

**Digital Heritage and Multimedia Course:
Design Brief**



TimeTowers

Presented by:



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Introduction

We propose developing an augmented reality (AR) experience centered on the Asinelli and Garisenda towers at the Museo Civico Medievale in Bologna. This project aims to leverage AR technology to provide a dynamic platform for visitors to explore the historical and architectural evolution of these iconic landmarks.

The primary goal is to enhance visitor engagement by offering an interactive experience that illustrates the towers' changes in architecture and use over the centuries. The AR experience will be integrated with a physical model of the towers, placed strategically within the museum's inner courtyard, serving as both an educational tool and a visual centerpiece.

Our initiative aligns with the Museo Civico Medievale's mission to educate the public about Bologna's medieval architectural heritage. By incorporating the AR experience within this context, the project aims to enrich the narrative surrounding the historic towers and extend the museum's educational outreach.

Ultimately, our project seeks to blend modern technology with historical education to create an immersive and informative experience. By doing so, it aims to foster a deeper appreciation and understanding of the towers' historical importance, demonstrating the potential of AR to enhance cultural heritage engagement.

1. The Context

(a) Museum and its Content / Collections

Museo Civico Medievale: The museum houses a rich collection of medieval artifacts and art, including sculptures, tombstones, and an impressive array of ivories that traces the evolution of this delicate art form. The museum's ivory collection, displayed across several rooms, showcases pieces ranging from the 10th to the 17th centuries, including both Byzantine and Italian works. Notable are the intricate ivories from the Cospi and Palagi collections, featuring religious scenes and everyday objects that highlight the interplay between art and life during the medieval to Baroque periods. The museum is dedicated to showcasing the rich history and culture of the medieval period in Bologna and the broader region.

(b) The location and its map/plan



Location: The Museo Civico Medievale is located in the heart of Bologna, housed in the 15th-century Palazzo Ghisilardi.





Map/Plan: The museum's layout includes multiple floors with thematic rooms dedicated to different aspects of medieval life and art. The AR experience will be integrated within a room that provides a strategic position (inner yard).

(c) Institutional Goal

Museo Civico Medievale: The museum aims to educate and engage the public with Bologna's medieval heritage, making history accessible and engaging through interactive and immersive experiences.

Asinelli and Garisenda Towers: The goal is to preserve and highlight their historical and architectural importance, ensuring they are recognized not just as structures, but as crucial elements of Bologna's cultural and historical narrative. Efforts are concentrated on maintaining their integrity as landmarks, educating visitors about its historical context, and promoting significance as symbols of Bologna's medieval past and present identity.

(d) Cognitive Goals

Museo Civico Medievale:

1. *Deepen historical understanding* – to help visitors explore the rich tapestry of medieval Bologna through engaging exhibits that showcase the city's vibrant history.
2. *Enhance appreciation for Medieval culture* – to encourage a deeper appreciation of the art, architecture, and daily life of the medieval period, highlighting its enduring influence on contemporary culture.
3. *Encourage thoughtful reflection* – to inspire visitors to think critically about how history is recorded and presented, examining the origins and contexts of the artifacts displayed.

Asinelli and Garisenda Towers:

1. *Illuminate historical context* - to enable visitors to grasp the key events that shaped the Asinelli and Garisenda towers and understand their roles in the urban and cultural development of Bologna.
2. *Reveal architectural insights* - to show how the towers' architecture evolved, spotlighting the innovations and changes that reflect broader historical trends.
3. *Boost engagement through technology* - to use interactive AR elements to make learning about the towers' history fun and engaging, stimulating curiosity and enhancing understanding.

(e) Star Assets

Star Asset for AR: The AR model itself, coupled with the 3D representations of the Asinelli and Garisenda towers, will serve as a modern 'must-see', attracting tech-savvy visitors and those interested in the integration of technology and history.

(f) Target Audience

- Primary, secondary, and university *students*. The experience also appeals to *academic researchers and historians specializing in medieval studies*.
- *Tourists* visiting Bologna *who have an interest in its medieval history and architectural landmarks*
- Locals with an interest in historical evolution, architectural changes, and cultural heritage conservation of their city.
- **Note:** The AR experience is designed to integrate with the museum's existing educational offerings, such as the "Bologna Turrata" workshops. These workshops focus on educating participants about Bologna's medieval architecture and urban development. The AR experience will enhance these programs by providing a dynamic and interactive way to explore the historical and architectural significance of the Asinelli and Garisenda towers.

2. The Audience

Schools

(a) Motivations

1. Students and teachers are motivated by the opportunity to supplement traditional classroom learning with hands-on educational experiences that bring history to life.
2. The AR experience aligns with school curriculums in history, technology, and arts, providing a valuable tool for teachers to enhance lesson plans.
3. Interactive technologies like AR are known to increase student engagement and information retention by making learning more immersive and visually stimulating.

(b) Barriers

- Varying levels of familiarity with using AR technologies among students and educators can affect the uptake and effectiveness of the experience.
- While the AR experience is educational, teachers might find it challenging to directly align the content with the specific learning outcomes required by the school curriculum.
- Teachers may be concerned about students becoming too focused on the technological aspects of the experience (like the mechanics of using AR) at the expense of the historical context.
- Organizing transportation for a large group of students can be costly, especially for schools located further away from the city center or in

adjacent cities.

(c) Capabilities

- Schools often visit museums in large groups, which means the experience must be capable of handling multiple users simultaneously without degradation in performance or experience quality.
- Teachers need tools that support their educational goals, such as guides, worksheets, or pre- and post-visit materials that integrate with the AR experience.
- Capability to provide feedback on the experience, which can be used to continuously improve the educational content and delivery method based on teacher and student feedback.

(d) Devices

- Most visiting groups are likely to have access to *smartphones or tablets*, which can be used to access the AR experience. The museum could also consider providing devices to ensure all people can participate.
- *Internet access* within the museum is essential to facilitate the running of the application.
- The application should be compatible with a wide range of devices and operating systems so no person is excluded due to the type of device.

Local community

(a) Motivations

1. Locals have a unique opportunity to explore Bologna's history in a new way. The AR experience lets them interact with the Asinelli and Garisenda towers through time, providing insights into their significant role in shaping the city's skyline and cultural identity.
2. Engaging with technology to learn about local heritage can enhance residents' pride in their city, promoting a deeper appreciation for its historical and architectural landmarks.
3. The project offers an alternative educational tool that complements traditional learning methods, allowing residents of all ages to engage in self-directed education about their city's past in an immersive environment.

(b) Barriers

- Disparities in technology access and digital literacy can limit engagement, especially among older community members.
- Ensuring the historical content resonates with local narratives and values is critically important. The experience must avoid generic approaches and instead reflect the unique stories and significance of Bologna's towers as understood by those who live there.
- Limited hours of operation, insufficient staffing, or lack of promotional outreach could hinder local engagement. Accessibility considerations, such as language options and physical accessibility

for the disabled, are also crucial to ensure community participation.

(c) Capabilities

- The platform is going to be designed to handle high user volumes simultaneously, crucial for events like local festivals or school breaks where group visits peak.
- Collaborating with local historians and educators to develop content ensures the AR experience is an authentic educational resource that aligns with community values and standards.
- Establishing continuous feedback with users to refine the experience regularly based on community input. This includes adapting narratives, interface usability, and accessibility features.



"I will go anywhere, provided it be forward"

Age: **16**
Occupation: **Student**
Technology Comfort Level: **High**
Location: **Bologna, Italy**
Character: **The Digital Native (Explorer)**



"We travel not to escape life, but for life to not escape us"

Age: **35**
Occupation: **Marketing Professional**
Technology Comfort Level: **Medium**
Location: **Helsinki, Finland**
Character: **The Explorer**



"The important thing is to not stop questioning."

Age: **65**
Occupation: **Retired Teacher**
Technology Comfort Level: **Low**
Location: **Prato, Italy**
Character: **The Sage**

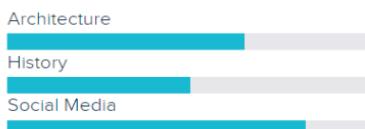
GOALS

- find educational content
- learn through interactive and engaging content (interactive learning)
- share her experiences on social media (social sharing)

CHALLENGES

- Finding engaging and interactive educational resources
- Focusing on the content provided

INTERESTS



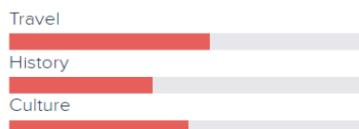
GOALS

- learn more about the history and significance of local landmarks
- find easy-to-use applications that provide valuable information without requiring extensive technical knowledge

CHALLENGES

- Finding reliable and user-friendly travel apps that provide in-depth historical information

INTERESTS



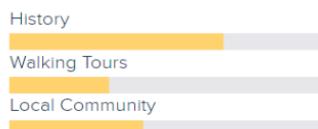
GOALS

- find historical narratives and facts about the Two Towers
- prefers straightforward and user-friendly technology
- likes to share his knowledge and engage with others in the community

CHALLENGES

- Adapting to new technologies
- Finding accessible and easy-to-use educational resources

INTERESTS



BIO

Sofia is a high school student in Bologna with a keen interest in history and architecture. She loves using technology for learning and is very active on social media. Sofia often visits historical sites with her friends and likes to share her experiences online.

BIO

Emma is a marketing manager who loves to travel and explore new cultures. She enjoys learning about the history and significance of the places she visits. She often uses technology to enhance her travel experiences.

BIO

Giovanni is a retired history teacher who has lived in Bologna for most of his life. He enjoys walking tours and participating in community events. He is not very tech-savvy but he's eager to learn and stay connected with the local culture and history.

3. Concept

(a) Problem/s

1. Many students are more familiar with and interested in digital media than traditional museum exhibits, so a key challenge is *making the museum experience as engaging and interactive as digital platforms* they are accustomed to.
2. The museum must allocate sufficient space for the installation of the physical model of the towers and ensure it is accessible. Moreover, considering the historic nature of the museum building, *any installation must be non-invasive and preserve the integrity of the surroundings*.
3. *Not all students may have personal smartphones or tablets*, which are necessary to participate in the AR experience.
4. The content of the experience must align with curricula to be considered a viable educational tool by schools.
5. Ongoing maintenance of both the physical and digital components can be challenging: e.g. the software needs to remain compatible with newer devices and operating systems.

(b) How your project will face the problem/s

- Allowing students *to explore various historical events through clickable points on the AR model of the towers*, where each interaction provides insightful historical facts and visual changes. The design should be captivating to the young audience.

- Design the physical *installation to be modular and flexible, capable of being displayed in various configurations* depending on the available space.
- Instead of relying only on personal devices, *the museum can be equipped with a set of tablets* attached to the exhibit area to prevent loss or damage.
- *Providing teachers with guides that specify the curriculum links and offer suggested discussion topics and activities* that could be conducted before, during, and after the museum visit.
- *Partnering with a tech company for support* to ensure the AR system is regularly updated and maintained (could include training for museum staff on basic troubleshooting and updates).

(c) Musicological approach

For the augmented reality experience we plan to integrate a sophisticated audio guide feature to enhance the educational and immersive aspects of the tour. This audio guide will offer narrated content that explains historical events, architectural details, and changes to the towers throughout various periods.

Key features:

- *Optional narration* - users will have the flexibility to choose whether they prefer to listen to the narrated content or read the information themselves. This ensures that the experience caters to different learning preferences and accessibility needs.

- *Toggle On/Off* - the audio guide can be easily toggled on or off within the application, allowing users to customize their experience based on their current environment.
- *Multilingual support* - to accommodate both local and international visitors, the audio guide will be available in multiple languages.

(d) Themes and topics we have selected as case study for our PW

Architectural evolution: focusing on how the Asinelli and Garisenda towers have changed physically and functionally over the centuries, highlighting major events such as the height reduction of Garisenda and the construction of defensive mechanisms around Asinelli.

Historical context: examining the roles these towers have played in Bologna's social and political history, including their use as prisons, military garrisons, and symbols of civic pride and power.

4. Requirements

(a) Must:

- ensure AR technology is reliable (software and hardware are robust)
- verify historical accuracy (all content must be historically accurate)
- supply devices for groups (Provide AR-capable devices for visitors without personal access)
- ensure full accessibility (Include features for the visually and physically impaired)

(b) Should

- add interactive elements (enhance engagement with quizzes and touchpoints)
- offer multilingual support (provide content in multiple languages)
- establish link with educational materials (connect AR content to teaching resources)
- train museum staff (prepare staff to assist and educate visitors on AR use)

(c) Could

- integrate gamification features (use points and leaderboards to motivate users)
- introduce virtual guest lectures (incorporate AR-driven presentations or talks by historians and experts, viewable at specific points)
- enable social sharing (facilitate sharing on social media platforms)

(d) Won't

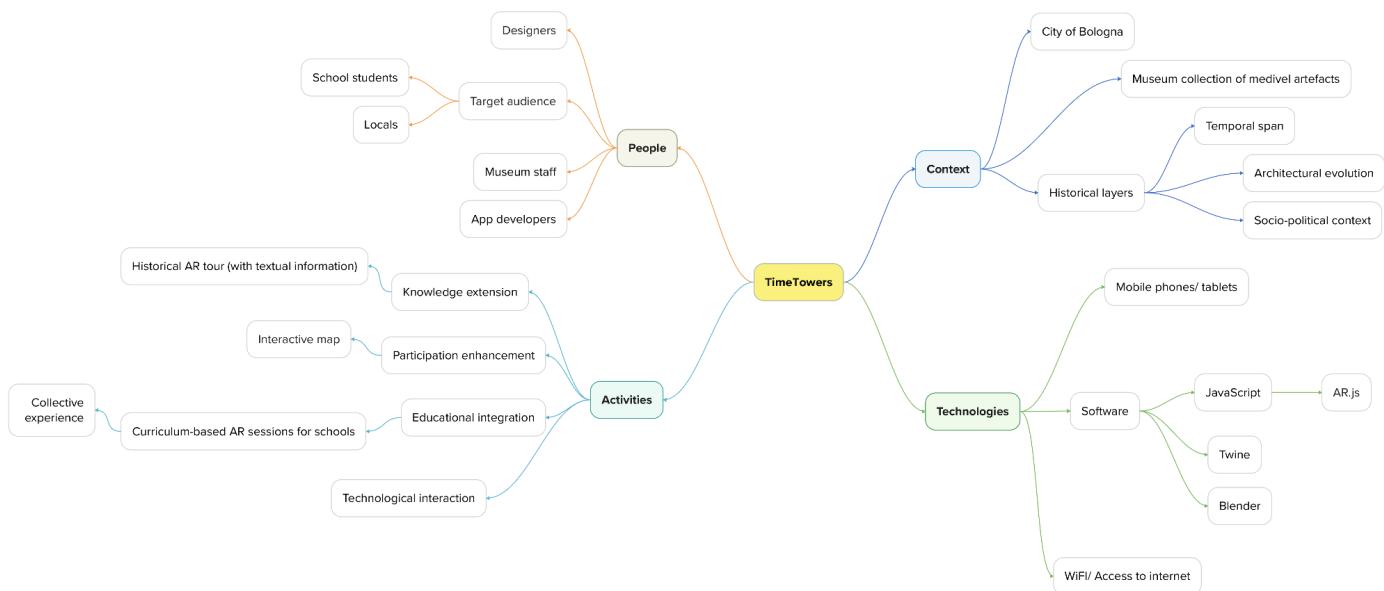
- develop external apps (focus will remain strictly on in-museum experiences)
- produce printed guides (resources will be channeled into digital formats)
- incorporate VR elements (VR will not be included due to budget and scope constraints)

5. Ideation

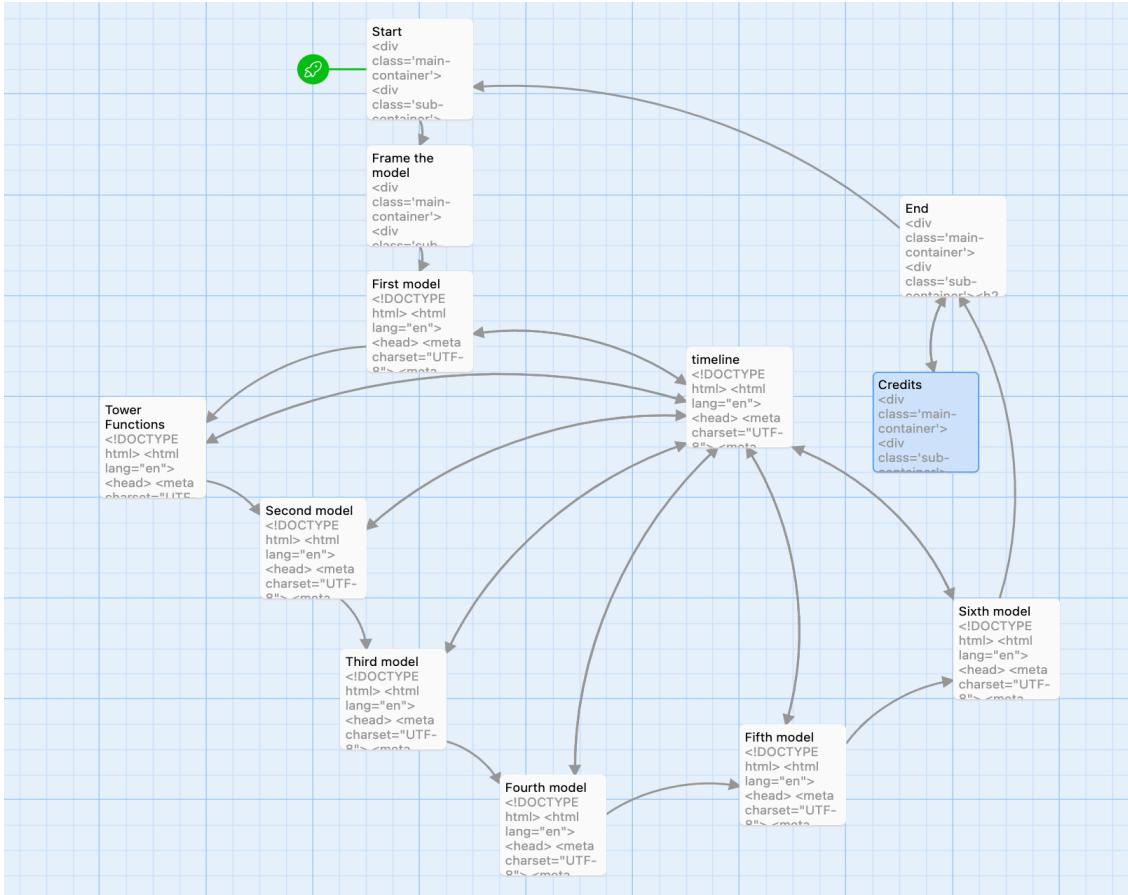
(a) Experience (from the users perspective)

Visitors begin by scanning a QR code on their smartphones or a museum-provided tablet, which activates the AR experience over a physical model of the towers. As they point the device at the physical model, superimposed 3d models show changes of the towers' structure between time periods. Users can tap on highlighted points for detailed narratives and visual change

(b) Conceptual map

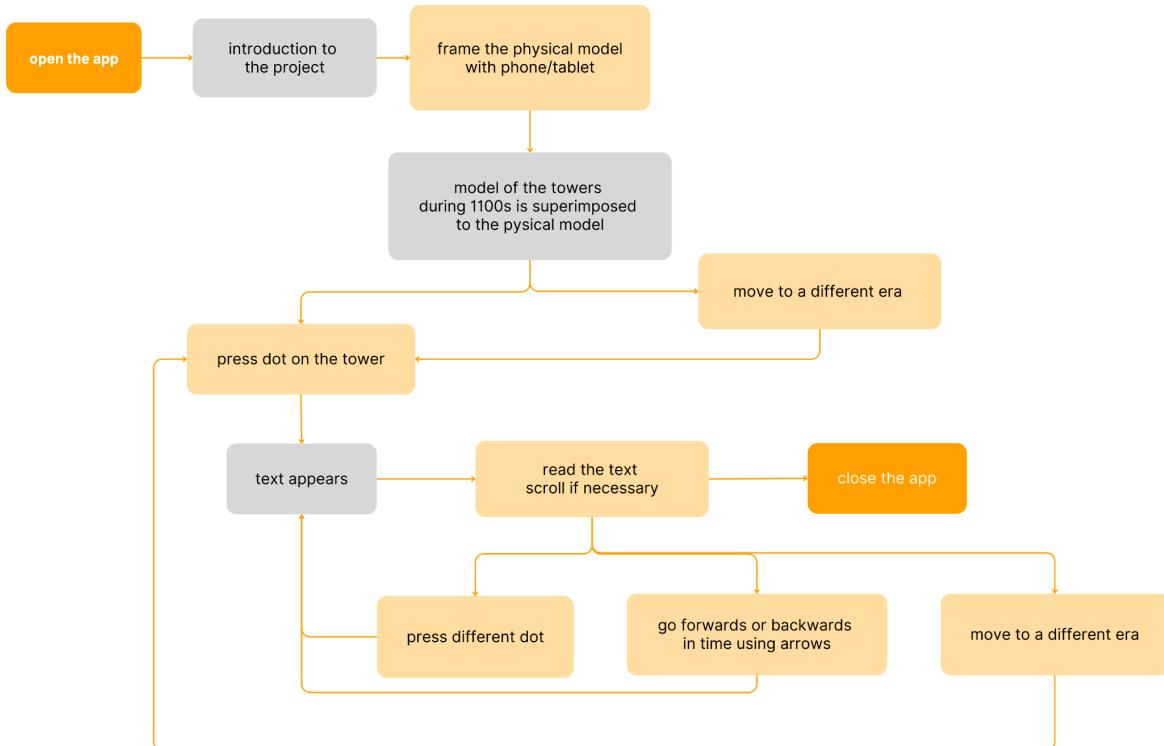


(d) The story (Twine)



(f) Description of the interaction between the application and the users

- **Initiate**: user initiates the experience via QR code.
- **Explore**: user points the device at the model to reveal AR content.
- **Interact**: tapping on points to uncover visual and information.
- **Learn**: multimedia content provides historical insights.
- **Navigate**: swipe to move to different parts of the timeline or return to previous content.



Interaction Diagram

*Pale yellow= actions of the user; gray = automatic action

(g) Foreseen workflow

Pre-visit	Encourage users to visit the museum's website where they can access a tutorial on how to use the web-based AR experience. It will explain the basic features of the AR tool and what content they can expect, helping them prepare for their visit.
During visit	<p>Upon arrival, museum staff will offer a brief orientation session. They will show visitors how to access the AR experience by scanning a QR code at designated points around the museum. This QR code will direct users to the web-based AR tool.</p> <p>Visitors can then engage with the AR model directly through their web browsers on mobile</p>

	<p>devices. They have the option to follow a guided pathway for a curated historical tour or choose self-guided exploration.</p> <p>For visitors who need additional help, staff with tablets will be stationed throughout the museum. They will assist with any technical issues, navigating the AR tool, or providing further information about the exhibits.</p>
Post-visit	<p>After the visit, users can send out a survey via email to gather feedback on the AR experience, asking questions about their satisfaction and areas for improvement (such feature will also be available via Application)</p> <p>Offering additional resources related to the content explored during the visit. This could include detailed articles, further readings, links to online lectures or webinars, information about upcoming events or exhibitions.</p> <p>Inviting users to join a social media group where they can discuss their experience, share insights, or post pictures.</p>

(h) Set-up: Foreseen hardware, software and Media (digital asset needed)

Hardware	Software	Media
Tablets and smartphones with AR capabilities, QR code scanners	<p>AR platform software developed specifically for historical content, capable of rendering high-quality 3D models</p> <p>Blender</p> <p>3D models of the towers by user DocKarl29 on UltiMaker Thingiverse</p> <p>VS Code</p> <p>Twine + Snowman (JavaScript, CSS)</p> <p>Sketchfab (platform)</p>	3D models of the towers, historical documents, photographs, and narrations

(i) Further development and maintenance issues

Continual updates to software to *ensure compatibility with new device technology* and to expand content based on new historical research.

Regular checks and updates of the physical and digital components to ensure they remain accurate and functional. *Feedback mechanisms to gather user insights* and improve the experience.

6. Disruption

Threats	Solutions
Technological obsolescence	Regularly update the AR software and hardware to keep up with technological advancements
Limited user engagement	Introducing varying levels of interaction to cater to different interests
Inaccurate historical representation	Collaborating with historians to review and update content to ensure accuracy
Insufficient funding for maintenance	Secure sponsorships and grants dedicated to technological and educational projects
Device damage	Providing devices only within controlled areas of the museum

7. Teams roles and work

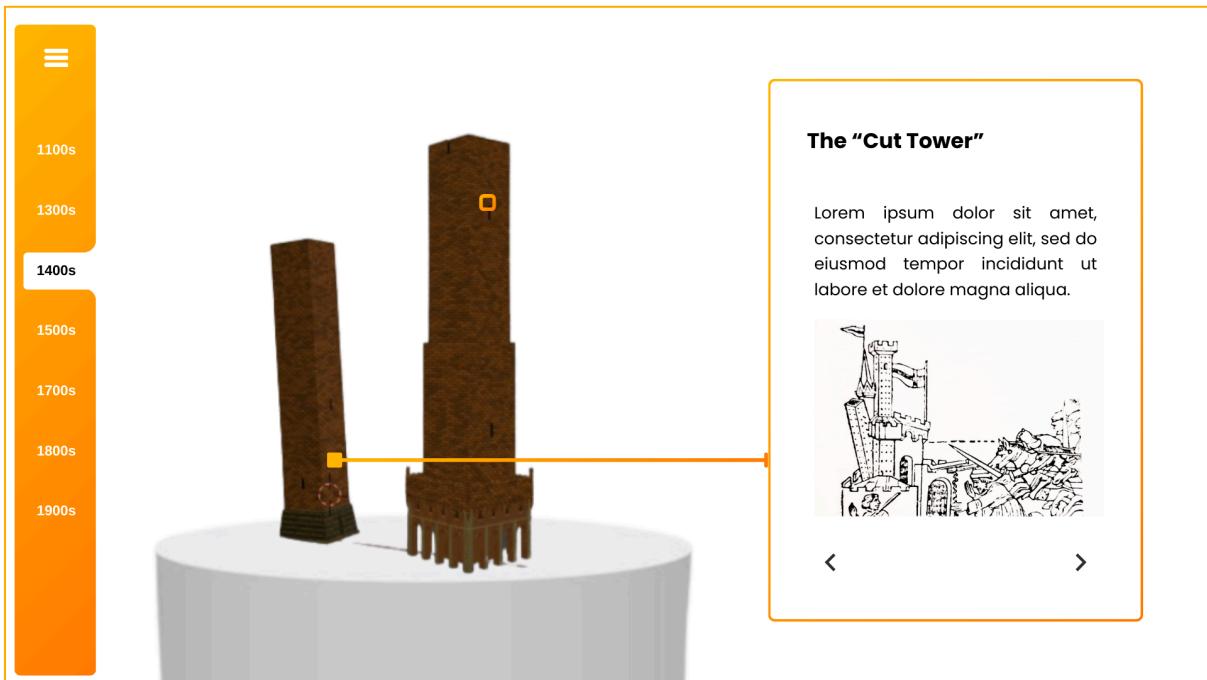
Niccolò	Giorgia	Elvira	Ludovica
3D Models design and creation Historical research	3D Models design and creation Historical research Interface and logo design	Design brief writing Timeline representation and organization of historical information	Twine building and design Historical research

8. UX Scenario

[Link](#) to the Twine scenario

[Link](#) to the file with steps to develop AR application

Possible design of the final User Interface:



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