of the conflictual past (in this example Greek-Cypriots' and Turkish-Cypriots' perspectives) and a multiple-choice question (Figure 2). The tours embed short quizzes after each stop to boost engagement and create incentives for the completion of the whole tour.

Fig. 1. Screenshot of the virtual tour of Nicosia, the world's last divided capital, showing four of the ten stops
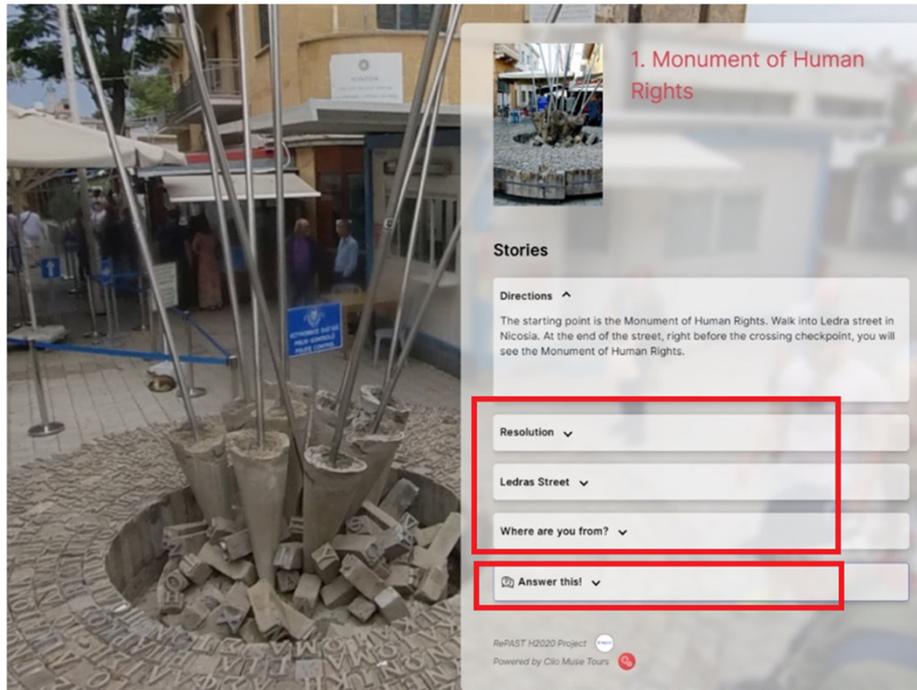
Fig. 2. Screenshot of the first stop of the virtual tour of Nicosia, showing an expandable navigation menu of Directions, three stories (Resolution, Ledras street and Where are you from?) and Answer this! which leads to a quiz question

This methodology of promoting both perspectives of the conflictual past also has support in Psaltis et al. (2017) as cited in [25]. Psaltis (2017) explained that "the way recent and old intergroup conflicts are presented around the world in curricula, textbooks, … can be characterized by four main approaches" (p.1) [25]. In the first approach, any reference to the conflictual past is avoided. In the second approach, groups offer either a positive presentation of the ingroup (defined as one's own group) or a preservation of the memory of the conflict by reiterating master narratives of one-sided victimization of the ingroup. A third approach attempts to overcome conflict by a simplistic understanding of a single peaceful narrative of co-existence. These three approaches are problematic. The first two approaches become an obstacle to conflict transformation by peaceful means while the third approach is overly simplistic. Finally, the fourth approach, "the interdisciplinary approach of transformative history teaching, attempts a critical understanding of the conflictual past through the cultivation of historical thinking, empathy, an overcoming of ethnocentric narratives and the promotion of multiperspectivity" (p.1) [25].

Following Psaltis et al. (2017)'s recommendations for the history teaching of intergroup conflicts [25], the study attempts to have students engage with the past using the interdisciplinary approach of transformative history teaching in a way that promotes multiperspectivity.

Storytelling within the virtual tours was used to provide multiple perspectives in a balanced manner using neutral, non-biased interpretations [19]. For example, the story that is included in the first stop of the Nicosia tour provides the experience of a person of Greek-Cypriot descent who was born and raised in Rizokarpaso, a small village in the northern part of the island, which is now occupied by Turkey (Figure 3). Rizokarpaso inhabitants were prohibited from fleeing to the southern part in 1974. Contrary to one-sided perspectives typically provided in school textbooks that portray the "other" community as the enemy, the story reveals strong connections among Greek-Cypriots and Turkish-Cypriots who used to live together harmoniously before the 1974 Turkish invasion on the island and attempted to help each other even during the 1974 war on the island.
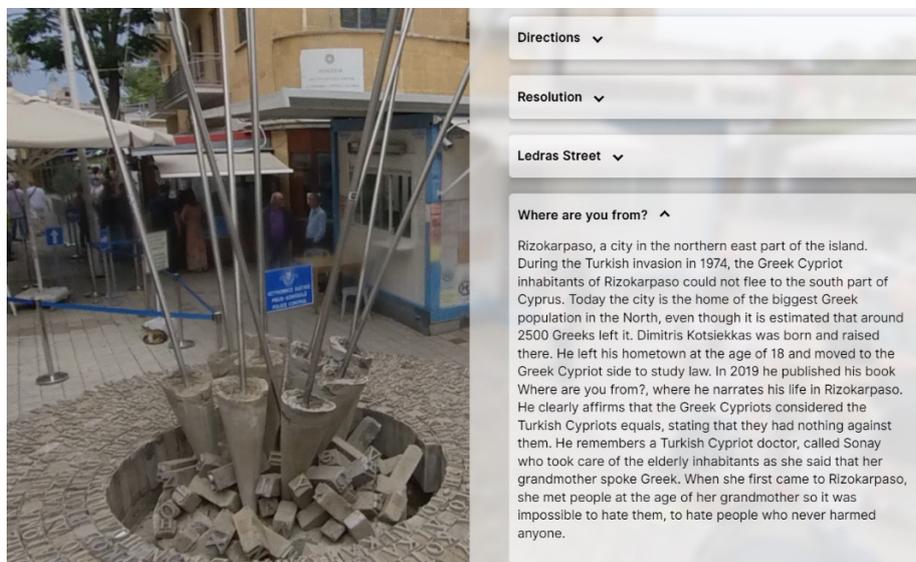

Fig. 3. Screenshot of the virtual tour of Nicosia, showing a story from the first stop of the tour "Where are you from?"

"Packaging and promoting darkness often requires particular management approaches and specialized marketing methods, depending on the target market (e.g. children and families) or the general sensitivies of the tragedy that occurred at a given location" according to [26]. Moreover, "exploring children's experiences at memorials and other dark sites summons additional concerns, because even indirect exposure to death and suffering may evoke distress" [22]. Keeping these in mind during the design phase of this study, a conscious effort involved limiting sensitive content in the tours to be able to address the needs of children as young as 11 years old.

With respect to functionality, there are two different tour types available: a) self-guided tours and b) virtual tours. The self-guided tours assume physical presence for

each location, and as such, they are best experienced during an on-site visit. If the device has a gyroscope, the virtual tours offer the option to move around in Google Street View by turning the device. Virtual tours utilize Google Street View to show the surroundings of each landmark in 360 degrees view and they can be experienced from the safety and comfort of home (Figures 1, 2 and 3). Both types of tours (self-guided and virtual) are mobile-friendly, offering the same functionality and experience to smartphone and tablet users. Virtual tours can also be accessed using a browser on a desktop computer.

1.2   Necessity for this study

No studies were found that used virtual tours as a tool to influence young children's perceptions about their own country's troubled pasts. The present study attempted to address this gap. It addressed direct members of relatively recent conflicts (the Cyprus war in 1974, the Bosnian War in 1992–1995, the Kosovo war in 1998–1999, the once-divided Berlin before 1989). In Cyprus, participants had a third-generation experience of the war in Cyprus. In the German case, the participants had exclusively transmitted knowledge from their parents' or grandparents' generation, who witnessed the division, the fall of the Iron Curtain and/or the transformation phase. All participating students were from West Germany. In Kosovo, participants had transmitted views of the conflict as most of them were born after the war in 1999 but potentially had memories of non-violent conflicts from the divided city of Mitrovica and the continuation of conflict with Serbia that is present to this date. In Bosnia and Herzegovina, all students were citizens of the country, however, of different ethnic origin. All of them had a second-generation experience of the war, as they were not born yet, when the war ravaged the country between 1992–1995.

With respect to the methodology used for questioning minors about sensitive topics in museum studies and in dark tourism studies researchers often rely on post-visit questionnaires [22]. Even though conducting measurements of attitudes on controversial issues once appears to be common practice [27], there are limitations in this approach as it misses a baseline measurement and therefore cannot detect changes in participants' attitudes or learning nor compare students' attitudes before and after a specific educational experience. The present study attempted to establish a baseline by including a measurement of perceptions prior to children's interaction with the virtual tour. This allowed the examination of a potential change in their perceptions, something that was missing from previous studies.

The aim of this study was to examine potential changes on students' perceptions of their country's troubled past after their individual interaction with a virtual tour of their capital: Nicosia (Cyprus), Sarajevo (Bosnia-Herzegovina), Pristina (Kosovo) and Berlin (Germany) using a pre-test post-test comparative case study design. A secondary aim of the study was to document students' evaluation of their experience of virtual tours to examine the acceptability of emerging technologies of this type.

1.3 Research questions

The main research questions of the study are the following:

RQ1: How do young students' perceptions of their own country's troubled past change as a result of their interaction with a virtual tour of Nicosia, Sarajevo, Berlin and Pristina?

RQ2: How do young students evaluate their experience of virtual tours of Nicosia, Sarajevo, Berlin and Pristina?

2 Methodology

2.1 Ethical issues

Regarding participants from Cyprus, approval for conducting the study was provided by the National Bioethics Committee (ЕЕВК ЕП 2020.01.193, approval obtained on Sep. 30th 2020), the Center for Educational Research and Evaluation (CERE) in Cyprus and the Directorates of the Ministry of Education and Culture of Cyprus.

Bosnia and Herzegovina does not have one (central) ministry of education that would cover the whole country, as is the case of Cyprus, but several ministries of education scattered around geographical areas and political entities. This is, in addition to separated collective memories and ethno-political narratives, one of the most important reasons of BiH not functioning as a stable country [28], [29]. With regard to Bosnia-Herzegovina, a delay in receiving an answer to the request to the Ministry of Education, Science, Culture & Sport of the BiH's Zenica-Doboj Canton to approve testing the virtual tour in the First Gymnasium (Prva gimnazija) in Zenica which was sent on February 8th 2021 led the research team to seek an approval to conduct the study directly at the Gymnasium's representatives, which was received on April 9th 2021.

In Germany, history teachers from secondary schools (Gymnasium/Realschule) were contacted and they were provided in advance with information on the aims of the project, the process and ethical implications for their approval.

In the Kosovo case, as there is no institution for Ethics at the Ministry of Education, Science and Technology and as participants were adults (older than 18 years old) ethical approvals were provided at the university level. The university professors who agreed with the use of the virtual tour in their classrooms provided approval of ethical procedures used in the study.

2.2 Sampling procedure

In Cyprus, upon obtaining all necessary approvals from the Center for Educational Research and Evaluation (CERE) and the Directorates of the Ministry of Education and Culture of Cyprus, a call for participation to the study was sent via email to all Greek-speaking public and private primary (n = 332) and secondary schools (n = 144) in Cyprus. The aforementioned invitation was addressed to history teachers working in schools that had access to a computer lab for students or had one mobile device per student in a school class. All schools that responded positively were included in

the study (self-selection sampling). History teachers first contacted the headmasters/ mistresses of their school to inform them about the research study and to obtain their approval. When this was received, informed consent forms were sent to the parents of students of the 6th to 10th grade of interested schools. Educators could choose to participate to the study at any time during the school year between November 2020 and June 2021. Because of COVID-19 and the difficulties of visiting places, the tours were implemented as virtual tours.

In Bosnia and Herzegovina, the study was conducted in a high school in the city of Zenica (Prva gimnazija u Zenici) after obtaining approval from the principal and a participating teacher. At the time of the study, due to the COVID-19 pandemic, all teaching at the school was held remotely. On 19 April 2021, approximately 120 pupils of first, third, and fourth year received an invitation from the teacher by email to participate in the study, as well as instructions on how to do so. The pupils' participation in the study was voluntary (self-selection sampling) and done remotely via their personal electronic devices. By 30 April 2021, all of those that expressed their willingness to participate in the study had done so.

In Germany, history teachers who agreed to have their students participate in the study identified the appropriate students in their classes. The study involved students from a Realschule and a Gymnasium in Bavaria (convenience sampling). Realschule and a Gymnasium are two different types of secondary schools in Germany. The survey was completely anonymously, and all participants were assured that they did not have to answer any questions they felt uncomfortable with and that they could withdraw from the project at any time. Data collection was carried out in June and July 2021.

In Kosovo, first year university students were asked to voluntarily participate in the study as part of university courses (convenience sampling). Data collection was carried out in June 2021.

2.3 Data sources

A questionnaire was developed specifically for the needs and purpose of this study, to answer the study's first research question. It was administered to students prior to and after their experience of the VR tour. The pretest consisted of six demographic questions (gender, age, grade level, country, nationality and whether one or both of the child's parents was/were a refugee or an internally displaced person). The pretest also consisted of eight statements on students' perceptions of troubled past on a 5-point Likert-scale. The post-test included the same eight statements on students' perceptions of troubled past, two open-ended questions with respect to students' experience with the virtual tour and three dichotomous questions to be answered with a "yes" or "no". The questionnaire was administered either on a paper-based format or it was completed online. A 6-digit identification number was given to students by the class educator, and it was used for both pretests and post-tests so that they could be paired anonymously. Students' real names were not collected.

The statements were different for each country to respond to the content of each tour. For purposes of illustration the statements for the Nicosia tour (Cyprus) are provided.

1. Before 1974 Greek Cypriots and Turkish Cypriots lived together peacefully in mixed villages in Cyprus.
2. In a historical conflict there are at least two different perspectives.
3. Greek Cypriots and Turkish Cypriots have different views about the Cyprus problem.
4. Both communities, Greek Cypriots and Turkish Cypriots, have suffered from the war in 1974.
5. Today, several movements and groups support the reunification of the island.
6. People from both communities are still trying for a united Cyprus.
7. A conflict can be overcome if we understand the "other's" (the enemy's) perspective.
8. Greek Cypriots and Turkish Cypriots can live together peacefully if a solution to the Cyprus problem is found.

Students responded by indicating their level of agreement/disagreement with these statements using the following Likert scale: 1 (Completely disagree), 2 (Disagree), 3 (Neither agree nor disagree), 4 (Agree) and 5 (Strongly agree). All statements were phrased in a positive way, therefore agreement with statements indicated positive perceptions towards understanding multiple perspectives (statements 2, 3), which includes understanding that the "other" (the enemy) suffered too (statement 4) and towards overcoming the country's troubled past (statements 7 and 8). The statements included three pieces of factual information (statements 1, 5 and 6) that students learned through the content of the virtual tour.

The instrument was localized in order to address the content of the Germany, Kosovo and Bosnia and Herzegovina tours. For example, statement 4 for Kosovo was the following: "Both communities, Albanians and Serbs, have suffered from the war in 1998".

To answer the study's second research question, which focused on the evaluation of the tour, the following questions were used which were common for all four tours:

1. I have used a virtual tour before.
2. I have heard the stories of the virtual tour before.
3. I would like to try another virtual tour, of a different city in Europe.

which were answered using a dichotomous "yes/no" scale.

Additionally, students indicated their level of agreement/disagreement for five statements using the following Likert scale: 1 (Completely disagree), 2 (Disagree), 3 (Neither agree nor disagree), 4 (Agree) and 5 (Strongly agree).

1. The content of the virtual tour was interesting.
2. The stories of the virtual tour were objective.
3. The navigation in the virtual tour was easy for me.
4. The experience of the virtual tour was nice.
5. I could easily understand the content of the virtual tour.

2.4 Data collection

The four tours were experienced virtually in formal education in classrooms in which every student had access to a desktop or mobile device. Teachers received a

protocol to follow that included three steps. In the first step, students first completed the pre-test using an identification number assigned to them by their teacher to ensure that their real name would not be used. Only students whose informed consent was received in writing through their parents/guardians participated in the study by completing questionnaires. As a second step, all students participated in an in-class virtual tour of a city in their country in the presence of their history teacher. The duration of students' individual interaction with the virtual tour was approximately 45–60 minutes. At the end of the virtual tour students, whose parents signed consent forms for them to voluntarily participate in the study, completed a post-test evaluation, either online or in paper-based format using the same identification number assigned to them by their teacher. Students' real names were not collected.

No preparation took place prior to students' virtual visit to specific cities in this study, as suggested by Kerr et al. [20], because the goal of the study was to isolate the virtual tour experience as an independent variable.

2.5   Data analysis

Data was input in a statistical package for analysis (IBM SPSS Statistics 25). For Likert-scale statements, the response of 1 (Completely disagree) received a score of 1, the response of 2 (Disagree) received a score of 2, the response of 3 (Neither agree nor disagree) received a score of 3, the response of 4 (Agree) received a score of 4 and the response of 5 (Strongly agree) received a score of 5. The total score of the statements measuring students' perceptions was computed. Descriptive statistics (M, SD) and inferential statistical tests (paired samples t tests) were used for data analysis for answering the research questions of the study. An α level of .05 was set a priori for all statistical analyses.

3   Results

3.1   Participants' demographic data

Dissemination efforts reached a total of 545 students from four countries who interacted with the virtual tour in a formal education setting. With respect to nationality, of these students, 325 students from Cyprus were Greek-Cypriots, 50 students from Kosovo were Kosovar Albanians, 42 students from Germany were Germans and 128 students from Bosnia-Herzegovina identified themselves with different nationalities. Specifically, 77 considered themselves Bosniaks, 48 considered themselves Bosnian and Herzegovinian and 10 of them considered themselves Croat (or Bosnian Croat).

A smaller number of these 545 students signed consent forms and completed both pre-test and post-test data so that they could be included in the sample of this study. Specifically, a total of 360 students from four countries with a troubled past participated in the study. The sample consisted of 212 students from Cyprus, 42 from Germany, 44 from Kosovo and 63 from Bosnia-Herzegovina.

Participants' age ranged from 10 to 21 years old. Their average age was 14 years old (M = 14.32, SD = 3.00, N = 342). The vast majority of participants (77.8%, n = 266/342) were minors (younger than 18 years old).

With respect to participants' age for each country that participated in the study, Cypriot students' age (n = 212) was on average 12 years (M = 12.32, SD = 1.48, min = 10, max = 16). Cypriots students' education level included primary (69.2%) and secondary school (30.8%). German students' average age (n = 41) was 15 (M = 15.07, SD = 0.26, min = 15, max = 16). They were all secondary school students. Students from Bosnia and Herzegovina (n = 63) had an average age of approximately 18 years old (M = 17.87, SD = 1.02, min = 15, max = 19). They were all secondary school students. Kosovar Albanian students (n = 35) had an average age of approximately 19 years old (M = 19.66, SD = 1.11, min = 18, max = 21). They were all university students. For the sample of participants from Kosovo, nine participants whose age exceeded 21 were excluded from analysis, as the study's aim was to focus on children and youth.

3.2 RQ1: Change in students' perceptions of their country's troubled past after their interaction with a virtual tour

The first research question of the study focused on documenting any changes in students' perceptions of their country's troubled past as a result of their interaction with the virtual tour of the capital of their country. Paired-samples t-tests were ran for the sample of students in each participating country to compare their pre and post-test results.

As can be seen from Table 1, Cypriots students' perceptions of their country's troubled past changed significantly (t_{211} = –2.78; p = .006) from M = 3.58 (SD = 0.56) before interacting with the virtual tour to M = 3.67 (SD = 0.62) after interacting with the virtual tour. German students' perceptions of their country's troubled past changed significantly (t_{40} = –4.85; p = .000) from M = 3.16 (SD = 0.38) before interacting with the virtual tour to M = 3.40 (SD = 0.51) after interacting with the virtual tour (Table 1). Bosnian students' perceptions of their country's troubled past changed significantly (t_{62} = –4.09; p = .000) from M = 3.02 (SD = 0.61) before interacting with the virtual tour to M = 3.31 (SD = 0.69) after interacting with the virtual tour. Kosovar Albanian students' perceptions of their country's troubled past remained relatively unchanged and did not have a statistically significant change (t_{30} = 0.66; p = .514) (Table 1).

Table 1. Participants perceptions on troubled pasts before
and after interacting with a virtual tour

Nationality	Perceptions Before the Virtual Tour		Perceptions After the Virtual Tour		Change in Perceptions (Paired Samples T-Tests)
	M	*SD*	*M*	*SD*	
Cypriots	3.58	0.56	3.67**	0.62	t_{211} = –2.78; p = .006
Germans	3.16	0.38	3.40**	0.51	t_{40} = –4.85; p = .000
Bosnians	3.02	0.61	3.31**	0.69	t_{62} = –4.09; p = .000
Kosovar Albanians	3.00	0.59	2.89	0.74	t_{30} = 0.66; p = .514

Note: ** indicating p < 0.01.

3.3   RQ2: Students' evaluation of their experience of virtual tours

The second research question focused on examining students' evaluation of their experience of virtual tours. Firstly, for the majority of students this was their first experience with a virtual tour (68.5%, 250/365). Moreover, the majority of participants (57.3%, 209/365) have never heard the stories presented in the virtual tours, therefore this was their first interaction with stories showing what life was like during a conflictual period in the history of their country. Most participants (66.5%, 243/365) agreed or strongly agreed with the statement that the stories presented in the virtual tour were objective.

The majority of participants (82.5%, 301/365) agreed or strongly agreed with the statement that the information presented in the virtual tour was interesting and evaluated the information presented in the virtual tour as understandable (90.2%, 291/365). The majority of participants (84.1%, 307/365) enjoyed the experience of the virtual tour and was interested in trying another virtual tour from a country other than their own (86.8%, 317/365). These findings show that virtual tours seem to be well accepted by children and youth. Participants did not have any difficulty navigating from one stop to another during the virtual tour as shown by the fact that almost 80% of students (79.2%, 289/365) evaluated the navigation as easy, a promising finding for the tours' future large-scale dissemination.

With respect to a comparative analysis, an ANOVA analysis using country as a factor revealed statistically significant differences for two items: the virtual tour as a nice experience and the information of the virtual tour as interesting. Independent samples t-tests analyses showed that the Kosovar Albanian students evaluated the experience significantly higher and evaluated the information of the tour as significantly more interesting compared to Cypriots, Germans and Bosnians.

4   Discussion

The study attempted to examine possible changes in the perceptions of children and youth from four different countries with troubled pasts who experienced a virtual tour of the capital of their country. To the best of the authors' knowledge, no other studies were found that used virtual tours as emerging technologies to influence young children's perceptions of their own country's conflictual past. Our study responds to calls for research to better understand children's experiences in dark tourism sites [22]. Results are overall positive and promising. A statistically significant positive change in children's perceptions of troubled pasts for students in Cyprus, Germany and Bosnia and Herzegovina indicates the effectiveness of virtual tours in changing young students' perceptions of troubled pasts. This finding is significant particularly in light of the fact that change in perceptions is visible even through short-term interventions, which were solely based on the use of this tool and did not include additional pedagogical activities such as teacher-directed whole class discussions that might have influenced students' personal views. In their paper, Kerr et al. (2021) [20] emphasized the importance of stories that potentially impact young children in dark tourism sites more than numbers [20]. Our study agrees with their view and provides empirical evidence

showing that the storytelling approach that was used in virtual tours to scaffold children and youth to realize multiple perspectives of conflictual pasts was effective. Our study builds on the findings of previous studies that showed an increase of children's knowledge and motivation in studying history after their visit to a dark tourism site without the use of technology [23]. It moreover has an important contribution as it measured students' perceptions systematically using a pre-post research design, something that was lacking from previous studies in the field [19], [23].

Contrary to statistically significant results observed with students from Cyprus, Germany and Bosnia and Herzegovina, Kosovar Albanian students' perceptions of their country's troubled past remained unchanged and did not have a statistically significant change. Observations from a previous study conducted with focus groups showed that second generation of Kosovar Albanians with indirect experience of war have stronger views of conflict and reconciliation. This could be due to amplified images and selective experiences of war through families, media and other sources. The lack of a statistically significant change in the sample of Kosovar Albanian participants could potentially be attributed to the maturity of participating students, who were young adults as opposed to primary or secondary school children in Cyprus, Germany and Bosnia and Herzegovina. Older students potentially have stronger views on events and venues represented in the digital tour, which are difficult to change as a result of a short interaction with the tool. In contrast, the literature supports that young children's attitudes can be positively affected even through relatively short term digital interventions at the primary education level [30], [31]. Therefore, there is support, both from the literature and from the present study's findings, for targeting young children in future, large-scale interventions attempting to resolve conflictual pasts and lead to social change through the use of virtual tours.

The second research question of the study focused on examining students' evaluation of their experience of virtual tours. For the majority of students their participation in this study constituted their first experience with a virtual tour. This shows that virtual tours can be characterized as novel tools for children and youth. More than half of participants were exposed to multi-perspective stories about a conflictual period in the history of their country that they have never heard before their experience with the virtual tours, which is an important finding that speaks to the typically one-sided, nationalistic approach used in school history textbooks. Participants were exposed to multiple perspectives through the stories included in the virtual tours that presented the perspective of "the other" community and reacted positively to this, as the majority thought that the stories were objective. This is an important finding, which shows that the purposeful storytelling design of the virtual tours, which included multiple perspectives of the conflict in the tour, was well received by participants. This finding adds to the literature that showed that virtual tours are generally well accepted by students [10] by showing that dark tourism virtual tours in particular are well accepted despite the controversial topics with which they engage students. Kosovar Albanian students seemed to appreciate the experience more than participants from other countries and found information significantly more interesting than other countries, yet their perceptions remained unchanged. A potential explanation for this finding is that the Kosovar educational system and curricula are conservative and do not offer adequate opportunities for experimentation

with digital tools, therefore participants welcome experiences of digital tools and e-learning and evaluate them positively.

The majority of participants evaluated the content of virtual tours as interesting and understandable. This finding indicates that the instructional design and content of the virtual tours was appropriate for children as young as 11 years old. The fact that the vast majority indicated an interest in trying another virtual tour shows high acceptability of the tool by children and youth. Lastly the evaluation of the navigation within the virtual tour as easy, is a promising finding for their future large-scale dissemination. Virtual tours are expected to reach thousands of European citizens, including tourists, professional guides, artists, students, teachers, and researchers, so that they engage interactively with troubled pasts in European countries. The project RePAST as a whole attempted to reach citizens that have not so far been active in the discussion of political historic discourse promoting participation, dialogue and European integration. The virtual tours contributed to this goal with their easy-to-use interface, no-installation-needed and short engaging stories that reveal multiperspectivity in conflicts.

4.1   Limitations of the study

The study did not include a random sample. Participants were self-selected either because they were minors whose teacher chose to participate in the study as was the case for Cyprus, Germany and Bosnia and Herzegovina or because they were selected by professors – educators as part of regular curricula of dealing with the troubled past in academic programs, such as in the Kosovo case.

The duration of the study was short as it consisted of a single interaction of participants with one particular tour of a city in their own country. Moreover, the results are based on students' self-reported data, which were only quantitative in nature. Lastly, the instrument that was used was developed specifically for the needs of this study and it was not validated.

4.2   Directions for future research

Future studies should aim to include participants from both sides of each country's conflictual past (e.g., Turkish Cypriots for the Nicosia tour, non-Albanians, e.g. Serbs for the Kosovo tour, East and West Germans for the Berlin tour, and Bosnian Serbs for the Sarajevo tour). Future studies could also aim to use virtual tours as emerging technologies that can be integrated in the school curricula as part of large scale, longitudinal interventions systematically aiming to explain conflictual pasts to young children. Interventions supported by these digital tools show potential to overcome limitations of the typically one-sided presentation of conflicts that is prevalent in school history textbooks, contribute to positive perceptions towards "the other" community and potentially support conflict resolution and social change.

5 Acknowledgment

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