MUSE·scape

THE SEARCH FOR
THE LOST
TREATISE

An interactive on-site escape room using HCI, for the
permanent exhibition of the Museo Internazionale e Biblioteca
Della Musica of Bologna.

- Loredana Salvatore - loredana.salvatore@studio.unibo.it
- Chloe Papadopoulou - chloi.papadopoulou@studio.unibo.it
  Students of the Digital Humanities and Digital Knowledge LM
- (Alma Mater Studiorum-Università di Bologna)

💡 Innovative points 💡

- Escape room structure
- Enhanced collaboration even with the use of technology
- Favoring of visitor's contact with the real museum setting

Introduction -Context

- Reference Institution
- Institutional goals
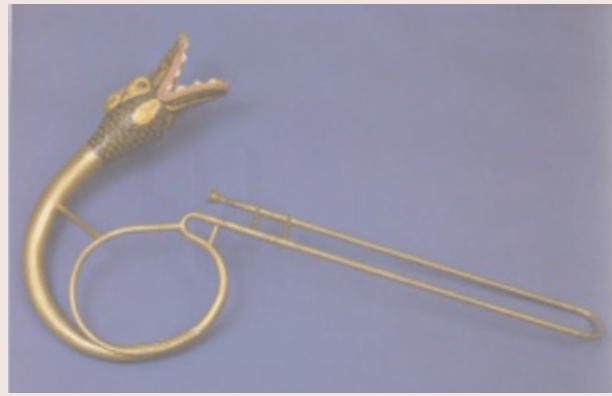- CH assets
- Location
- Target audience

Reference Institution

Museo Internazionale e Biblioteca Della Musica

- It is part of Settore Musei Civici Bologna - Area Musica.
- Founding date: May 11th 2004
- The museum is connected to a huge, important music Library
- The first nucleus of the musealia and books was collected by the scholar G. Martini in 18th century.

Museo internazionale e biblioteca della musica
Strada Maggiore, 34
40125 Bologna
tel. 051 2757711 fax 051 2757728
museomusica@comune.bologna.it
bibliotecamusica@comune.bologna.it
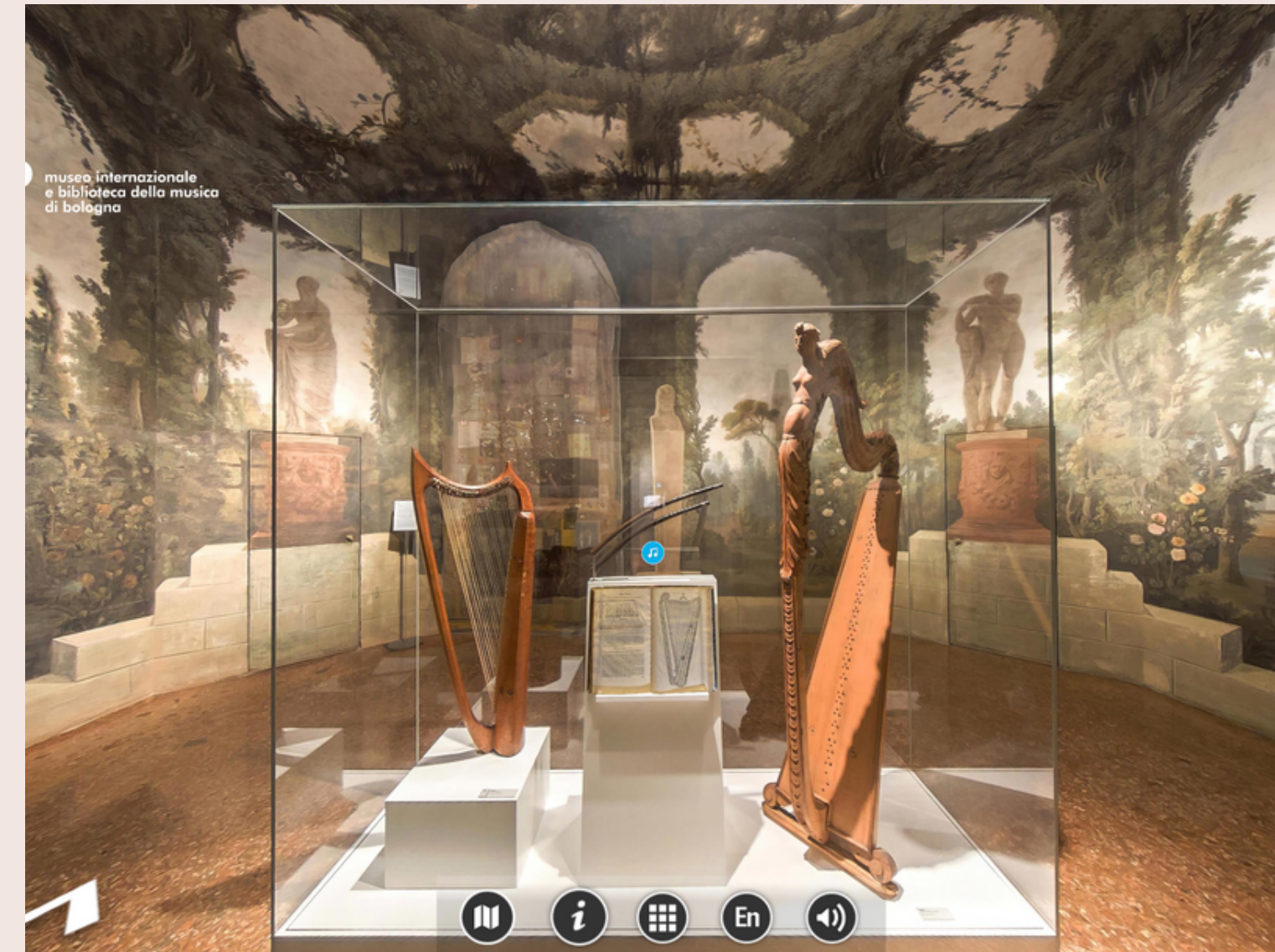labmuseomusica@comune.bologna.it

CH Assets

- paintings of illustrious musical figures
- ancient musical instruments - unique exemplars
- a wide selection of documents
- Collection catalogues - aggregators
- <u>Virtual interactive Tour</u>
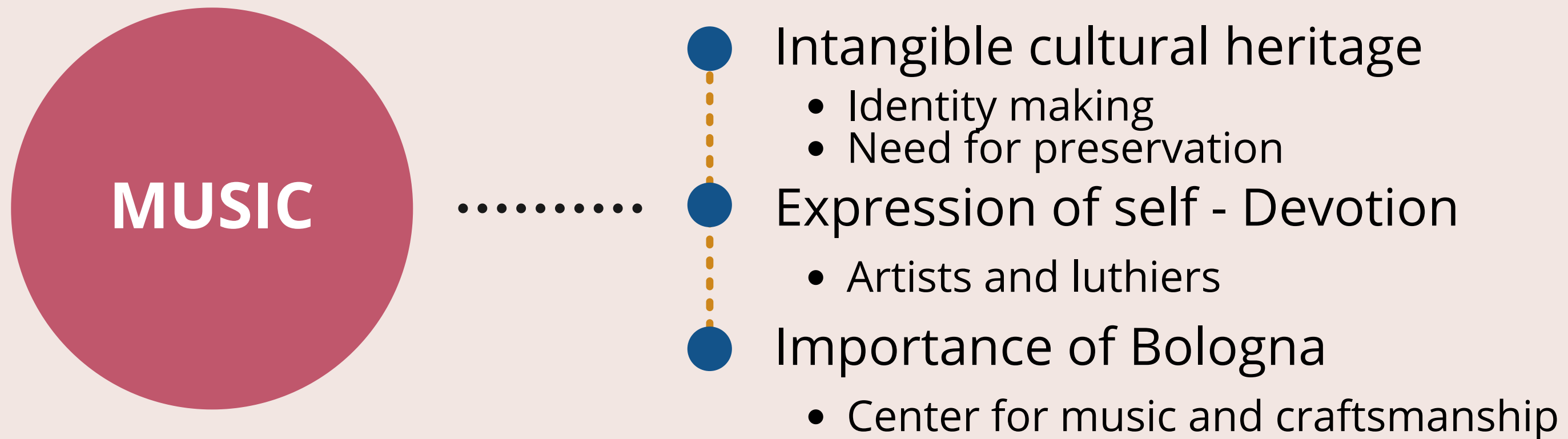
Star Assets

- first ever printed music score
- young Mozart's own autographs
- the "perfect keyboard"
- replica of Otello Bignami's studio

Educational goal

- **Increase the visitor's understanding of the exhibition,** by enhancing the link between musealia and their concept
- **Introduce more complex aspects of musical heritage**

MUSIC

Intangible cultural heritage
- Identity making
- Need for preservation

Expression of self - Devotion
- Artists and luthiers

Importance of Bologna
- Center for music and craftsmanship

Marketing goal

Strengthen links with ally institution, Teatro Comunale di Bologna, also devoted to musical heritage.

- The campaign will implement social media awareness, and the prize for winning the game will be a guided tour at the Theater, and a discount on an Opera play.

Adapt to young visitors' interests and attract a bigger audience

- Experience combining education and entertainment

Location

Restored 16th century Palazzo Sanguinetti - Strada Maggiore 34, Bologna

Exhibition Itinerary - Experience setting

- Replica of Otello Bignami's studio
- Nine frescoed rooms tracing 6 centuries of musical heritage

Target Audience

Children and Teenagers

Motivations - Entertainment, Curiosity, Inclusion -Sense of Belonging
Possible Barriers: Short attention span, Background differences

Devices - Experience with tablets and smartphones (for the most part, according to age/background)

Capabilities -Basic to advanced level regarding the operation of devices and musical skills, experience with simple games and collaboration

Concept

- Conceptual Map
- Museological approach
- Experience Design
- Main CH Topic
- Cognitive focus
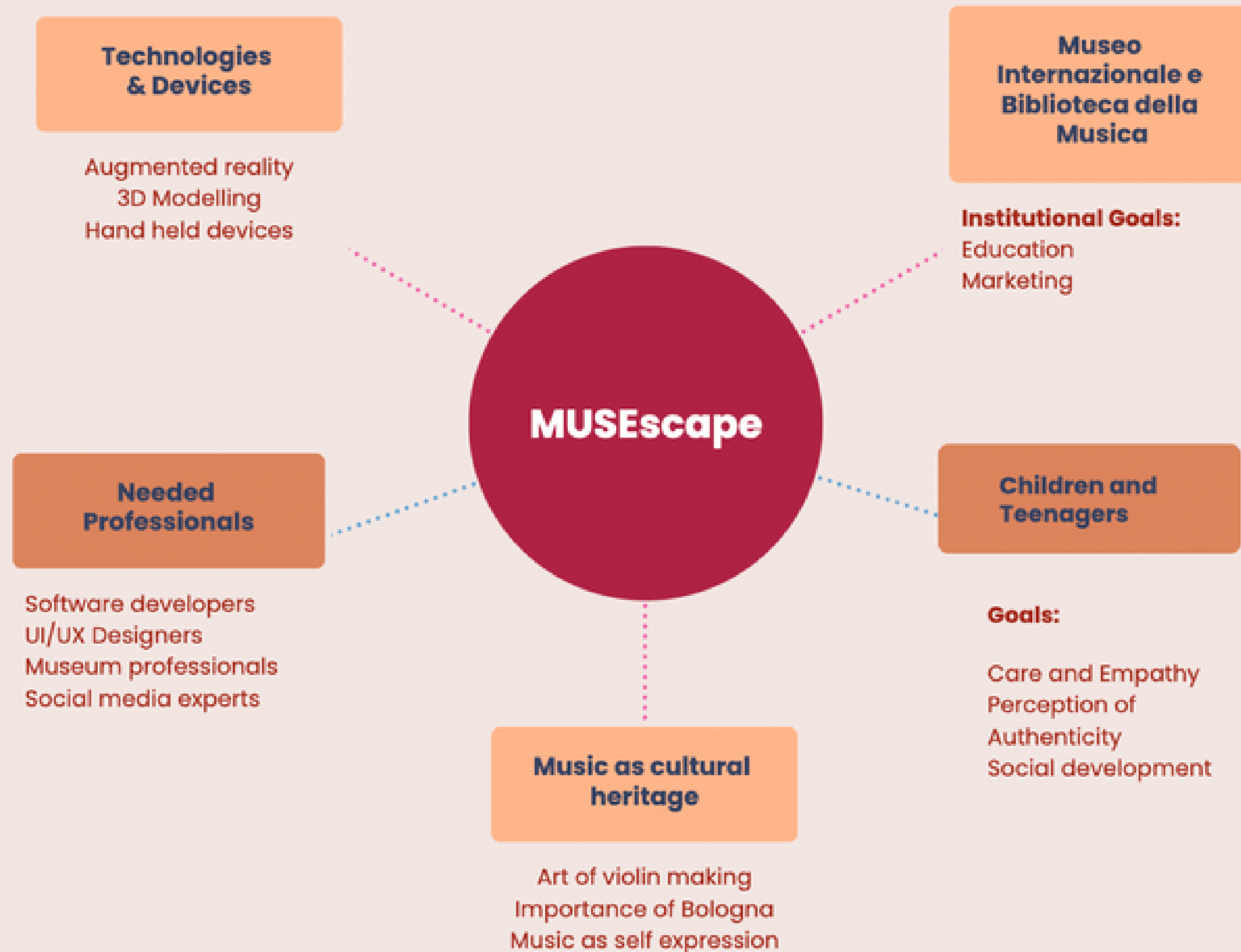
Museological approach

Category B in *Taxonomy of Virtual Museums:*

Need: Education
Interaction: Closed
Space: Closed
Virtual/Real: Virtual on Real
Visitor contribution: Not allowed

Experience Design

Escape room inside the museum exhibition (40')
- Narrative storytelling by the paintings' figures, in their AR form.
- Small tasks which include the interaction with 'real' museum objects in their AR form.

Main principles: attention, engagement and collaboration
- The objects are selected in order to induce lasting remembrance.
- Clues for the completion of each task are distributed among the players

Goal of the game
- to save a lost manual that can help restore the ancient craftsmanship of luthiers

Augmented Reality Features
- Painting figures animated through AR
- Clues are found by framing objects and discovering AR animations on them

Main CH Topic

- **The Luthier figure**: Craftsmen that for centuries, have produced some of the finest lutes and violins ever made.
- **Importance in CH**: UNESCO included the tradition of Cremonese violin making in the list of the Intangible Cultural Heritage, with the aim of safeguarding the their craftsmanship skills and knowledge.
- **Bologna** was known as a center of production of good quality musical instruments starting from the fifteenth century.

Goals

- Cognitive focus
- Cognitive and emotional goals
- Requirements

Cognitive focus

How can a museum that hosts *tangible* objects provide a meaningful and interactive experience on the complex *intangible* cultural heritage that is music?

MUSEscape focuses on:

- meaningfulness, emotions and empathy
- perception of authenticity

.... **Education and Connection with complex aspects of Musical Heritage**

Cognitive/Emotional Goals

Induce active learning and lasting remembrance
by the interaction with museum objects and their concept,
extended to the whole topic of musical heritage.

Increase the visitor's care and empathy
for the profession of luthier craftsmen, and for the famous musicians connected to the city of Bologna, and their importance in the cultural heritage domain through a dedicated setting, story and character.

Requirements

Scenario Observation - Research on the main target audience
Interviews on target audience lead us to decide on the following:

- **(Threat based) narrative storytelling** to induce empathy and enchantment, through emotion-based narration, perspective taking, and affective connection.

- **Teamwork** activities to generate *entertainment*, *active learning* and *sense of belonging,* and aid in the development of our target audience.

- Experience designed to match with teenager's *short attention span* through **persuasive technology** (behavior-reward mechanism, physical movement, playing familiar music, explaining tasks before).

- **Natural Interaction:** tablets can be operated by young users with minimal technology skills and are suitable to support the necessary hardware for AR.
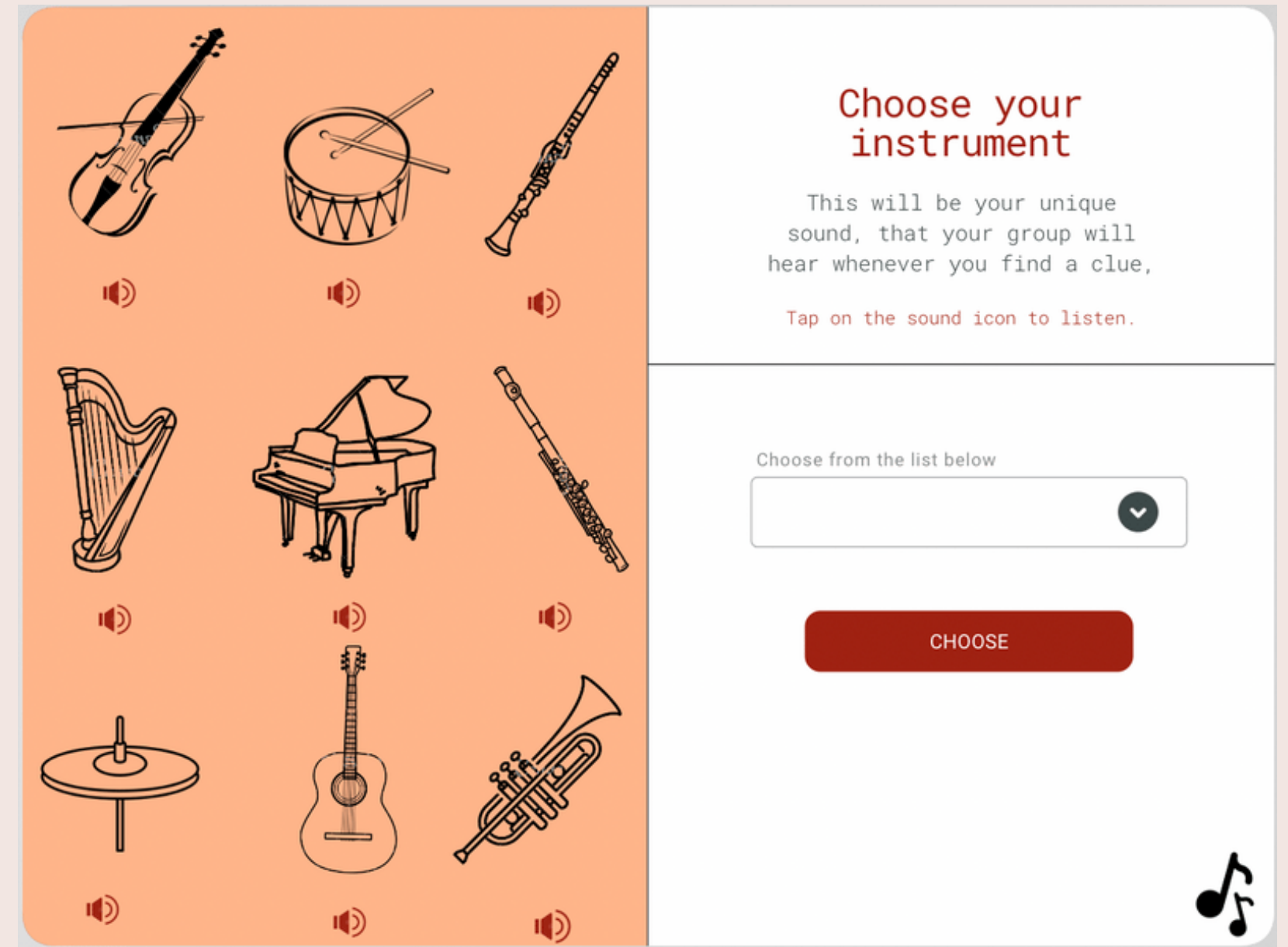
Development
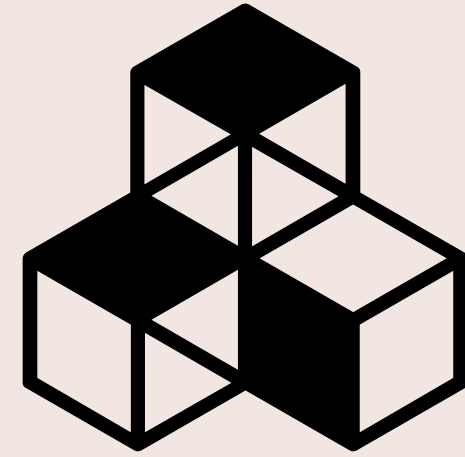
- The story
- Interaction between project and users
- Development to reach the cognitive focus
- Foreseen workflow
- Further development and maintenance issues

The story

Introduction to the game

- Introduction of Otello Bignami by his own AR figure, using emotional-based storytelling.
- Introduction to escape room consisting of small tasks, with **a final quest**: to find a hidden treasure inside the museum.

Player profile personalization

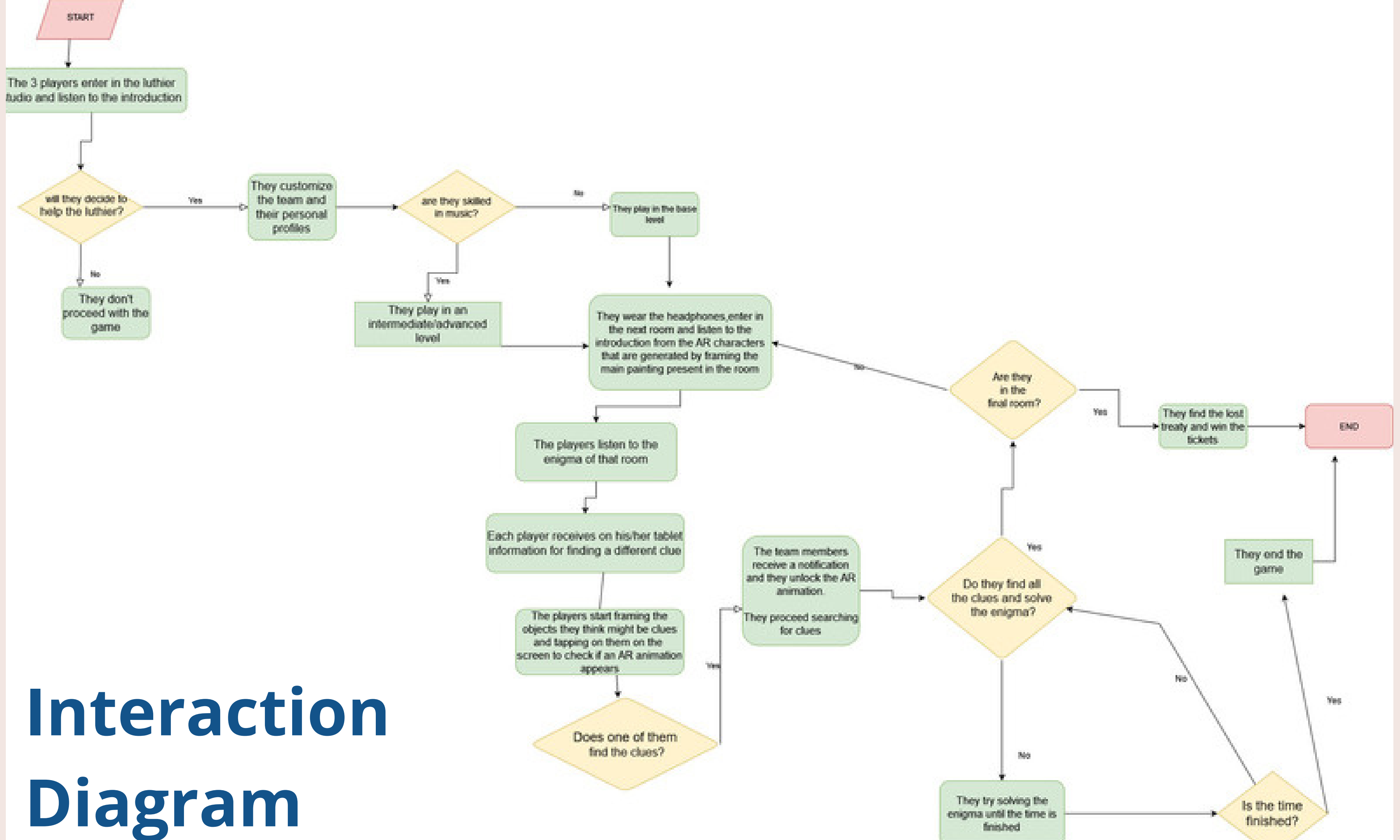Selection and assignment of unique sound as their identifier.

Tasks inside the exhibition

1. Short description of the room and its concepts.
2. Presentation of the enigma - Distribution of information to each member
3. Once all clues are found, the next room is unlocked.

Interaction Diagram

Requirements - techniques for reaching the cognitive focus

STRUCTURE
Escape room

- Narrative based threat
- Physical movement
- Explained tasks
- Behavior-reward
- Collaboration

CONTENT
Real and AR/3D museum objects
AR Figures
Sound

- Narrative story telling
- Potential of surprising
- Contact with real objects
- Familiar Music

TECHNOLOGIES
Augmented Reality
3D Modelling
Hand Held Devices w/ camera-based sensor

- Active listening
- Perspective giving
- Co-located and remote collaboration
- Interaction with reality
- Interaction with virtuality

- Enchantment
- Attention

- Engagement
- Collaboration

- **EMPATHY**
- **PERCEPTION OF AUTHENTICITY**

Foreseeable workflow and needed professionals

- **Coordination with institutions**
  - Museum professionals, Marketing and communication experts
- **Creation of prototype**
  - ・UI/UX Designers
  - ・Sound specialists for sound patterns
  - ・Software developers proficient in AR integration for handheld devices
  - Computer Graphics professionals for acquiring, modeling, rendering and animating models
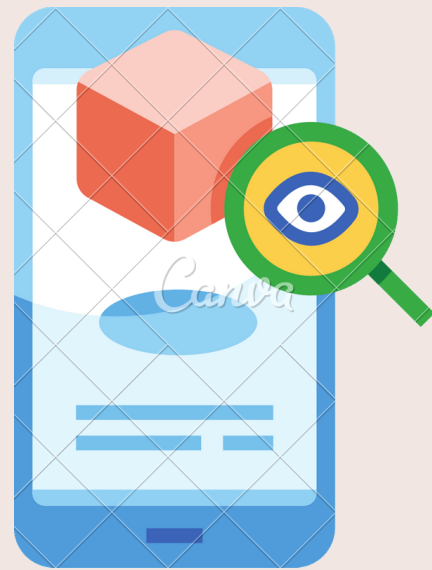- **Hardware**
  - Tablets (HHD) with processor, display, camera and microelectromechanical systems
 - (MEMS) sensors with an accelerometer and GPS.
  - Headphones
- **Technologies**
  - **3DF Zephyr** for photogrammetry
  - **Blender/Meshlab** for the historical figures and augmented objects

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Human - Computer Interaction and the Augmented Reality application

Tracking: Camera-based
Sensory Modelling: Visual, Auditory and Haptic
Object modelling: Real-Virtual
Presentation: HandHeld Device
Interaction: **touch-user interface-**
based on the sense
of touch (haptics) through tablets
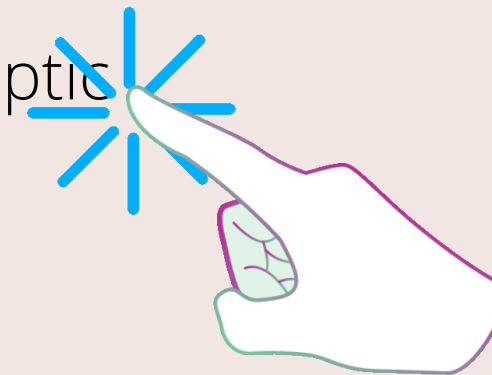
- **3D animation**: the animated characters of the paintings will be created and animated in a 3d software
- **non contact methods for acquisition -** photogrammetry
- **Image-based modelling** (IBM): Photogrammetry - Structure From Motion (SFM)
- **hidden AR markers** – which, when scanned with a smart devices camera activates an augmented experience
- object-based tracking as a previous step for integrating physical and virtual environment

Next steps and needed professionals

1. Prototype testing – monitoring of behavior, interviews
2. Optimization through iterative development
3. Creation of dedicated page linked in the museum website.
4. Social media campaign
   - Marketing and social media experts of both institutions
5. Deployment and publication
6. Museum personnel to monitor the experience and for safety and anti-theft measures

# Further development and maintenance issues

Enhancing immersivity

- Spatial AR- 3D projectors
- smartglasses and headsets
- free-form gesture and voice recognition

Why did we choose to not to include them?

- project more affordable
- experience favors the contact with the real exhibition of the museum

Maintenance

- Control of devices and application's proper
- function by museum's IT expert
- Continuation of social media awareness in a semi-regular basis
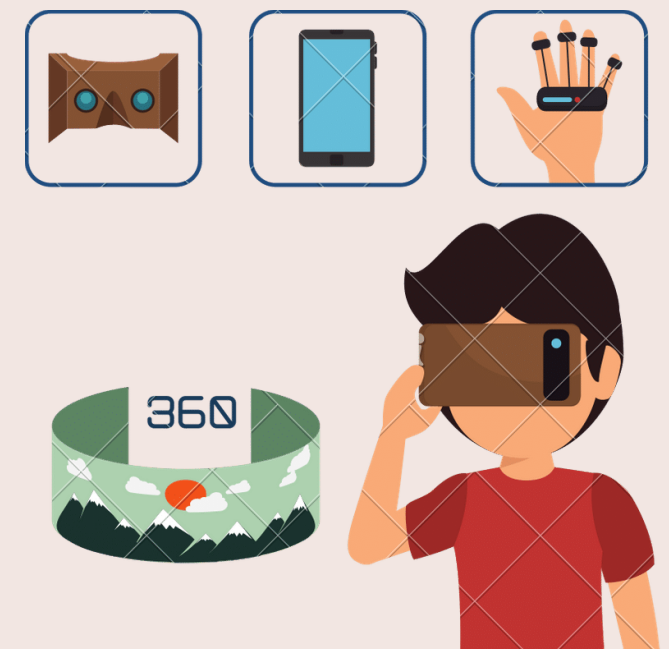
Disrupting the design

Scenarios of vast diversity among groups

- experience is designed in a way that will introduce basic things to the audience, whether or not they are music enthusiasts or experts
- adapt to visitors with knowledge in music theory and history

Solution: three levels of ascending difficulty, each corresponding to **age range and the musical skills** of our target audience

- **Level one**: individuals with no music skills
- **Level two**: primarily aimed at: individuals with basic music skills
- **Level three**: individuals with more advanced music skills

Disrupting the design

Possible disruption of other museum activities and visitors

- game displayed in dedicated hours, in order to integrate the escape room inside the museum activities without sacrificing its interactive nature

Accessibility

- possible adaptation of the experience according to different necessities implementing more visual text or audio descriptions for participants with hearing or vision impairment

Member Roles

The workflow was shared to a great extent regarding the design of concept and interaction methods, the implementation of technologies and development of twine narrative.
The following tasks were divided:
Chloe Papadopoulou: Research on target audience, cognitive and emotional goals, disruption of design, creation of conceptual maps.
Loredana Salvatore: Research on Institutional goals, description of the specific development techniques applied obtaining the cognitive focus, user – experience interaction.

Additional material

Sample of narrative developed with Twine

Chloe Papadopoulou, Loredana Salvatore