

# Using Extended Reality Technology for C3 Inquiries

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The *2020 Educate Horizon Report* identifies extended reality (XR) as a key emerging technology. Among other technologies, XR includes augmented reality (AR) and virtual reality (VR). The Report defines XR as “a comprehensive term for the environments that either blend the physical with the virtual or provide fully immersive virtual experiences.”<sup>1</sup> There is tremendous potential for utilizing these tools as low cost and freely accessible portals through which students can actively engage with interesting and difficult topics in social studies classrooms.<sup>2</sup> It is important to consider how we can treat virtual reality as a source alongside other historical sources to be unpacked and “read” with a disciplinary eye in order to make evidence-based claims to answer guiding questions within an inquiry arc.<sup>3</sup>

In this paper we define and clarify terms, discuss key ethical issues that must be considered when using extended reality experiences, and introduce focused Inquiry Design Models (IDMs) that students can use to interrogate XR alongside other sources in disciplined inquiries on the Holocaust, the U.S. civil rights movement, and Greek Art.

## Terminology of XR Defined

Virtual Reality is a “... computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment.”<sup>4</sup> VR can be used with varying levels of immersion; while a Head-Mounted Display can be used for visual immersion, you can also use VR on a computer monitor or mobile device because the experience can still be entirely computer-generated and allow for navigation and interaction.

In a world history classroom, students can explore the National Geographic Society’s “Clearing Everest’s Trash.” The strength of this video is that it depicts the

beauty of the Himalayan region of Nepal, while showing in graphic detail the garbage left behind by tourists. Students can consider what benefits there are from tourism (money, exposure to different cultures), but also what downsides there are. The video makes clear to students that an increase in visitors has led to an increase in trash. While Nepalese authorities have undertaken a proposed solution, students can consider whether the strategy is enough, and what else could be done. This might prompt a discussion about trash in students’ own communities.

Augmented Reality is the overlay of digital content (3D objects, photographs, videos, illustrations, maps) to “supplement/augment” a person’s view of the real world with information.<sup>5</sup> Most often experienced using smartphones, an example from popular culture is Pokémon Go. In the context of social studies, AR may be used to view artifacts and scale models of historic structures overlaid on the real world, or in the case of a field trip to a historic site, to bring lost/distant/hidden objects or structures into view.

In social studies classrooms, teachers can have their students use any mobile device or tablet to engage with AR. For example, using the Google Expedition App, students can view various pieces of technology from World War II, such as a soldier’s uniform and a U-Boat, to help determine how material objects impact the outcome of war. A major advantage of Google Expeditions is that there is a very low barrier to entry, as many (if not most) schools and students already have Google accounts. The panoramas that are included can be projected to an entire class, and students can also view them on their laptops as well as through an application on a mobile device. Further, there is a searchable list of hundreds of expeditions that students and teachers can embark upon, many of which have accompanying lesson plans and ideas. For each expedition on the list, the titles of the panoramas are given (there are often between five and nine included), alongside the location of the expedition, a brief description that provides historical (and often contemporary) background and identifies what the user will see, the URL for the expedition, and for some, accompanying instructional ideas.

The power of extended reality (XR) is in providing a sense that what is being experienced and/or interacted with—whether an object, person(s), or place—is credible and feels real. This perception of “as if real” is described in the VR literature as plausibility and place illusion.<sup>6</sup> Plausibility illusion is the sense that what you are experiencing

or interacting with is real. Place illusion is the sense of being actually present in another place. Together, plausibility and place illusion are used to create an environment for users to safely practice procedures to improve their technical skills in such fields as medicine, aviation, engineering, and the military in ways that would otherwise not be productive or safe.

Additionally, the concepts of plausibility and place illusion may provide visitors with the potential to interact with perspectives of “others” who differ from themselves and also with places and contexts that are otherwise inaccessible. Our argument is that XR has the potential to help students “develop a sense of empathy with people in the past whose perspectives might be very different from those of today,”<sup>7</sup> as well as a more nuanced and refined sense of time, continuity, and change within and across context and place.

### **The Use and Ethics of XR in Social Studies**

When using XR to view and interact with the pyramids or examine Greek art, there is minimal risk of having to negotiate concerns around ethics and/or trauma. However, if XR is used to view and interact with a representation of another’s life experiences, it is important to recognize and negotiate the ethical issues that could arise. Using XR to help understand difficult histories raises the same concerns that the Anti-Defamation League, and others, have expressed about the use of simulations and other media that can “trivialize the experience of the victims” as well as “stereotype group behavior.”<sup>8</sup> Educators must use XR carefully within their instruction and avoid the clumsy and dangerous pedagogical decisions that have been well documented in the media regarding historical simulations.<sup>9</sup>

We contend that it is worthwhile to use XR to visit and examine Auschwitz-Birkenau as it is today. Visitors can look around naturally and come to understand the environment. In this way, a visitor may feel a sense of place illusion,

which may make the experience more memorable and encourage further learning about what happened there in the past. However, it is unethical, untenable, and unrealistic to suggest that students can engage in an exercise where they are asked to experience Auschwitz-Birkenau as someone who was there during the Holocaust or to use XR to create such an experience.<sup>10</sup>

Within our IDMs, the XR experiences are meant to be treated as “visual texts/sources” that, like other sources, need to be interrogated for what they are—representations of individuals, events, places, and narratives. Like other sources, including media and film, these experiences carry the burden of historical representation.<sup>11</sup> Each experience was created and curated for a variety of purposes—not necessarily with students as the intended audience. It is important for students to learn to be aware of what XR experiences can and cannot provide and how they can work as possible sources within an inquiry. Developing such a level of awareness can begin with scaffolding questions that help students not only to interrogate the content of the source but also to examine the nature, nuance, and provenance of these representations, while simultaneously providing a structured experiential inquiry (See Figure 1 on p. 100).

One of our IDMs uses a provocative VR documentary entitled “*I AM a Man*,” which immerses the visitor in the 1968 Memphis Sanitation Workers’ Strike. The emphasis of this IDM is not to suggest that this experience can serve as a portal into the lived experiences of African Americans at that time; rather, we stress the importance of using scaffolding questions from Figure 1 to unpack the source as part of an inquiry about civil rights. The question frames are designed to encourage students to learn first about the goals of the designer in order to develop a more nuanced understanding of whether the environment—sources used and perspectives offered—constitutes a useful representation of the past.

Working with the questions would lead students to an online interview with the designer, Derek Ham, an African American professor of design at North Carolina State University. His goal was to explore the role of narrative and storytelling using historical sources from the period for historical accuracy while taking creative liberty to tell the story of the events. His decision to use black hands in the VR documentary was to create a “jarring” experience for many users, while creating an illusion of plausibility by having the user see hands and not just touch controllers, which would detract from the experience.<sup>12</sup> Such insights, we contend, provide a level of awareness for students to engage with the environment and then continue to use the questions within Figure 1 to further discuss the credibility and value of the experience as a source when interrogated alongside other sources within the IDM.

### **Using XR in Your Classroom: Focused Examples Based on the C3 Inquiry Design Model**

In the section that follows, we present three focused examples of how to use XR in the classroom. All are based on the C3 Inquiry Design Model (IDM). The full inquiries are freely available and ready-to-use on the Visualizing History website: <https://historyviz.com/xrclassroom/>.

1. *Resistance During the Holocaust Anne Frank House: Produced by Anne Frank House and available on Oculus* (<https://annefrankhousevr.com/>)  
*Auschwitz-Birkenau: 360 Video* ([www.youtube.com/watch?v=EOM\\_CxAKB\\_Y](http://www.youtube.com/watch?v=EOM_CxAKB_Y))

**Compelling Question:** *During the Holocaust, what did resistance look like? What does it mean to resist?*

**Staging the Question:** Ask students what it means to resist something. Students can create a concept map for the term “resistance.” This map should

*continued on page 102*

Figure 1. **A Framework for Treating Historical Immersive Experiences as a Source**

**Question Frame 1**

**Unpacking XR’s Burden of Representation.** The questions that follow are designed to help teachers and students interrogate XR experiences as sources and representations within and through an inquiry. The questions are organized into three primary groups to help students: (1) consider the creation and production of the experiences; (2) evaluate the degree to which the experience felt real or credible; (3) reflect upon their learnings. Not all questions can or need to be answered as part of the analysis or investigation.

<p><b>Production and Purpose</b></p>	<p>Who created the (VR or AR) representation?</p> <p>Why do you think they created it? (Educational, game, commercial, personal/professional sharing)</p> <p>What can you find out about who was involved in its design, creation and making? (Artists, educators, historians, companies, organizations)</p> <p>What ideas, understandings, and messages do you think the experience is designed to give you?</p>
<p><b>Plausibility and Place Illusion and Credibility</b></p>	<p>To what extent did your experience give you a sense that you were in a different time and place? Why and how?</p> <p>What was “real” about the experience? The visuals? The sounds? The characters? The characters’ actions? The accuracy of the history?</p> <p>What types of actions—movements, language, interactions—are you allowed to do in the experience? How real do they feel?</p> <p>Did the actions and perspectives of the individuals involved make sense within the context that was represented?</p> <p>How accurate do you think these representations are? Why or why not?</p> <p>At what point, if any, did the feeling of “being there” end or get interrupted?</p>
<p><b>Reflections/Reactions on and “Reading” of the Experience</b></p>	<p>How did your experiences enhance your understanding of an event, period, person, or idea?</p> <p>How does this experience push against what you are willing to accept and agree to in terms of what you believe and think you know about this topic?</p> <p>Based on what you have already learned in class, or already knew, what is missing in this representation?</p> <p>How did participating in this experience affect your understanding of the perspectives of other people and contexts within which they lived?</p> <p>How did your experiences provide you with an understanding of how the individuals or groups represented felt, made decisions, acted, and dealt with the consequences of those decisions?</p>

## Question Frame 2

### A Framework for Treating Historical XR as a Source within an Inquiry

Based on the SCIM-C scaffold for historical source analysis—Summarizing, Contextualizing, Inferring, Monitoring, and Corroborating—the following framework is designed to help students analyze the experience as they would other historical sources. The question frame is meant to be a flexible scaffold: depending on the experience, not all questions can or need to be answered as part of the analysis. The first 4 stages of SCIM-C are designed to help analyze the XR experience itself while the final stage—Corroboration—is designed to support student analysis across the multiple sources that make up an inquiry.

<p style="text-align: center;"><b>Summarizing</b></p> <ul style="list-style-type: none"><li>• What specific information details and/or perspectives does the source provide?</li><li>• What are the subject and purpose of the source?</li><li>• What representations and interactions have been created?</li><li>• What types of events, people, or places are you interacting with?</li></ul>	<p style="text-align: center;"><b>Contextualizing</b></p> <ul style="list-style-type: none"><li>• When and where was the source produced?</li><li>• Why was the source produced?</li><li>• What period, places, and events are being represented within the source?</li><li>• What else do you know about this time/place/person?</li></ul>
<p style="text-align: center;"><b>Inferring</b></p> <ul style="list-style-type: none"><li>• What are your interactions within the experience designed to tell/suggest to you?</li><li>• To what extent did your experiences provide you with a sense of understanding of how the individual groups that are represented felt, made decisions, acted, and dealt with the consequences of those decisions?</li><li>• What perspectives and viewpoints are missing or omitted in the experience?</li><li>• How did your experiences shape your understanding of past events in terms of social, political, economic, technological, moral and ethical issues, and questions?</li></ul>	<p style="text-align: center;"><b>Monitoring</b></p> <ul style="list-style-type: none"><li>• What ideas, images, or points of view need further defining?</li><li>• What questions do you have of the source/ experience?</li><li>• How useful or significant is the source for its purpose in answering the inquiry?</li><li>• To what extent did your experience give you a sense that you were in a different time and place? Why and how?</li></ul>
<p style="text-align: center;"><b>Corroboration</b></p> <ul style="list-style-type: none"><li>• What similarities and differences exist between the sources?</li><li>• What factors account for the similarities and differences?</li><li>• What conclusions can be drawn from the accumulated interpretations?</li><li>• What additional information or sources are necessary to answer your historical question more fully?</li></ul>	

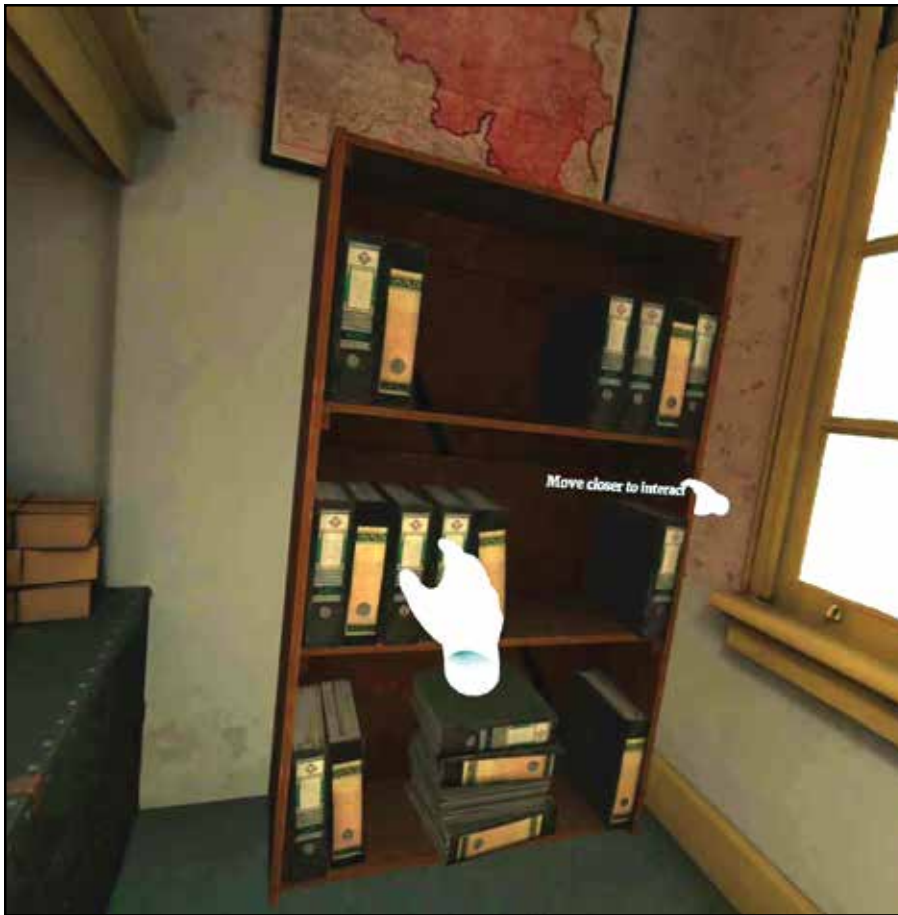


Figure 2: Scene from the Anne Frank House VR

## USING EXTENDED REALITY TECHNOLOGY *from page 99*

include a definition, criteria, historical and modern examples of resistance, and it should describe what it takes (physical, emotional) to resist. Who resists?

**Supporting Questions:** Where does resistance take place? What acts and physical objects did people use to resist Nazi rule? What examples/evidence do we have of resisters? Who were the resisters and how did they resist?

In this IDM, students examine cases of resistance during the Holocaust through learning stations. These include Jewish partisan fighting, cultural and spiritual resistance (where the act of creating a sense of normalcy and survival is an act of resistance), and uprisings in concentration camps and ghettos. As an introduction to the learning

stations, the teacher provides context using the map of resistance created by the U.S. Holocaust Memorial Museum. While at each station, students analyze a range of sources, including oral histories and news articles, related to various resistance movements. In two of the stations, students explore two short VR experiences.

At the spiritual and cultural resistance station, students view a VR recreation of the Annex where Anne Frank and her family hid (Figure 2). During the experience, students listen to excerpts from Anne Frank’s diary as they consider how the residents and helpers of the Annex resisted Nazi rule. At the station on uprisings in concentration camps, students view the 360-degree video of present day Auschwitz Birkenau, and listen to a survivor of the Sobibor uprising discuss resistance in the camps.

After completing the learning stations, students use the sources to answer the

compelling question. As an extension, students examine the nature of the sources, including how the VR helped shape their understanding of resistance. Finally, students consider what resistance to anti-Semitism and Nazi rule looks like in the twenty-first century.

Full sources for this inquiry, as well as the social studies standards that the activity supports, are accessible at <https://historyviz.com/xrclassroom/>

### 2. *I AM a Man:*

*Created by Derek Ham*

([www.oculus.com/experiences/rift/1558748774146820/?locale=en\\_US](http://www.oculus.com/experiences/rift/1558748774146820/?locale=en_US))

**Compelling Question:** How does the language of movements and protest such as “I Have a Dream” and “I AM a Man” capture the nature and struggles facing the civil rights movement in 1960s America?

**Staging the Question:** Ask students to describe the power of statements such as “Black Lives Matter,” “Say Her Name,” and “I Can’t Breathe.” What is the context of these statements, and what is the intended message today? Transition into the power of messaging during times of civil rights protest and the aim of learning more about “I AM a Man” and “I Have a Dream.” Explore the provenance and power of these statements as well as their connection to statements today.

**Supporting Questions:** Who were the Memphis Sanitation Workers, and what did they have to do with Martin Luther King Jr.? Why did striking workers hold signs that read, “I AM a Man?” What did the Memphis Sanitation Workers’ protests look like in 1968 and how did this connect to the civil rights movement?

In this IDM, students consider the power of messaging as part of the U.S. civil rights movement in both the 1960s and today. To create a shared context about this period, the class views *At the River I Stand*, a documentary about the events of 1968. Students then watch





**Figure 3: A Scene from the Virtual Reality Experience, *I AM A Man*.**

a video of Martin Luther King’s 1963 “I Have a Dream” speech and listen to a portion of Malcolm X’s speech, “The Ballot or the Bullet,” made in 1964.

Subsequently, working in small groups using the VR documentary, *I AM a Man* (Figure 3), students examine photos and film from the period and listen to the voices of participants from the 1968 Memphis Sanitation Workers’ strike as they “walk” and demonstrate on the streets of Memphis. Students then analyze two oral histories from strikers. After unpacking the various sources, students consider how the various sources impacted their understanding of the power of the civil rights messages and how these messages captured the context of the time, driving the movement forward. Students evaluate and analyze the language of protest movements in the 1960s as well as language used today, such as “Black Lives Matter,” and “Say Her Name.”

Students are asked to consider the context and intended message of these statements, and consider if there are any similarities between the 1968 Memphis Sanitation Workers strike and protests around the world in June 2020. Finally, students evaluate the utility of VR and the other sources as sources of evidence.

Full sources for this inquiry, as well as the social studies standards that the activity supports, are accessible at

<https://historyviz.com/xrclassroom/>

### 3. *Greek Mythology (AR)*

Greek Mythology: Produced by Google Expeditions (<https://expeditions.gle/fdl/AYsW>)

Greek Mythology: Gods and Goddesses: Produced by Google Expeditions (<https://expeditions.gle/fdl/QHKY>)

**Compelling Question:** *How does art represent the culture within which it was created?*

**Staging the Question:** As a whole-class activity, a teacher can model and demonstrate how to analyze a piece of art by asking questions such as “what do we see,” “what do we wonder,” and “what do we think”? Show a statue or image of a Greek statue and ask students what they See, Think, and Wonder. Facing History has an excellent strategy for this at [www.facinghistory.org/resource-library/teaching-strategies/see-think-wonder](http://www.facinghistory.org/resource-library/teaching-strategies/see-think-wonder)

**Supporting Questions:** What were the beliefs of ancient Greeks? What symbols were used to represent various aspects of Greek myths? What types of art were used to represent Greek deities?

In this World History IDM, students can work in groups to analyze statues from Ancient Greece, including Zeus, Medusa, and Athena. On the Google Expeditions webpage or through the

app, students are tasked to locate the expedition entitled “Greek Mythology” and/or “Greek Mythology: Gods and Goddesses.” Using their phones or tablets, students can then view and look around a series of statues on their desk or floor. Each statue is accompanied by a brief written description of the image. The students then begin to analyze the various statues of Greek deities from the AR. Each of the statues will be paired with different readings based on the reading level of the class. As the students analyze the pieces of art, they can refer to the various readings and myths to contextualize the figure they are examining. Students will complete the See, Think, Wonder graphic organizer in which they will partner aspects of the statue with direct quotes or examples from the reading. After viewing the statues on the AR, students will be asked how their experience would have changed if they had been viewing images of the statues rather than through AR. As an extension, students can apply what they learned about analyzing statues to statues familiar to them, such as the Statue of Liberty or a local statue.

Full sources for this inquiry, as well as the social studies standards that the activity supports, are accessible at <https://historyviz.com/xrclassroom/>

### Conclusion

The above examples offer pathways to supporting deep and flexible learning and new ways of accessing, visualizing, and interrogating the past, present, and future. Each IDM is meant to be malleable. You can use them as they are or as pull pieces that complement your existing curriculum. Visualization tools create unique situational contexts that offer users the chance to examine, explore, and participate in inquiries and experiences that they otherwise would not be able to.<sup>13</sup> We contend that such experiences have the potential to spark students’ curiosity by creating the illusion of “presence” as they explore inaccessible people, locations, and eras—walking, flying, or protesting in

the footsteps of others.🌐

#### Notes

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## The Korean War and Its Legacy: Teaching about Korea through Inquiry

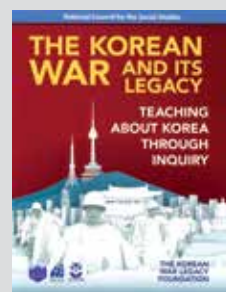
Korean War Legacy Foundation. 231 pages. 2019

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