

Second Cycle Degree Programme in
9224 - “Digital Humanities and Digital Knowledge”

Treasures of Dozza

Design Brief for the final project of the course
B5058 - Digital Heritage and Multimedia (I.C.)

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1. The Context

The museum

La Biennale del Muro Dipinto is an Open-Air Art Museum all around the historical center of Dozza, always available to anyone that wants to visit their frescos, without opening hours or fees to enter this museum. This project began in the 1970's with Tomaso Seragnoli, and every two years this Museum gets bigger.

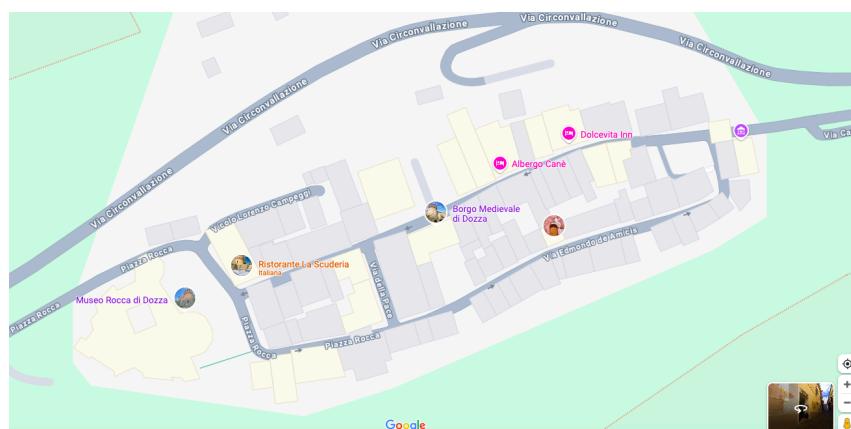
Dozza Città d'Arte Foundation is the managing institution of the *Museo della Rocca* and is responsible for the organization for the *Biennale del Muro Dipinto*, for the production of cultural and artistic exhibitions, and for promoting the historical center of Dozza.

The artworks of the museum are in the walls of the houses of the inhabitants of the town, frescos and low reliefs are depicted permanently all around the streets of the town in which every artist that was invited to the Biennale was allowed to express themselves in correlation with the place.

In the historical center there is also the *Museo della Rocca*, former house of the noble family of the Sforza and later of the Malvezzi-Campeggi. Today this palace is a museum that holds the collection of artifacts of the noble families and houses some of the *strappi* from the Muri Dipinti, the most damaged frescos that were removed from the walls in order to preserve them. Nowadays this practice is no longer carried out, as restoration in place is believed to be the best option.

The location

The medieval village of Dozza is located on the top of a hill south of Bologna and 6 km from Imola, in the Region of Emilia-Romagna, Italy. The museum, as said before, is all around the village, an open air gallery, in every street, and almost every building houses an art work. Besides all the works around the town there is also the *Museo della Rocca*, a historical palace of former ownership of noble families, now house to the Foundation *Dozza Città d'Arte*, that manages the Biennale, caring for the organisation of the events and preservation of the open air museum.

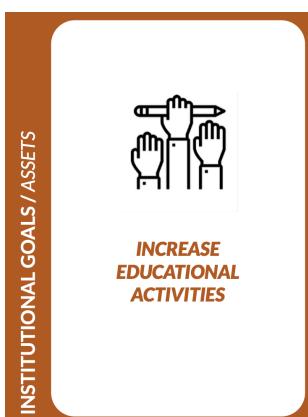


Institutional Goals

The *Dozza Città d'Arte* Foundation was established by the Municipality of Dozza in 2003, with the purpose of ensuring the preservation of the medieval village of Dozza, which houses a monument such as the palace (Rocca Sforzesca) and an art museum around the town created throughout the years with the project *Biennale d'Arte Contemporanea del Muro Dipinto*.

The Foundation promotes the Biennale, with the aim of producing exhibitions of cultural and artistic values, developing didactic and informative initiatives for the appreciation while promoting tourism in Dozza.

While considering the goals of the Foundation that manages the Biennale we developed our application with the following purposes:



The Foundation produces several tours and guides around the town for everyone that wants to visit by themselves or with a guided tour. Working as a cultural institution they make workshops inside the museum for children, therefore we want to **increase the educational activities** done for the younger audience with the use of technology, providing a different approach to educate more about the open air museum that is Dozza.



Taking into account that nowadays the production of AI images and content has increased exponentially, making people lose the idea of what is real and what is not, future generations may struggle to differentiate virtual reality created by Artificial Intelligence. We present an application that aims at **changing visitor attitudes and beliefs**, providing the tools necessary to tell apart what is real from what is artificially produced.



In the light of the poor amount of **digitized assets** that the foundation has of the works of art, and the limited usage of technology involved in the dissemination of the *Muro Dipinto*, we acknowledged the need to digitalize the complete collection of art works represented on the walls of Dozza, to create our interactive application and therefore enhance the use of digital technologies.

Cognitive Goals

For the creation of any digital application in the field of cultural heritage we have to consider cognitive-emotional goals around which to develop our application. The ones identified by the team are the following:

Concentration is the action of maintaining one's attention into a particular task, for the longest period of time possible without distractions.

In our application we consider the ability of children to concentrate in the activity that they are undertaking and not lose their attention with distractions that may appear in the environment around them. Our main strategies to capture their attention involve the eye catching design specifically realized for children and the employment of gamification principles.



Concentration & Distraction



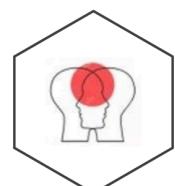
Caring Attitude

Sense of care is the sentiment developed by a person towards a cultural heritage item or place, generating a relationship of care, protection and connection.

With our application, we aim to foster the sense of empathy and caring attitude in children towards the artworks of Dozza. By triggering emotions such as sense of belonging, curiosity and sense of loss, if there is not a correct preservation of the works of art, we intend to encourage a deeper awareness of the importance of restoration and conservation.

Place attachment refers to the development of a strong emotional bond with a place.

We foresee that after engaging in the activities with our application children may develop a sense of attachment towards Dozza. By evoking a sense of wonder with the open air museum, children will leave the town with the willingness to come back with their families and explore more of this place. Ultimately, the goal is to foster a lasting appreciation for the town and a sense of care towards the artworks they have discovered.



Place Attachment



Curiosity

Curiosity can be defined as the desire for knowledge that stimulates exploratory behavior.

Throughout the activities, the application provides information about both the artworks and the town of Dozza. With this we aspire to foster children's curiosity and encourage deeper interest. Therefore we developed an intelligent assistant

that provides information to the participants, interacting and guiding them during the experience through the tablet's interface. After the completion of the activities, we expect that children will be interested in art, paintings and the importance of conserving, preserving and disseminating cultural heritage places such as this unique town.

Lastly, we want to instill in younger generations an awareness of the growing presence of AI generated images and content; we seek to inspire in the participants the search for authentic knowledge and develop the ability to differentiate between real and manipulated information.

Star Assets

In view of the unique museum that is *Muro Dipinto di Dozza*, the most important asset to appreciate are the artworks placed all around the town. Therefore we consider that the star asset for our application is the **location** itself, the Medieval Town of Dozza.



Due to the nature of the museum, we consider the most important aim of our application to be the **learning activity** carried out by our target audience, school students. Through the different activities developed in our application we expect that the students are able to learn about the works of art, the importance of preservation and restoration, while understanding the relevance of being able to differentiate reality to AI-generated content. We expect that by the end of the interactive activities students will have fully learnt about the remarkable town of Dozza and its treasures.

2. The audience

Defining a target audience for the project was one of the first and most essential steps in our design process. To gain further insights, our team conducted a site visit to the *Museo del Muro Dipinto* in Dozza. During the visit we discovered that in 2024 the museum introduced a web application called *Guido*, designed to accompany visitors through the village. It offers a multilingual audio guide which uses a location-based system to highlight in an interactive map the most important frescoes, enhancing the experience by sharing contextual and historical information. We learnt that the app

has been developed by a local start-up in collaboration with the *Dozza Città d'Arte* foundation, which is not directly responsible. During a conversation with one of the curators of the foundation we asked questions about the employment of technologies in educational visits, particularly for children and school groups. They acknowledged that, in recent years, some digital tools have been incorporated into visits at the *Museo della Rocca*, however for the *Museo del Muro Dipinto* the activities had remained limited to physical workshops, conducted indoors in a dedicated room within the museum buildings, not extended to the outdoor murals, mainly due to the lack of funds. This observation highlighted a clear gap and opportunity which led us to a final decision: designing an interactive, technology-enhanced experience for children in the open-air museum setting. As a result we defined our primary target audience as students from primary and middle schools, preferably aged between 7 and 12. This age group is not only a common demographic, since the village of Dozza is often the destination of school trips in Emilia Romagna, but also is highly responsive to gamified and interactive learning methods.

As part of our user-centered design approach, we defined a set of educational and emotional goals for our audience, using the CoDesign Tool cards which helped us brainstorm and make decisions.



The app is thought of as a digital companion that supports exploration and learning, stimulating children's **cognitive development** by encouraging observation, comparison, memory and problem-solving. At the same time the experience aims to promote **social interaction** among children during the visit, since they are invited to cooperate and share their personal interpretation to pass the quiz and proceed to the next task. Furthermore, the app features an intelligent assistant

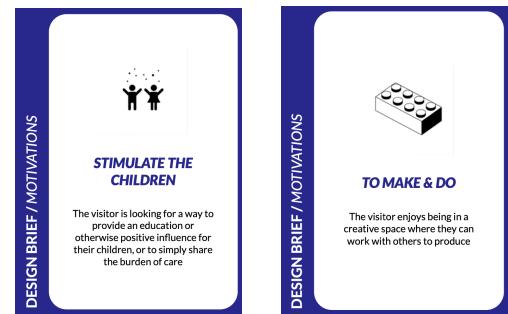
that guides children through the village using a friendly tone and engaging storytelling, which helps in creating a **sense of familiarity** and connection with the environment.

One of the central educational aims is to raise awareness and foster a sense of care into young visitors, who are introduced to basic concepts of conservation, respect for public art and the importance of **cultural heritage preservation** through interactive contents and age-appropriate language, fostering early civic consciousness. The app also includes moments of reflection about **irreversibility** and the negative consequences of some actions for artworks and heritage sites, always making use of storytelling elements, before-and-after images and simple **restoration tasks** to be accomplished on their tablets.

To design an effective application we also analyzed key factors influencing the overall experience, in order to make better decisions aligned with abilities and constraints of our target audience, taking into consideration their interaction with the cultural environment and digital tools.

Motivations

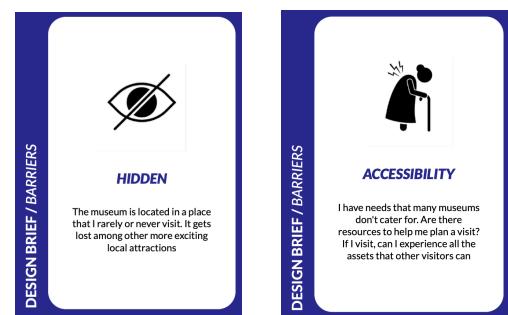
To make and Do is obviously one of the key aspects of the entire experience that we tried to create. Children in the 7-12 age range are naturally curious and drawn to activities that involve creativity and playful interaction, that is the reason why we have adopted a gamification approach. The app proposes itself as a valid alternative to common classroom activities, sharing the same aim of teachers.



Indeed it offers an experience that **stimulates the children** while fostering curiosity about the frescoes of Dozza and the techniques employed in the creation process.

Barriers

Dozza can be considered a **hidden** gem, since it's located in a small village which may easily go unnoticed. The goal of this interactive experience is also to promote the *Museo del Muro Dipinto*, encouraging more schools to organize school trips which can represent the occasion for students to engage in interactive learning activities. Anyway, several barriers must be considered: for children instructions or goals that are not immediately clear can cause disengagement, that's why we decided not to employ



a technical language but to maintain the conversation of the intelligent assistant on a friendly level. For what concerns **accessibility** of interface design, we addressed these barriers by using intuitive icon-based navigation, multimodal content (text is always accompanied by the audio transcription) and clear instructions. For what concerns the accessibility of the environment itself, the lack of stairs allows people with wheelchairs to explore the village, maybe helped by their group mates or teachers.

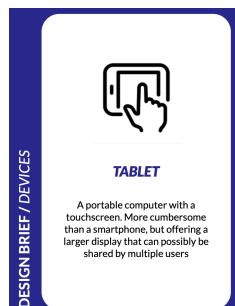
Capabilities

Nowadays children in this age group are typically familiar with **mobile apps** and **computer gaming** since they often interact with them both for entertainment and learning. We decided to take advantage of their capability of navigating touch interfaces and understanding game mechanics, taking inspiration from popular educational games and leveraging their interaction patterns (drag and drop, tap to reveal, leveling up, final reward).



Devices

Since the experience will take place in smaller groups, the team considered that the best option would be to provide 3-4 **tablets**, depending on the number of students participating. These devices will be under the responsibility of the Foundation, which will also supervise and lead all the activities and the various steps, with the support of the teachers.



3. Concept

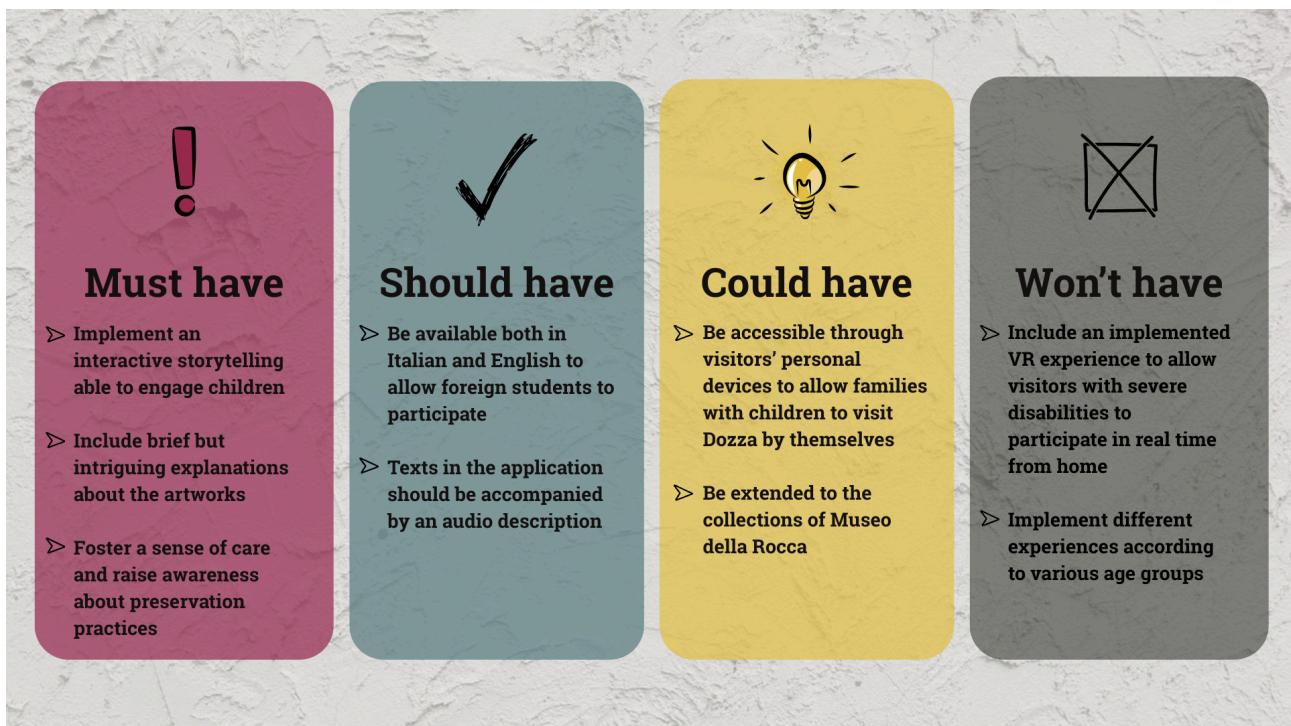
The ideation of an application for children is always faced with issues regarding the ability to keep the visitors' attention high and maintain engagement, as children tend to be distracted easily, especially in an open air environment such as the village of Dozza. Moreover, the frescoes scattered throughout the village are not part of a proper museum and children may fail to consider them as part of their cultural heritage for not being included in a delimited physical space; the concept of *Ecomuseum* (De Varine, 1978) should therefore be made known to the young visitors, as to make them aware of how a physical environment can also be a cultural space.

In this regard, the team thought of a gamified approach to the visit of *Il Muro Dipinto* for groups of schools, to involve the children directly in a “fresco hunt” and have them engaged through questions submitted by an intelligent assistant throughout the experience. The relationship between the works of art decorating the village’s walls and the physical space of a museum is also confirmed by the fact that the visit starts from the *Museo della Rocca* in Dozza, where the pupils are informed by the museum staff about the activities that they will undertake.

Participation and collaboration are key features of the experience, as the application allows the visitors to navigate the village and discover the frescos only by answering questions in groups. For the studies on engagement the team was inspired by the theories in *The Participatory Museum* by Nina Simon (Simon, 2010) and by John Dewey (Dewey, 1934), who believed that any art product becomes a work of art only with the viewer’s participation and that the visitor can only learn about the cultural heritage if actively taking part in it. *Il Muro Dipinto* in Dozza could also be classified as a *museum without walls*, using André Malraux’s words (Malraux, 1947), as the artworks are not framed by a museum but are part of the streets of the village: the collections that would feature in it are replaced by the connections between the works identified by the visitors while walking around the town and noticing similarities among them, hence building their own *Musée Imaginaire*.

The aim of the application is to raise awareness among the youngsters about the need to protect cultural heritage, especially in a context in which the rising adoption of AI for image generation has started blurring the line between authentic artworks and machine-generated ones, making it challenging especially for the new generations to recognize a real work of art produced by humans in the past. Through questions and games of restoration, children get closer to the frescoes they find in Dozza and by viewing them in real life and working on them can develop a connection with each one of them, truly understanding the meaning of making art “the old way”.

4. Requirements



5. Ideation

The ideation of the project started with a first brainstorming session. The team gathered a series of preliminary ideas and travelled to Dozza with the aim of capturing photographic documentation and conducting a contextual survey of the site. Subsequently, we used the CoDesign Tool to evaluate and shape the most suitable option.

The experience

The experience begins in the *Museo della Rocca*, where a guide provides a brief introduction to Dozza and offers instructions regarding the planned activities. Participants will be organized into groups and a unique path to follow is assigned to each group. The *Dozza Città d'Arte* Foundation provides each group with a tablet equipped with a dedicated application to be used during the journey. The team decided to name the application *Treasures of Dozza*, hinting at the hidden frescoes scattered around the town which are the true gems of Dozza.

An intelligent assistant, represented by a dragon named Tomaso after the founder of *Il Muro Dipinto*, guides the students during the entire experience and offers support in completing the tasks. Throughout the activity, participants should collaborate in order to solve challenges related to

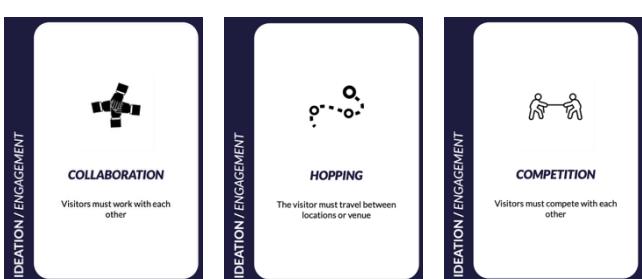
specific frescoes located along the path. A QR code placed next to each fresco can be scanned to launch a quiz on the tablet. Depending on the type of fresco, there are four possibilities:

- **Restoration quiz:** participants solve a puzzle generated by AI. When the puzzle is solved, a photo of the original mural is revealed, allowing the students to visualise the artwork in its original appearance.
- **Inspiration quiz:** an existing artwork that may have inspired the fresco is shown alongside three AI-generated images. Participants must identify the authentic painting.
- **Spot the difference (still-life frescoes):** students must compare the actual fresco with a picture created by AI and are asked to identify the differences between reality and the AI-generated image.
- **Information point:** the dragon provides historical and artistic context about the fresco and its creator.



Once a quiz is completed, the next stage is revealed, and the competition can continue. The first group to complete the entire hunt will be declared the winner. Thus, the experience incorporates elements of:

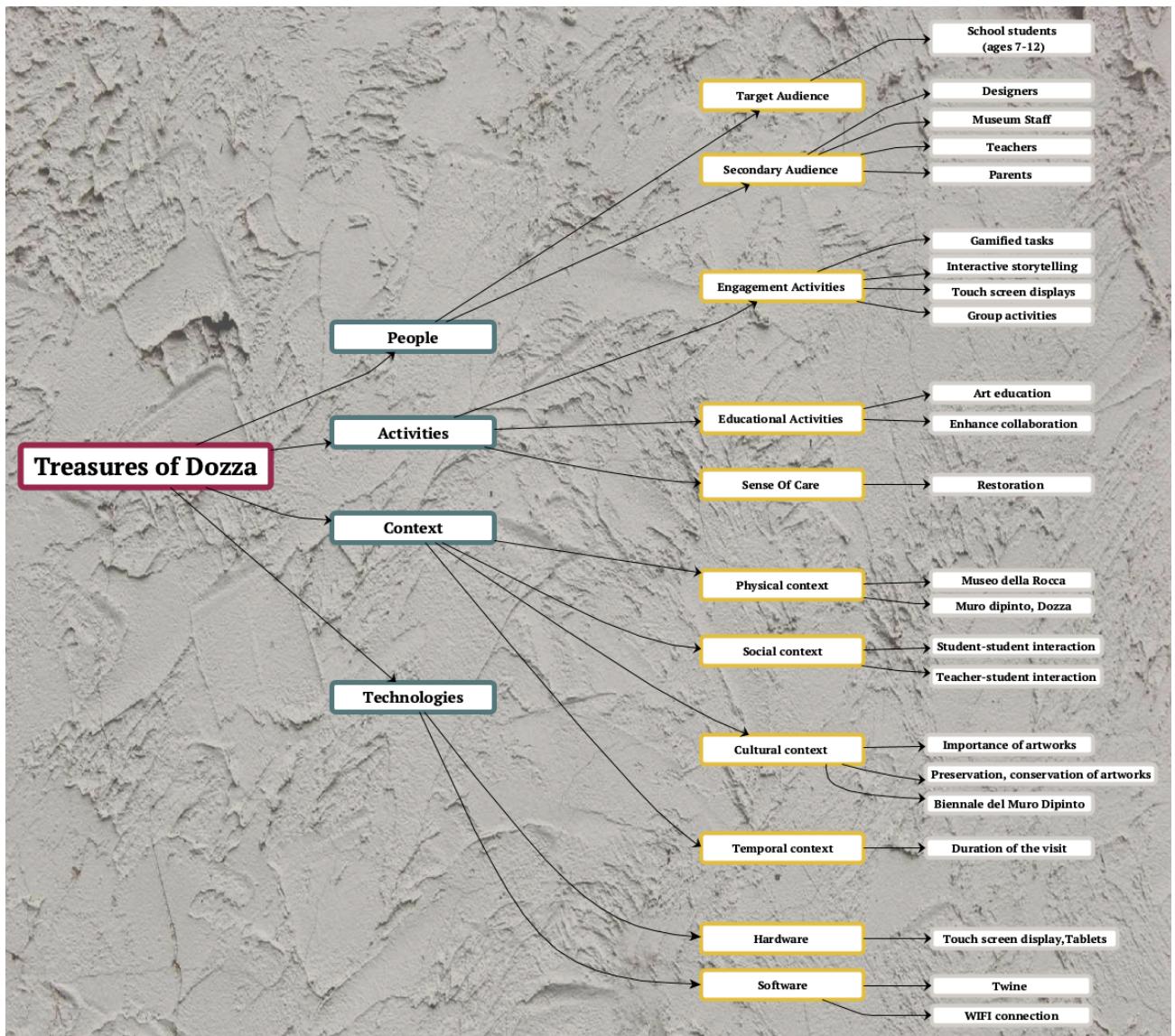
- **Collaboration**, considering that each group shares one tablet, encouraging students to work together and develop social interaction skills;
- **Hopping progression**, as the journey consists of multiple sequential steps;
- **Competition**, with the fastest group being declared the winner.



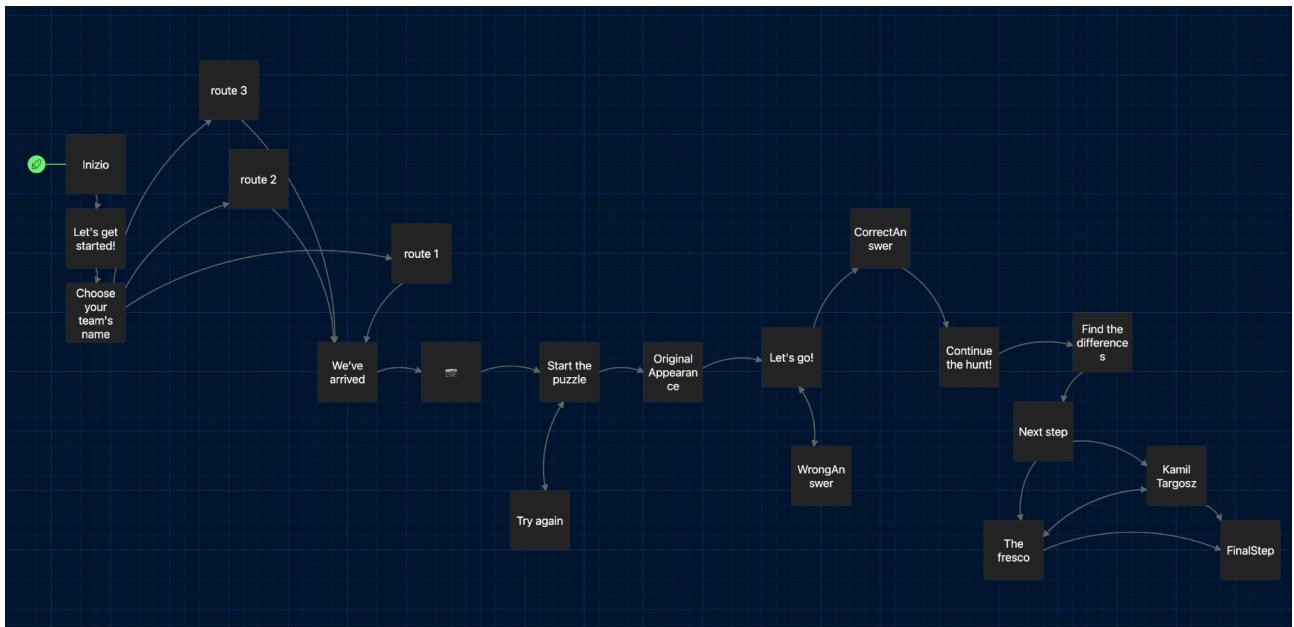
At the end, each student receives a postcard illustrating a mural of Dozza and the dragon Tomaso, as a keepsake. Hopefully, this experience will offer the base for future lectures or educational activities to the teachers. Thus, the exhibition at Dozza presents an opportunity to extend the visitor journey beyond the museum and village visit (Devine, 2015).



Conceptual map



The story



The team developed one of the possible journeys providing an example of the four types of interaction that the user can have with the Intelligent Assistant Tomaso.

At the following link it is possible to test the experience:

<https://github.com/boloICOMs/TreasuresofDozza/blob/main/Twine-Dozza.html>

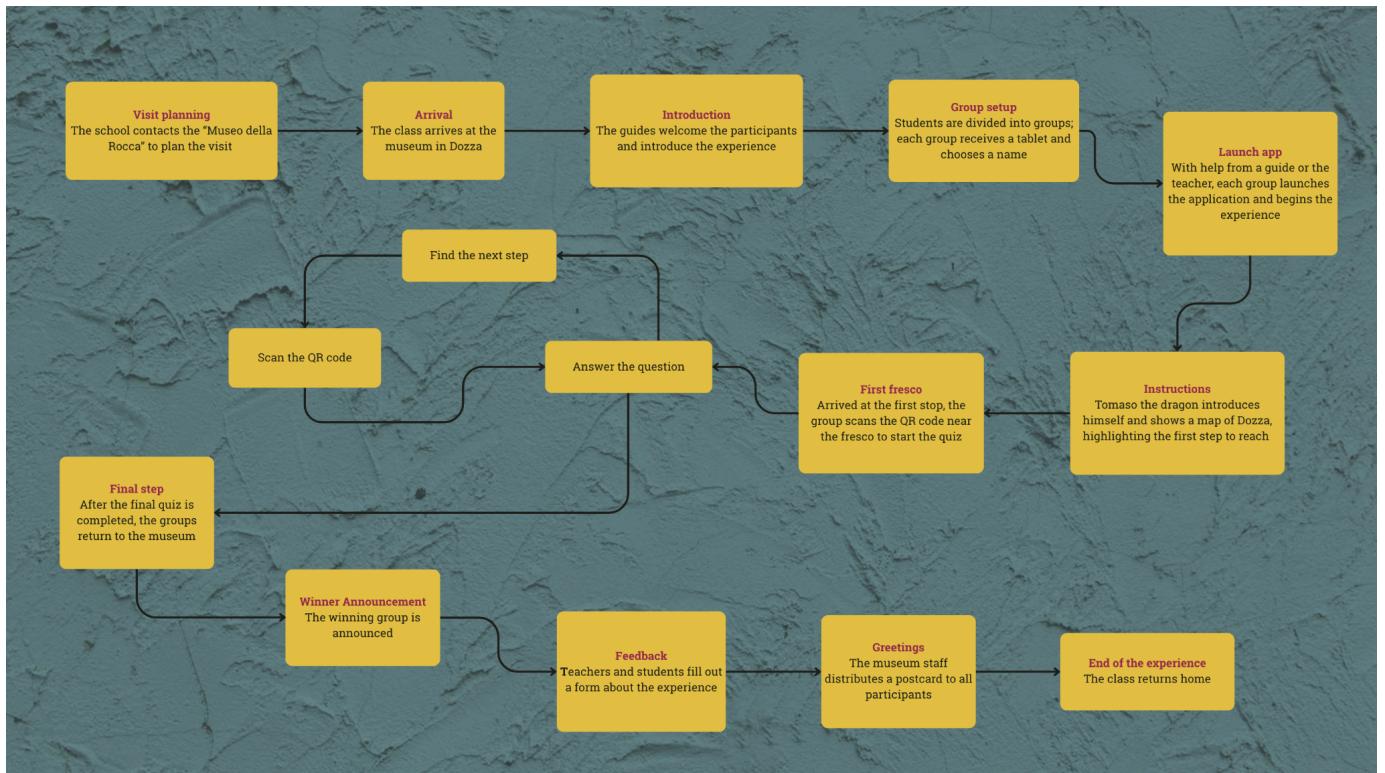
The interaction

Teachers take the students to the museum, where a guide explains how the experience will take place. They are divided in groups, and each group receives a tablet, which is already equipped with the *Treasure of Dozza* app. Within the app, Tomaso interacts with the children by providing information, guiding through the journey and narrating the history behind the frescoes as well as the broader story of Dozza and of the *Biennale del Muro Dipinto*. A tablet seems to be an appropriate device for the proposed activities, it is more cumbersome than a smartphone, but it is versatile and offers a larger display that can be shared by multiple users.

Every time students are asked to answer a quiz, they must choose from multiple-choice options. In the case the answer is incorrect, participants are given the opportunity for further attempts. After submitting the right answer, the app displays a photograph of the original frescoes – especially in cases where the artwork is damaged – and the related information, allowing students to compare the current condition with its original appearance. The interaction continuously engages both the real-world environment – through a physical journey in the centre of Dozza and the observation of its frescoes – and the game-based digital one offered by the application.

When the students finish the hunt, they go back to the museum, where the winning group is announced. At this point, both students and teachers are invited to complete a form to share their impressions and provide feedback. The museum staff then distributes postcards to the participants ending the experience, greeting the class which heads back home.

Interaction diagram



Graphic proposals

TREASURES OF DOZZA

LOGO

For the ideation of the logo the team focused on the **dragon**, which is the symbol of Dozza. Legend has it that the reptilian creature used to frighten the village and decimate livestock in the XI century until it was captured in the Rocca, where it still is now. The dragon was also chosen as companion for the experience as it is part of the **fantasy** realm and likely to attract the young audience.



NAME

As for the name of the app, *Treasures of Dozza* alludes to the gems scattered throughout the town, the frescoes which represent the true treasure of Dozza.

COLORS

The study of colors for the app started out from the dark red typically associated with **Bologna**. The shade was slightly altered and made more **pop** to fit the audience and a set of according colors was selected with the aim of creating a colorful but overall modern and pleasing look.



GRAPHICAL PROPOSAL



The diagram illustrates the graphical proposal for the app, showing a sequence of five screens:

- SPLASH SCREENS:** Displays the logo and the text "TREASURES OF DOZZA".
- Restoration task:** Shows a puzzle interface where users can restore a historical fresco.
- Inspiration task:** Displays a grid of four smaller images, each representing a different historical fresco or scene.
- Spot the difference:** Features a comparison between two versions of a fresco, with a speech bubble asking "Can you spot the differences?"
- Information point:** Shows a dragon character interacting with a user, with a speech bubble asking "Think you can spot them all?"

The team designed a prototype of the app using the Figma application, which can be found at this link:

<https://www.figma.com/proto/Ar1RAo5MSL8SyMTG5JhdDL/Dozza-project?node-id=38-2&p=f&t=WFik4g7nAHfQ22Gg-1&scaling=scale-down&content-scaling=fixed&page-id=0%3A1&starting-point-node-id=37%3A5&show-proto-sidebar=1>

Further Developments

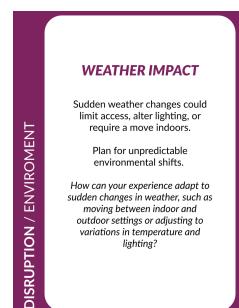
Regarding maintenance, both the devices and the application should be regularly updated and properly maintained. In case of malfunction or if the technology becomes too outdated, the tablets must be replaced and the application reviewed.

Currently, the exhibition is designed for students between 7 and 12. In the future, it would be interesting to expand the target audience and adapt the experience to engage a wider range of participants. Additionally, extending the experience into a virtual reality environment could be valuable, enabling individuals who can not visit Dozza in person to explore the village through other devices. In this case, additional technological equipment is required, such as appropriate tools for 3D modelling. This option could also stimulate curiosity about visiting Dozza in person and experiencing the frescoes in their authentic setting.

6. Disruption

In this final phase, the team has identified some issues in the developed idea.

Since the visitor experience takes place in the streets of Dozza and the interaction with the application only occurs when being in front of the frescoes on the walls, **weather unpredictability** is our biggest concern, as the whole experience is unlikely to happen under bad weather conditions. Unfortunately nothing can replace the authentic experience of viewing and playing with the works of art wandering through the village, but a further development could be the implementation of a virtual environment to reproduce the physical one and allow for the game to be undertaken even from the inside of the *Museo Della Rocca*.



The same further development could be useful to increase **tech sustainability**, as children with limited mobility may be unable to hop around the city for the whole visit and might find it more convenient to explore the artworks with a VR headset. As for people with visual impairments, the text-to-speech translation of the information supplied by the digital companion about the frescos is already available in the application, allowing inclusivity and involvement of all the children on the same level.



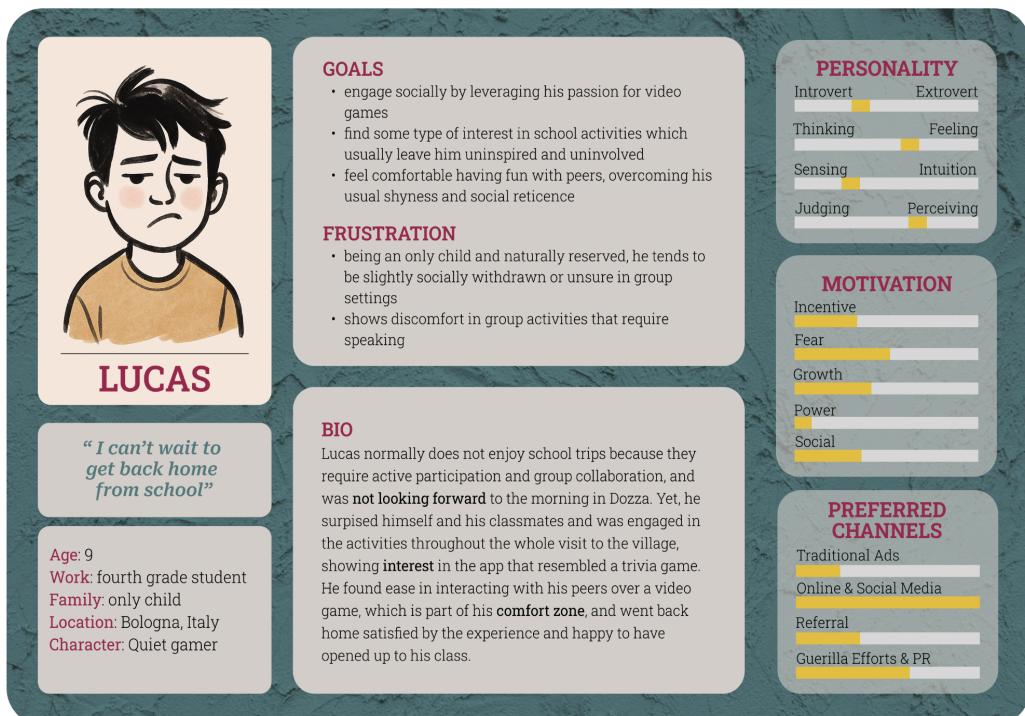
As for the engagement, the application only works for children as it is based on a competition among different groups answering the most questions right, hence most of the engagement comes from the gamified approach and a big focus is on the cooperation among members of the same group to find an answer and move on in the game. To allow **visitor flexibility**, the application should be designed for different types of groups and not only schools and also provide different types of activities depending on the number of people taking part in the visit; this could be achieved by making explicit the type and number of visitors as soon as opening the application, or developing a whole other type of application for groups of adults or single individuals who are willing to explore Dozza and get closer to the frescoes.

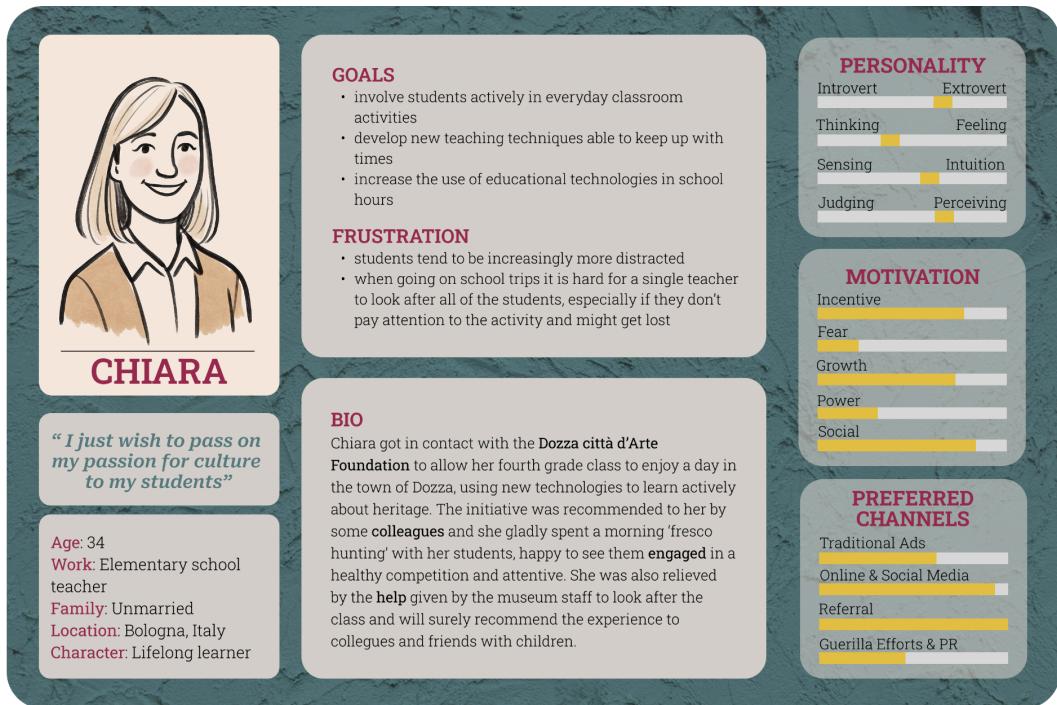


7. UX Scenario

For our UX scenario we decided to create two Personas, the teacher Chiara and the student Lucas, since our expected audience is a school class.

We anticipated that the teacher would prepare for the visit to Dozza providing a short explanation to the class the day before, hoping to inspire the students. In the end, she acknowledges that our application is able to achieve her goal by involving all the children, even students like Lucas, who are usually the most difficult ones to engage.





8. Team's roles and work

The team worked together since the beginning of the project. We began brainstorming some project ideas that could work for the open air museum of Dozza that were inside the guidelines of *The detective of the Past*. After we defined our project idea we went to Dozza to get to know the town itself. We spent a day there, taking photographs of the murals, talking to inhabitants of the town, and visiting the *Museo della Rocca*. We talked with the foundation curator who explained to us how the foundation manages the *Biennale del Muro Dipinto* and how the conservation of the frescoes works. After the fieldwork we started to develop the Design Brief and we divided the different tasks that each of the team members had to perform.

Nicol D'Amelio and Miriana Pinto undertook the duties related to the UX designers and the 2D graphic designers. During the fieldwork they acquired the photographs of the murals and developed the layout of the application using Figma. Meanwhile Sara Roggiani and María Juliana Gamboa carried out the jobs related to storytellers and the prototype designers; they produced the texts related to the narrative of the application and together developed the interaction and conceptual diagrams with the Twine tool. After we finished all of our assignments we brought together all the work done and completed the Design Brief, therefore finishing our project, *Treasures of Dozza*.

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