DIVE: DIGITAL INTERACTIVE VOYAGE INTO EGYPT

4 Seasons

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ABSTRACT

This project aims to create an on-site gamified experience for children through the development of an interactive narrative. Designed to support guides and teachers during visits, this tool will enrich the educational experience during the visit at the museum. We plan to install touch screen displays next to key exhibits, allowing guides to complement their oral presentations with interactive content.

The narrative will revolve around a selection of artifacts, each linked to a specific episode of the story. Each episode will feature quizzes, quests, challenges, and educational information about ancient Egypt. This interactive format enables children to engage directly with the story, solve quizzes, and participate in educational games, making learning more enjoyable and engaging.

By integrating multimedia content with the guides' oral presentations, this approach enhances young visitors' motivation and interest. The interactive platform, built using Twine, allows for easy updates and adaptations to include new objects or themes, keeping children's attention engaged over time.

Before developing the project, we conducted an in-depth investigation into the Archaeological Civic Museum of Bologna. This research focused on the museum's history, location, collections, strengths, weaknesses, and aspirations, with particular attention to its Egyptian exhibition.

In summary, this project aims to create a more stimulating educational experience during visits by using an interactive narrative that combines historical learning with gamification strategies. It provides valuable support to guides and teachers, making the educational process more dynamic, fun and effective.

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1. The Context

(a) The museum, its content and collections

Figure 1: The museum's entrance, Via dell'Archiginnasio 2.

The Archaeological Civic Museum of Bologna (Italian: Museo Civico Archeologico di Bologna) was founded in September 1881 by the merging of two separate museums: the one belonging to the University of Bologna – heir of the Room of Antiquity belonging to the Academy of Sciences

founded by Luigi Ferdinando Marsili in 1714 – and that belonging to the City of Bologna, enriched by the antique collection of Artist Pelagio Palagi (1860) and the large amount of finds from excavations conducted in and around Bologna during these times.

This museum is among the most important in terms of archaeological finds in Italy and is highly representative of the local history from prehistoric period to Roman Age.

The museum currently holds the following collections: Prehistoric, Etruscan, Celtic, Roman, Greek, Egyptian.

The Egyptian Collection

Figure 2: A room inside the Egyptian collection.

The Egyptian collection of the museum is the third most important in Italy and is one of the most noteworthy in Europe, rich in more than 3500 artifacts, including sarcophagi, steles, and ushabti figures that document three thousand years of civilization.[1]

The collection consists largely of materials collected by the painter Pelagio Palagi, donated to the Municipality of Bologna in 1861 after his death. This collection was enriched in 1881 with about a hundred objects from the Regio Museum of the University and, in the following years, with other minor collections or occasional acquisitions.

Starting from 1960, there's been a revival of scientific interest in the Egyptian collection, previously known mostly through Kminek Szedlo's catalog (1895): materials were restored, studied, and exhibited in temporary displays; a guide to the collection was published, and the ongoing publication of scientific catalogues began. The entire collection was reorganized in 1994 according to new exhibition criteria.

Currently, the section is divided into three areas: the first includes the reliefs from the Saqqara necropolis, the second exhibits materials in chronological order from the origins of Egyptian history to the Roman era, and the third illustrates some fundamental aspects of pharaonic society, such as writing, funerary worship, and magic.

The modern layout suggests a chronological journey, starting from the Old Kingdom to the Ptolemaic era, with in-depth sections on topics of particular interest, such as funerary equipment, writing, and amulets.

Additionally, the museum offers different services to its audience and it is equipped with an educational section, a specialized library with a reading room, a historical archive – available by appointment –, a photographic archive – available by appointment or through written request –, a restoration laboratory, access and elevators for disabled people, rooms for temporary exhibitions, a conference hall, and a bookstore. These existing services integrate seamlessly into the museum's infrastructure and contribute to enhance the overall visitor experience across various age groups and interests.

The museum also provides a paid smartphone application, called *MuseOn*, downloadable from Android Play Store and Apple Store, which is centred on the Egyptian exhibition and offers guides and more information about the artifacts.

[1] See Morigi Govi (ed.), Guida al Museo Civico Archeologico di Bologna, Bologna, Editrice Compositori, 2009.

(b) The location and its map/plan

Figure 3: The internal museum's courtyard (June 2024).

The Archaeological Civic Museum of Bologna is located in the fifteenth-century Palazzo Galvani building at Via dell'Archiginnasio, 2. The building rises right in the heart of the city centre, on the site of the ancient Church of Santa Maria della Morte and its namesake Hospital, built starting from 1289.

The Egyptian exhibition has been reorganized in 1994 on the basement level of the museum, according to new museographic criteria.

The new layout is divided into three main sections, which are detailed below.

Figure 4: Plan of the Egyptian collection exhibition. Entrance on the left.

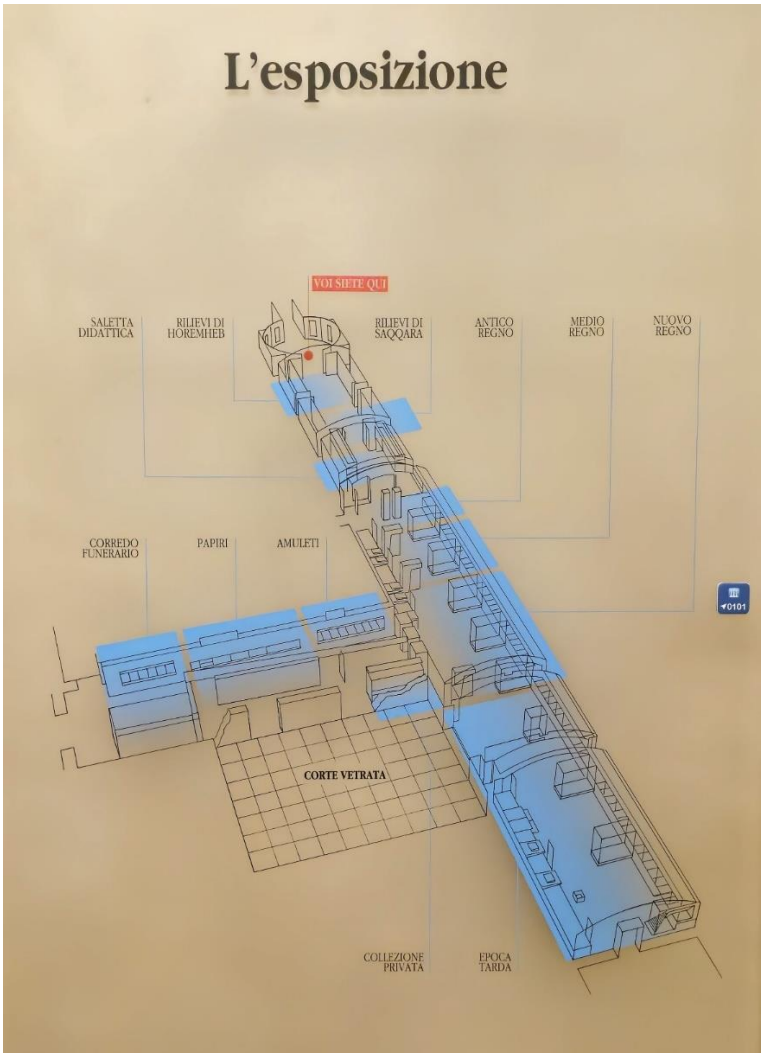


Figure 5: The thematic sections of the Egyptian collection.

After an informative introduction dedicated to the constitutive events of the collection, the reliefs from the Memphite tomb of Horemheb are displayed, alongside those from Saqqara, two unified complexes that the arrangement of the new layout has allowed to reunite. Here we can also find a didactic room (Fig. 6), currently featuring two backlit canvases displayed opposite each other, each portraying traditional Egyptian landscapes.

Figure 6: The didactic room.

Next are artifacts arranged chronologically, reconstructing some stages of Egyptian art from the Old Kingdom to the Late Period.

The last room is dedicated to some representative themes of the collection, such as the funerary equipment, writing, amulets, and scarabs. The funerary equipment is an example of the typical Late Period ensemble and includes items belonging to various personas, from painted wooden coffins to the mummy of Usai, who lived in Thebes during the XXVI Dynasty, a pair of papyrus sandals, a headrest, canopic jars, and ushabtis. The final section also includes a collection of 85 pieces with inscribed material, donated to the museum in 1987.

(c) Institutional Goals

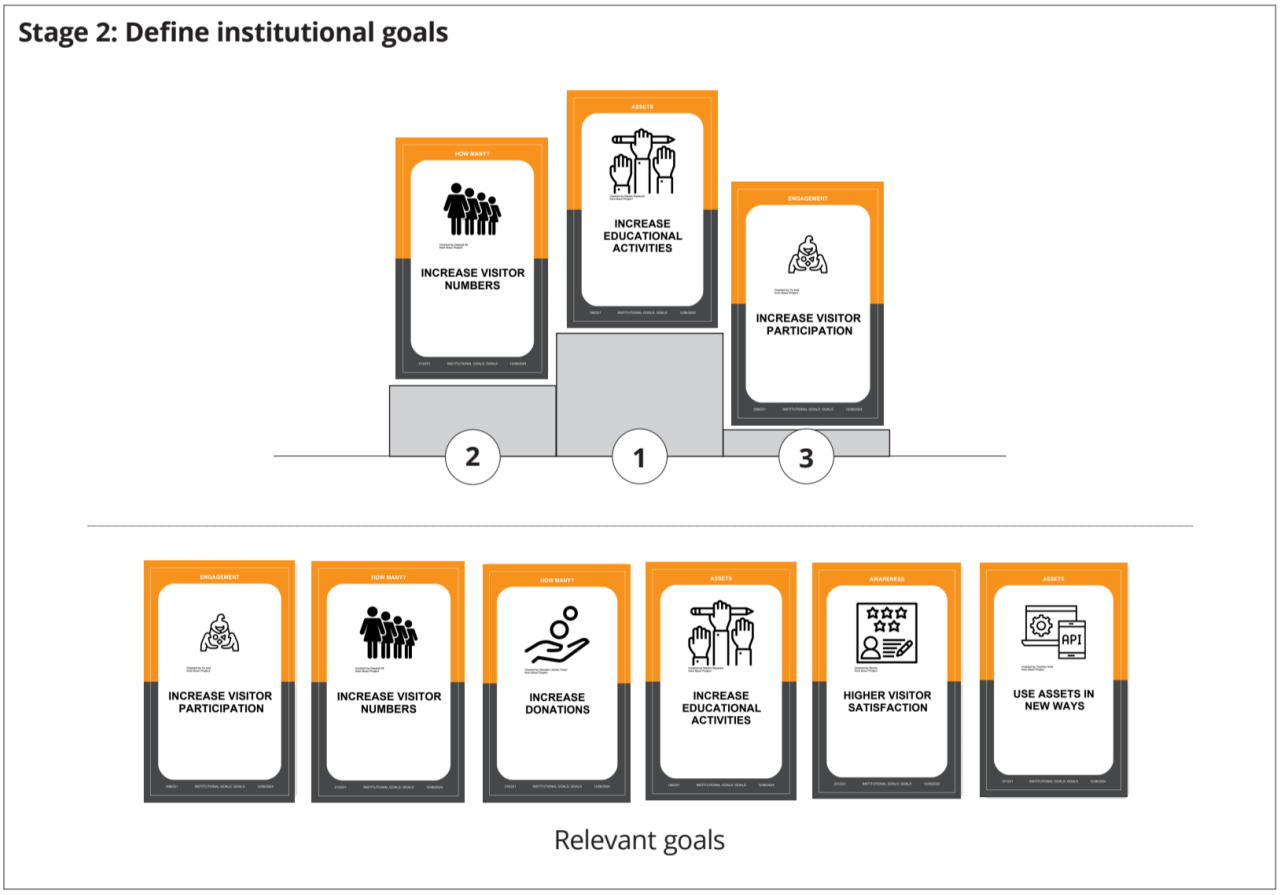


Figure 7: Definition of the Design Brief - Institutional goals.

In alignment with the institutional goals outlined by the Museo Civico Archeologico di Bologna[2], we selected three main objectives:

- Increase educational activities
- Increase visitors participation
- Increase visitors number

We decided to focus primarily on enhancing educational activities within the museum's framework. As articulated by the museum's mission statement, our aim is to foster a deeper understanding and appreciation of cultural heritage among visitors through comprehensive educational initiatives. Drawing from the museum's commitment to research, documentation, and study of its collections, we aspire to develop and implement an innovative educational project that aims to enhance visitor engagement and learning experiences through Interactive

[2] Regolamento museo civico archeologico, Approvato con delibera 16/2021 del CdA dell'Istituzione Bologna Musei P.G.n. 270155/2021, https://www.museibologna.it/archeologico/schede/mission-e-regolamento-639/.

Media Design strategies, where visitors can explore the wonders of the past and connect with the richness of human history in meaningful and transformative ways.

We intend to create a gamified experience for visitors by placing alongside the exhibition path five large LCD touch displays – about 42” wide – landscape-oriented.

The introductory room's display – placed inside the didactic room mentioned above – will set the stage, providing a captivating overview of the narrative, drawing visitors into the story. As they proceed, the displays positioned next to the relevant artifacts will offer interactive content tailored especially for children, featuring quizzes, games, tasks, and detailed historical information linked to the artifacts.

This setup aims to deepen visitors' understanding of ancient Egypt and its cultural heritage, fostering curiosity and excitement about Archaeology and History. Through this approach, we intend to align with the museum's mission to communicate, conserve, and valorise its collections for educational purposes, enhancing the overall visitor experience and promoting lifelong learning.

(d) Cognitive Goals

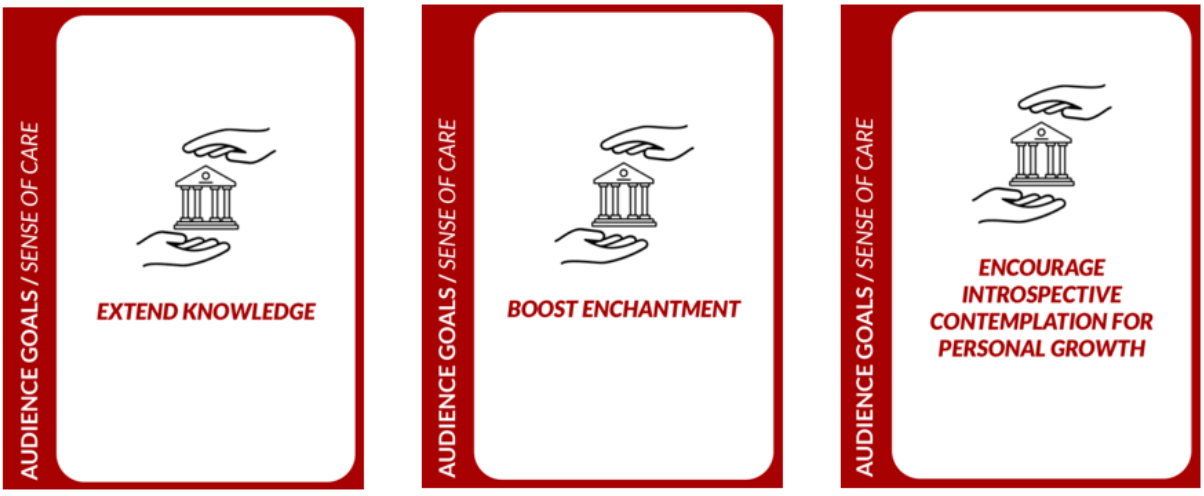


Figure 8: The three Visitorbox cards selected as cognitive-emotional goals.

Rooted in the overarching theme of "**sense of care**", our project has three primary goals: extending knowledge, boosting enchantment, and encouraging introspective contemplation for personal growth.

First, to extend knowledge, we deepen visitors' understanding and connection to historical authenticity by using multimedia tools to explain the cultural and historical significance of the artifacts. Through interactive elements, narrative stories from ancient Egypt are brought to life, illustrating the artifacts' roles in everyday life and religious practices. This approach helps children and young adults explore how these artifacts were understood and used by ancient Egyptians, fostering a meaningful connection with the past and promoting cultural empathy.

Second, to boost enchantment, we emphasize the intrinsic beauty and realness of the artifacts. Detailed, interactive views and explorations highlight the intricate details, textures, and inscriptions that make these objects significant. This interaction not only heightens appreciation for the historical items but also enhances the educational experience by fostering a sense of wonder and admiration for the ancient Egyptian culture.

Third, to encourage introspective contemplation, the project prompts personal growth by inviting participants to reflect on their own lives and cultures in relation to ancient Egyptian practices and values. By contemplating the diversity of human experience over time, children are encouraged to develop an open-minded approach, recognizing and valuing differences, and building a broader sense of belonging within the human narrative.

Additionally, the project strives to ensure the credibility and trustworthiness of the educational content, collaborating with Egyptologists and historians[3] to validate information, providing transparent sources for further exploration, and integrating feedbacks from educators and experts to keep the content accurate and updated. This approach not only deepens children's engagement with History but also fosters a trusted educational environment that respects the reliability of information about the ancient Egyptian culture while connecting with visitors' curiosity and learning styles.

(e) Star Assets: must-see of the museum

In developing our project, we identified four key star assets: exhibits, learning activities, location, and guides.

The museum boasts a rich and diverse array of archaeological objects spanning various epochs, thoughtfully curated in the collections detailed above. This extensive assortment offers a

[3] Cfr. paragraph 3(c) - Museological approach.

profound glimpse into different historical periods and cultures, enriching the educational experience for visitors.

Situated next to the iconic Basilica di San Petronio, the museum's central location is a significant advantage, particularly for tourists seeking to explore both the city's heritage and its archaeological treasures. Its positioning enhances accessibility and increases the appeal of the museum as a cultural and educational destination.

Guides play a crucial role in the museum experience, providing expert-led tours that enhance visitor engagement with the collections. They offer insightful narratives and detailed explanations, transforming the static displays into a vibrant educational journey that connects past civilizations with present-day visitors.

Among these assets, we have chosen to prioritize **learning activities** as the primary focus of our project. This decision aligns perfectly with our target audience, primary school children. These interactive and educational activities are designed to stimulate curiosity, foster a deeper understanding of archaeology, and create a dynamic learning environment. By integrating engaging learning activities into the museum experience, we aim to inspire and educate our younger visitors, making the exploration of ancient artifacts both fun and educational.

With regards to the artifacts shown in the Egyptian collection, we selected the following exhibits:

Figure 9: False Door in the Name of Sameri Stele (Late 5th Dynasty, Old Kingdom)

The "false door" stele is a funerary element typical of the burials of the Old Kingdom (2705-2225 BC) and is made up of an architrave, two or more lateral uprights and a central part depicting a rolled mat, which must look like a door from which, by magical virtue, the soul of the deceased (Ba) could enter and exit the tomb. This stele belongs to a high official named Sameri, member of a family of courtiers very close to the pharaoh, and is dedicated to him by his father Urkaptah, who also includes his wife and other children in the gift. Sameri is depicted both on the architrave, while he sits in the company of his mother Henutes in front of a table full of food offerings useful for afterlife survival, and on the outer left panel, where he affectionately embraces his wife Khenut, according to an iconography that is very rare in monuments of this era. Precisely the use of this iconography and the structural characteristics of the stele allow its dating to the end of the 5th dynasty (2520-2360 BC).

Figure 10: Coffin of Irinimempu (12th-13th Dynasty, Middle Kingdom)

This sarcophagus was intended for the funerary objects of an Egyptian named Irinimempu. Its decorations are a series of "palace facade" panels, a motif inspired by the funerary architecture of the Old Kingdom. At the center of one of the long sides of the coffin, numerous food offerings are depicted, while in a corner there are offerings intended for personal care, including a mirror, jars for ointment, and a case, probably for clothes. Between the two types of offerings, a closed door is painted. Above the door, two eyes are depicted, indicating the presence of the mummy's head inside and simultaneously providing magical protection for the body of the deceased.

Figure 11: Funerary Papyrus in the Name of Djedkhonsuiufankh (Third Intermediate Period: 22nd-23rd Dynasty, 944-716 B.C.)

The papyrus, though highly fragmented and divided into two non-connecting parts, contains some formulas from the "Book of the Dead" belonging to Djedkhonsuiufankh. Originating in the New Kingdom (1539-1075 BCE) and used until the Ptolemaic-Roman Period (332 BCE - 324 CE), the Book of the Dead is believed to have been written by the god Thoth to protect the deceased in the afterlife. This papyrus was part of Djedkhonsuiufankh's burial items. The smaller fragment, showing the beginning of the text, depicts him in a white linen robe worshipping an unpreserved Osiris, with a hieroglyphic inscription revealing his name and titles: "Divine Father of Amon and Chief of the Warehouse of Amon-Ra". The larger fragment contains three columns of hieratic script with rubrics, and the script and owner's name suggest it dates to the 22nd-23rd Dynasty (944-716 BCE).

Figure 12: Relief of Nectanebo I (30th Dynasty, 380-362 BC, Late Period)

This relief, originally part of the temple dedicated to the god Atum in Heliopolis, once adorned the temple façade; it is now part of the "Late Period" section of the museum's exhibition. It features four central scenes surrounded by hieroglyphic inscriptions. It showcases four central scenes framed by hieroglyphic inscriptions, and depicts a finely engraved representation of Pharaoh Nectanebo I (380–362 B.C.) kneeling as he presents jewels and fabrics to various guardian demons. The demons, menacingly brandishing long knives and standing on pedestals, have a mix of forms; apart from the lion-like demon on the right – this scene is incomplete –, the other three demons have identical bodies with different heads: one with an open-mouthed crocodile, another with a closed-mouthed crocodile, and the third with three snake heads. The accompanying hieroglyphs on the slab indicate that Nectanebo I expresses gratitude to these demons for the power and victories granted to him in Egypt and beyond.[4]

[4] See Giovetti P., Picchi D., "EGITTO. Splendore millenario. La collezione di Leiden a Bologna", Ginevra-Milano: SKIRA editore, 2015, p. 559;

The relief is notable for its meticulous detail and pursuit of realism, shifting from the idealized features of earlier art to an authentic depiction of the pharaoh, characterized by a small, prominent chin, thin lips, deep-set eyes, and an arched nose.[5]

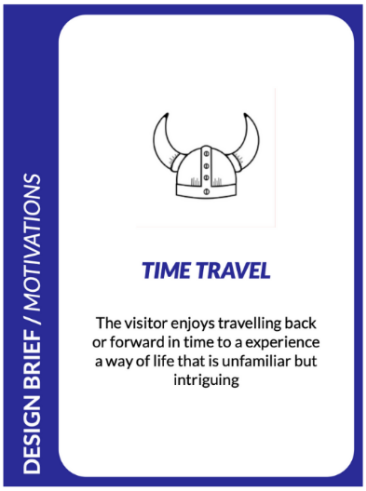
(f) Target Audience

For our project, we decided to target primary school children aged 6 to 11 years old. This kind of audience is particularly receptive to interactive learning experiences, being at a stage in their cognitive development where they are curious about the world around them and eager to explore new ideas and concepts. By tailoring our interactive design strategies to their interests and educational needs, we aim to engage them in a meaningful way and inspire a lifelong passion for History and Archaeology.

2. The Audience

The focus of this project is to engage school students because as we said, they are highly receptive to interactive and immersive learning experiences. Given the museum's location and the nature of its exhibits, these young learners consistently form a significant part of its audience. By fostering a greater understanding and appreciation of these artifacts, we aim to forge a stronger bond between this demographic and the cultural heritage of the city.

(a) Motivations



[5] See more in Electa 1990, *Il senso dell'arte*, p. 172.

Figure 13: The two visitorbox cards selected as motivations.

The motivations behind our project are deeply rooted in the desire to create an engaging and educational experience for children and young adults. By leveraging the rich historical and cultural heritage of the Egyptian collection at the Archaeological Civic Museum of Bologna, we aim to spark a sense of wonder and curiosity in our target audience, and the allure of time travel serves as a primary motivation for visitors, especially children, to such an extent that we have decided to incorporate it as a feature in the storyline of our Twine project.

The concept of traveling back to ancient Egypt, exploring the lives of pharaohs, and understanding the civilization's rich history can captivate young minds. By creating interactive and immersive experiences, we can make history come alive, allowing visitors to feel as if they are genuinely stepping back in time.

The curiosity is further fuelled by the Egyptian artifacts themselves, which are inherently fascinating with their intricate designs, mysterious hieroglyphs, and the allure of mummies and tombs. The interactive elements, such as animated displays and catchy games, will deepen this engagement, making the past more tangible and relatable for young visitors. Our aim is to foster a lifelong passion for history and archaeology by making these ancient stories and objects accessible and exciting. This motivation aligns with the broader institutional goals of **increasing educational activities**, **visitor participation**, and overall **visitor numbers** at the museum. Engaging young visitors through interactive media can create a foundation for lifelong learning and appreciation of cultural heritage.

Additionally, the project happens to stimulate cognitive development in children. Through storytelling and interactive experiences, we encourage visitors to reflect on ancient History, enhancing their historical perspective and fostering empathy, understanding, and acceptance of cultural diversity. This approach not only supports the museum's educational mission but also helps build a sense of community and shared human experience among visitors. By targeting primary school children and young adults, we aim to capture the interest of those at a formative stage in their cognitive and emotional development, making the museum a meaningful and transformative place of learning and exploration.

(b) Barriers

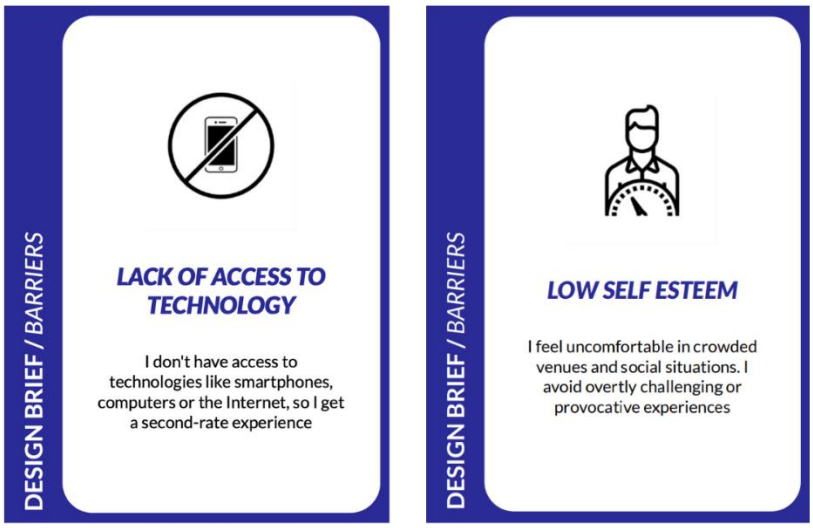


Figure 14: The two visitorbox cards selected as barriers.

Despite the promising potential of these technologies, several barriers need to be addressed to ensure their effective implementation.

One major barrier is potentially the lack of access to technology to our audience goal. In fact, not all young children have mobile phones or tablets, which could limit their ability to engage with the interactive elements of our project. To overcome this, we will have big touch screen displays at the museum, ensuring that all visitors can see them and participate.

Furthermore, we must address potential barriers related to content engagement that we noticed from online research. Many reviews on popular sites like TripAdvisor tell us that the audience is not impressed by the info points and signs, particularly for the restoration project of the mummy. The current app's audio guide is not children-friendly, and staff do not recommend it for children. Also, language can be a barrier, particularly for foreign visitors. To overcome this, we will provide multilingual options in our displays, ensuring that both Italian and non-Italian speakers can fully engage with and understand the content offered.

Finally, we would like to address a potential issue: low self-esteem among less outspoken children in our interactive game setting, where interaction with teachers is necessary for providing answers. We can implement several strategies to mitigate this challenge. Firstly, we can encourage and create a supportive environment where all students feel comfortable participating. To foster a sense of inclusivity and acceptance, teacher and guides can choose to incorporate collaborative learning activities where students work together in small groups. This

allows quieter children to contribute and engage in discussions with their peers, reducing the pressure of speaking up individually. Moreover, it's important for teachers and facilitators to be attentive to individual needs and provide encouragement tailored to each child's personality and learning style. By being supportive and patient, educators can help boost the confidence of quieter students and enable them to participate more actively over time.

(c) Capabilities

Figure 15: The three cards selected as capabilities.

To achieve our goals, we will harness a variety of capabilities that align with contemporary technological advancements and our educational strategies. Our primary focus is on utilizing mobile apps, computer gaming, and a website optimized for both computer and mobile use.

Mobile apps are particularly effective as they can be used both onsite and offsite, allowing visitors to continue their educational journey beyond the museum's walls. Currently, the museum uses the third-party *MuseOn* app, which provides valuable information about exhibits. However, this app requires a payment, and the information is accessible for only 24 hours. Our goal is to enhance this experience by potentially developing a dedicated museum website application that offers extended access to ensure a continuous and enriching educational experience. In fact, a website with a user-friendly interface for both computers and mobile use can present the museum experience online, providing access to the Twine interactive storytelling without the additional information from a teacher or guide in presence. This is particularly useful for people or classes who cannot physically visit the museum, offering an

inclusive way to engage with the content. Moreover, the website can be a valuable resource for individuals with low self-esteem, anxiety issues or discomfort in crowded environments, offering a secure and accessible way to explore and learn from the comfort of their own space.

Integrating computer gaming into the museum experience introduces an additional layer of engagement. By gamifying the exploration of ancient Egypt, we aim to transform learning into a dynamic activity, particularly captivating for young visitors familiar with gaming environments. While our devices may not support direct competitive play, the experience remains dynamic through group activities facilitated by displays. Activities may involve digital scavenger hunts where players scour exhibits for clues or closely analyse artifacts to uncover information, connecting the dots between fragmented images.

By leveraging these capabilities, the DIVE project aims to create a rich, engaging, and educational experience that makes history come alive through technology.

(d) Devices

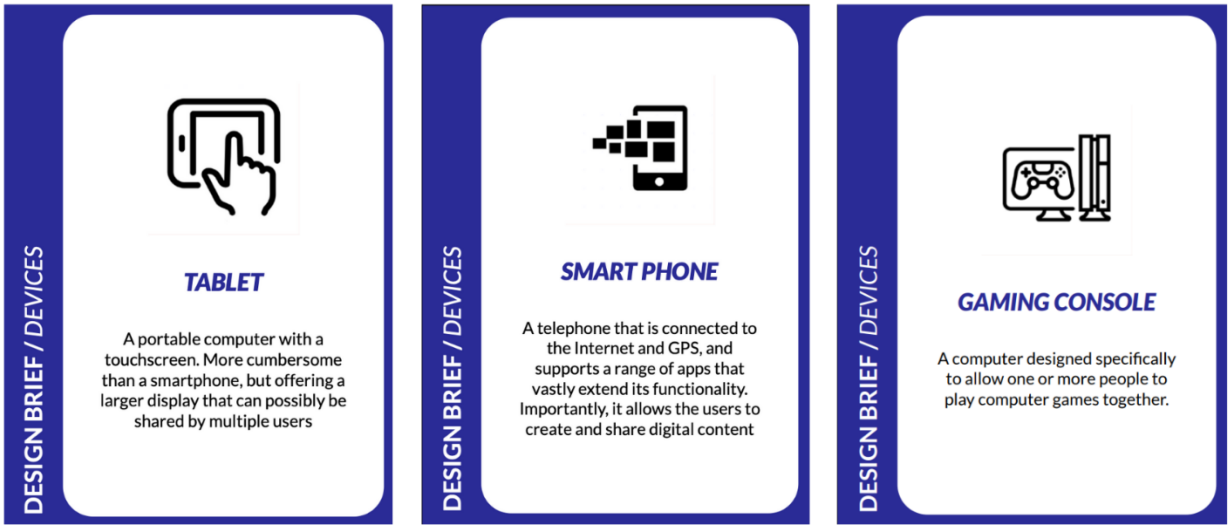


Figure 16: The two cards selected as devices.

The successful implementation of our project hinges on the careful selection and deployment of appropriate devices. Our focus will be on tablets, smartphones, and gaming consoles to deliver a seamless and interactive experience for visitors.

Interactive touch screen displays will replace traditional tablets as the primary tool for delivering content to visitors. These devices, strategically placed throughout the museum, will provide

detailed information about the exhibits, including videos and animations explaining the historical context and significance of the artifacts. Particularly beneficial for younger visitors who favour interactive learning methods, these screens will feature quizzes and interactive storytelling elements to maintain engagement. Additionally, we will incorporate the concept of gaming consoles by hosting educational games related to the Egyptian collection, allowing visitors to interact with the content in an enjoyable and engaging manner. While our devices may not support direct competitive play, group activities facilitated by the displays will ensure a dynamic experience. The potential for further development of these applications will be discussed in Chapter 5, Section G.

Smartphones will enhance the museum experience by providing a portable and personal way for visitors to interact with the content. The experience's mobile app, accessible through browsers and QR codes located at the entrance and in front of key exhibits, will offer extended access to information beyond the museum visit. Unlike the current MuseOn app, which is limited and requires payment, the new app will be free and feature rich. The website will provide detailed artifact information, interactive maps, educational videos, and quizzes, allowing visitors to continue their educational journey offsite. Additionally, if booking slots are full, the website application will allow visitors to use their own devices to access the interactive experience, ensuring everyone can engage with the museum's content.
Our goal is to blend the physical and digital realms in a way that enhances the overall museum experience, making it more interactive, informative, and enjoyable for all visitors regardless of their age or background.

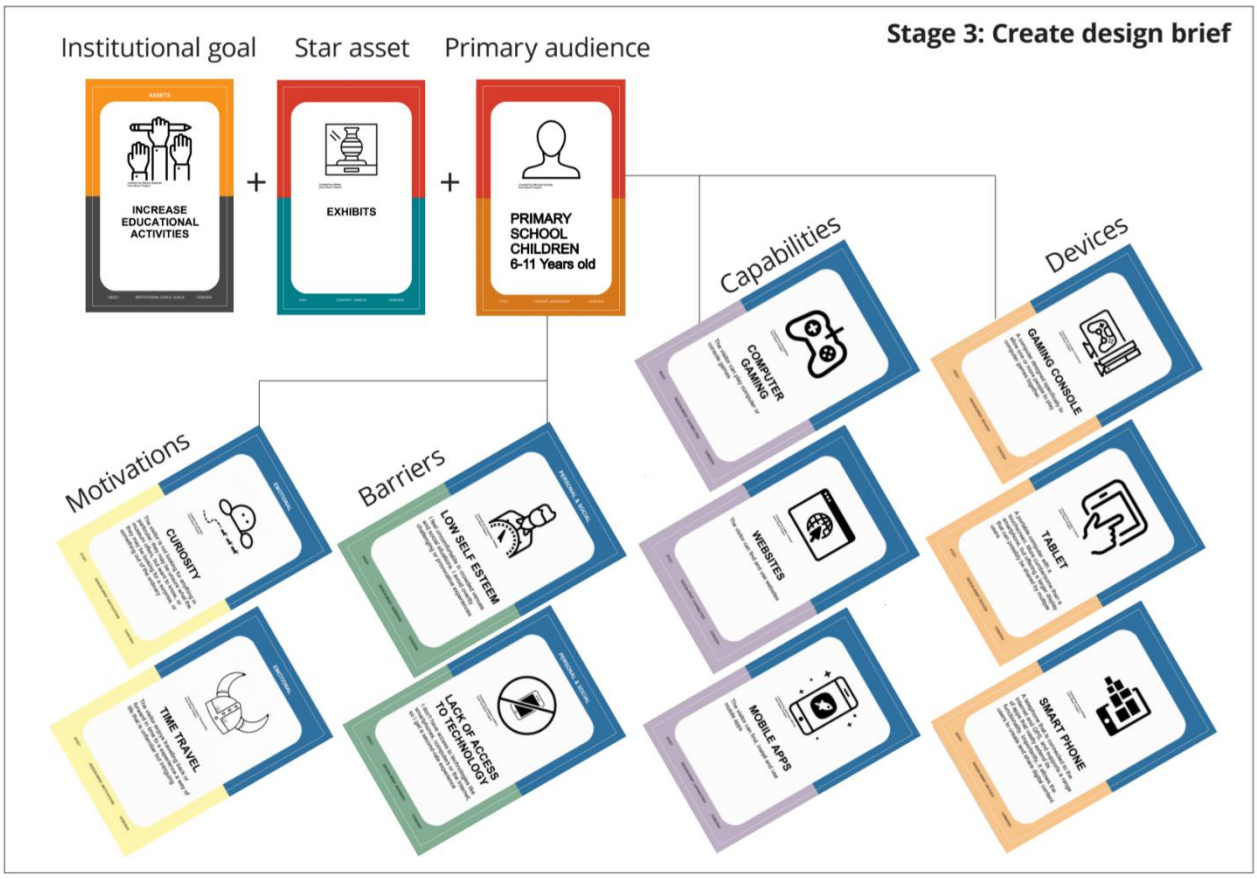


Figure 17: Definition of the Design Brief.

3. The Concept

(a) Which are the specific problem/s you are facing with the project?

The project is primarily focused on how to keep kids interested and engaged for extended periods during a museum visit. Children often struggle to maintain their attention due to the passive nature of traditional museum experiences. Our goal is to design an engaging experience that channels kids' natural curiosity and energy through interactive activities. These activities will be integrated with explanations that contextualize the museum's objects and highlight their cultural value. We aim to blend educational content and interactive elements seamlessly, so that the latter enriches the first rather than overshadowed it. It is important for us that the experience would be available for schools. The presence of classes with many students must be kept in mind during the design process, to come up with solutions that allow multiple users to engage in the experience at the same time.

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

First, we thought about strategies that could help in catching the kids' attention and keeping them focused for the entire visit. We decided to use storytelling, because it is a powerful technique to convey information and stimulate emotional engagement. The project combines expository and narrative storytelling. The interactive experience is centered around a compelling storyline that connects important items of the museum in a cohesive narrative, following the adventures of a protagonist the kids can identify with and feel emotionally connected to. The story is also used as a mean to provide explanations about the items' history, characteristics, and symbolism as well as additional information about Egyptian culture.

Each part of the storyline is accompanied by educational games that test kids' knowledge in a fun and engaging way. Gamification is an effective strategy to enhance the learning process because presenting information in a game-like format, it can motivate them to participate more actively and retain knowledge more effectively. Display technologies, such as touch screens, will be used to show videos with animations that illustrate the story and serve as a device to play the games.

A good strategy to ensure broader inclusion and participation in using the displays would be to implement a mandatory reservation system. The experience must be booked in advance to better manage the number of participants, ensuring that the activities proceed smoothly and that everyone is involved. This approach allows the museum staff to create a more organized environment, where each child can fully engage with the learning activities without feeling overwhelmed or excluded. The presence of a teacher or guide will also be helpful. They would supervise the activities, providing support for the children as they play and ensuring that none of them feels left out or disengaged.

Designing the experience to accommodate multiple users simultaneously transforms it into a collaborative learning opportunity. Children will learn to communicate effectively, share ideas, and support one another in finding solutions to the games, ultimately strengthening their problem-solving skills and their attitudes towards teamwork and collective effort.

(c) Museological approach

The objects inserted in the storyline were identified among the exhibits currently displayed inside the Egyptian collection of the museum. The team conducted bibliographic research and

interviews with Laura Michelini – an archaeologist and external guide of the museum – as well as Professor Daniela Picchi, expert in Egyptology, whom we would like to thank for their valuable support.

The latest museum guide (Morigi Govi, 2009) was crucial for providing information on the objects and their historical periods of origin, helping to locate them in the corresponding sections within the museum's exhibition.

The storyline is divided into four parts, each centered around a different object, plus an additional part that serves as an introduction, bringing the total number of necessary displays to five. We have carefully considered where the devices should be positioned. An ideal place for the first display, dedicated to the introduction, is the didactic room with backlit canvases showing traditional landscapes. The room currently empty, except for a few chairs, offers ample space to be further utilized. Its position, preceding the rest of the exhibition, makes it the perfect place for a starting point. As for the other displays, they will be distributed throughout the remainder of the exhibition. They must be located near the items that are the main subjects of the part of the story that they will show. However, they should be positioned in such a way that they will not obstruct visitors' ability to move around or block the view of other displayed artifacts.

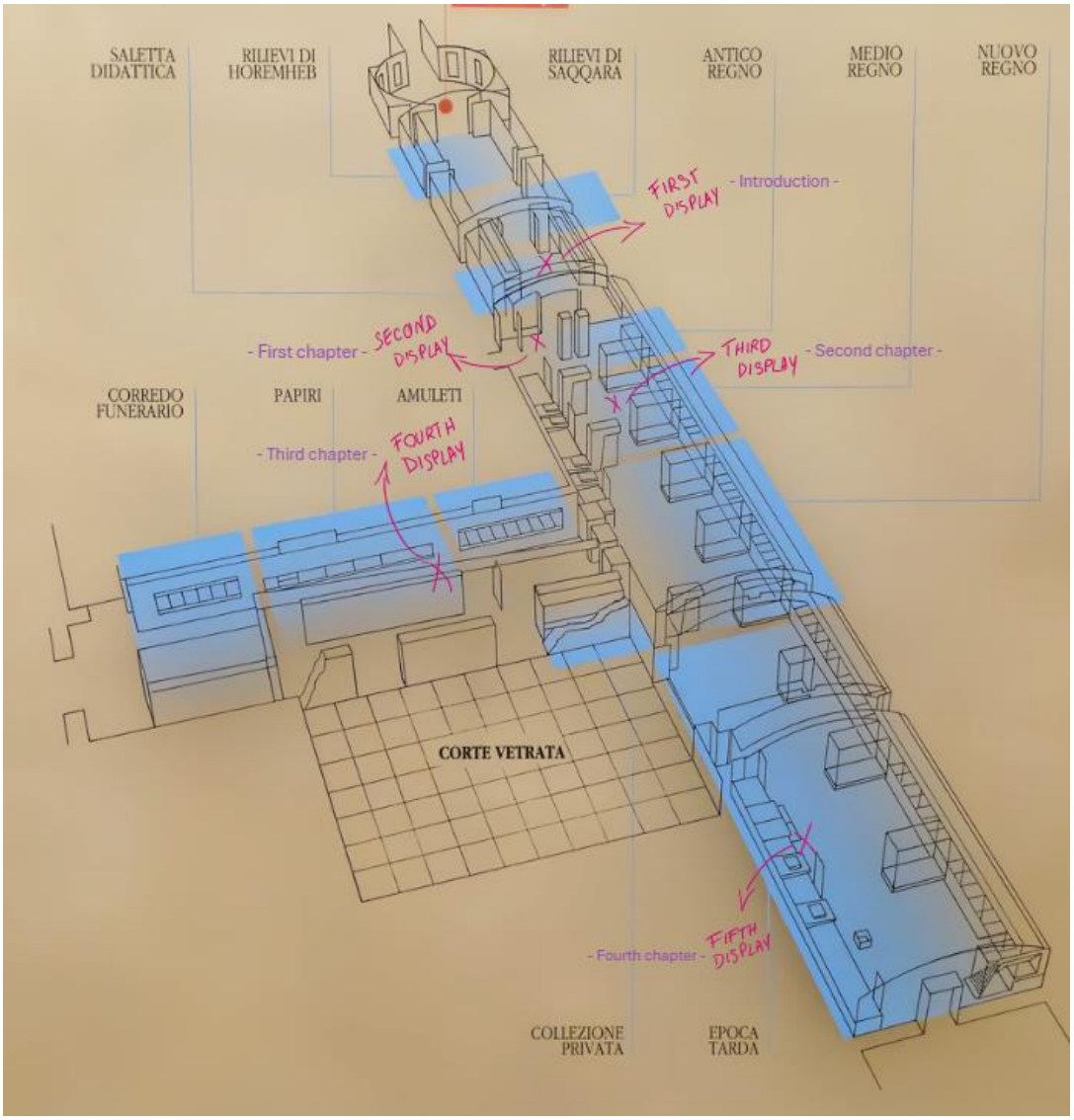


Figure 18: Map of the exhibition with the positions of the displays.

(d) PW case study: themes and topics

"*The curse of the Tomb Robbers: an Ancient Egypt Puzzle Mystery*"[6], is a puzzle storybook written by Andy Seed and illustrated by James Weston Lewis. The book was the result of the joint efforts of The British museum and children's publisher Nosy Crow, who teamed up to create it in occasion of the Museum's new exhibition, "*Hieroglyphics: Unlocking Ancient Egypt*", centered around the discovery of the Rosetta Stone and the decoding of hieroglyphics. The book tells the story of two friends on a quest to stop tomb robbers from raiding Queen Neith's tomb and unleashing a terrible curse. This engaging narrative framework keeps kids entertained while they

[6] https://www.britishmuseum.org/blog/can-you-crack-code.

learn, using storytelling to provide an immersive educational experience. Gamification further supports learning, as kids uncover the story and solve puzzles alongside the two protagonists.

Another initiative worth noting is the "*Bussole di Carta*"[7] educational kit of the Egyptian Museum of Turin (Italian: Museo Egizio di Torino). This kit is targeted towards families with children and offers a choice between four themed paths: important places in Egypt, famous explorers' discoveries, false myths and curiosities, and an introduction to hieroglyphics. Children are involved in a more interactive narrative that takes them to explore the museum in a way that caters to their individual interests, making the experience both educational and entertaining.

Both "The Curse of the Tomb Robbers: An Ancient Egypt Puzzle Mystery" and the "Bussole di Carta" educational kit offer engaging ways for children to learn about Ancient Egypt, but they do so through different approaches. The storybook offers a structured narrative combined with puzzles to make history come alive through gamified learning, while the provides a more personalized experience, fostering discovery within a real museum setting. Our aim is to combine the storytelling and gamification aspects of the first example with the explorative approach to the museum environment of the second. With the help of adequate technology, these aspects will be enhanced to create a rich experience for young visitors.

4. Requirements

(a) Must

Keeping in mind the target audience of this project, it is essential to design the narrative in a way children would find engaging. It is also important to shape the narrative in a format that is easy to understand and follow.

The goal of this project is to teach children about historical artifacts using a narrative, therefore it is a must for the narrative to include historically accurate scientific-based information and utilize this information in a meaningful way that would reinforce the narrative.

(b) Should

With the intention to enhance accessibility, the presentation of this project should ideally be in multiple languages to facilitate children from different backgrounds. This approach would help

[7] https://museoegizio.it/esplora/notizie/visita-il-museo-egizio-con-le-bussole-di-carta/.

the museum to accommodate international visitors, making the project and the information available comprehensible for a variety of visitors.

(c) Could

Considering the way this project is designed, the narrative and the games included could also be implemented using VR technologies to enhance the visitor experience. Additionally, 3D models of the target objects could also be generated with the help of photogrammetry or 3D modelling to generate a higher sense of involvement for the visitors.

Additionally, to enable visitors to interact with the project directly, a version of the narrative and the games could be implemented for the museum app and smartphones.

(d) Won't

This experience will not in any way deal with topics including or around discrimination. It is essential that every visitor who participates in this experience feels included and respected, therefore this project will not include any discriminatory elements. This experience will also not contain any justification of theft/deprivation of artifacts from other countries.

5. Ideation

(a) Technologies, Engagement, Audience Goals

Figure 19: The three proposals of ideation from the Visitorbox cards.

The decision-making process for selecting the most appropriate interactive museum project model was the result of a thorough and thoughtful consideration of all available options. The primary aim of the project is to create an engaging and educational on-site experience for children, enhancing their understanding and interest in ancient Egypt through interactive narratives and multimedia content. Episodic storytelling and public display technologies were integrated and by breaking down the narrative into manageable, thematic episodes, the experience becomes easier for children to follow and absorb. Each episode can feature interactive content, quizzes, and games that make learning about ancient Egypt more enjoyable and memorable. The incorporation of historical characters helps to personalize the experience, allowing children to connect emotionally with the stories being told, thereby fostering a deeper understanding and empathy for ancient cultures.

In contrast, if we decided to rely on environmental embodiment and visual markers that might have been less effective in delivering structured educational content. While these elements can create an immersive environment, they might overwhelm young visitors without providing clear educational objectives and visual markers.

The chosen model utilizes public display technologies, involving the installation of interactive touch screen displays next to key exhibits. This setup is ideal for integrating multimedia content that complements the physical artifacts. Public displays can showcase animations, detailed historical information, and primally interactive games that children can engage with through a guide/teacher.

In comparison, a model focusing on visual markers may require children to have devices to scan QR codes, and employing augmented reality with visors, while innovative, might require more advanced technological infrastructure and maintenance. Additionally, AR might not be as intuitive for younger children compared to touch screen displays that instead are a technological approach they are used to.

Active listening deals with creating a specific character's story and it encourages children to empathize with historical figures and understand their stories on a deeper level. This active engagement is crucial for young visitors who benefit from storytelling that prompts emotional and cognitive involvement.

Promoting collaboration, such as asking children to work together to solve tasks, can be beneficial. However, it may not cater to individual learning as effectively. Considering the

museum's resources, currently, we plan to distribute one device to each child or expect them to bring their own. Managing group education within the museum setting could be challenging due to varying group sizes and dynamics. Nevertheless, with the guidance of teachers and guides, we believe that posing questions to children and encouraging them to answer as a group could foster camaraderie and improve their focus.

From a practical standpoint, opting to implement our chosen model (Fig. 19, Idea 2) is more straightforward and manageable within the existing museum infrastructure. Public displays are easier to maintain and update compared to the continuous technological upgrades required for other systems. This makes public displays a more sustainable and reliable choice for long-term educational engagement.

Ultimately, public displays, active listening, and episodic storytelling align with the project's educational goals, effectively utilize technology, and engage the target audience in a meaningful way. Episodic storytelling and public displays offer an immersive and structured learning experience, while active listening ensures deep emotional and cognitive engagement.

(b) User Experience

The on-site experience designed for the Egyptian collection of the Archaeological Museum of Bologna is centred around an interactive narrative that leverages the Twine application to create an adventure through ancient Egypt. This experience is specially tailored for primary school children, transforming history into an educational and enjoyable experience.

The interactive narrative is designed to be both instructive and entertaining. It is guided by a third-person narrator – typically embodied by a museum guide or teacher – who enriches the story with additional context and insights. Interaction with the application is facilitated through this intermediary, ensuring a seamless and accessible experience. The interfaces are user-friendly, with clear instructions to enhance the storytelling and educational value of the experience.

Experience Dynamics

Users purchase museum tickets and book the interactive experience "*DIVE: Digital Interactive Voyage into Egypt*", either with a museum guide or not – in this latter case, users are groups of school children accompanied by their teacher. They proceed to the Egyptian exhibition of the museum, where the experience takes place. Upon arrival, they receive a brief introduction

outlining the dynamics and objectives of the experience. It unfolds across five distinct sections spanning different rooms of the exhibition, each equipped with a touch screen display corresponding to a key episode in Amun's adventure. Each displays features a number indication, and the users are asked to look at these indications along the exhibition to follow the correct path.

FIRST EPISODE – Introduction to the story

As users enter the Didactic room of the exhibition, they encounter the first display of the experience. Here, they are introduced to the story of Amun, the central narrative guiding them through the exhibition. The participants engage with the animated display, which sets the stage for Amun's quest.

SECOND EPISODE – The Mysterious Fake Door of Sameri

Narrative Function

Amun stumbles upon the fake door inside the tomb, activating its hidden mechanism which transports him to the mystical afterlife. This artifact serves as the catalyst for the adventure, compelling Amun to find another fake door to return to the living world.

Interactive Elements

Children will engage in an interactive game where they explore the significance of funerary offerings and learn about the people associated with the artifact. The first section of the game consists of figuring out the funerary offerings by guessing the letters of the answer and learning about the significance of the offerings in Ancient Egyptian belief of afterlife. The second section of the game consists of guessing which family members of Sameri were depicted on the false door stele. This section of the game encourages the visitors to inspect the people depicted and learn about them based on what is written on the different parts of the artifact.

THIRD EPISODE – The Coffin of Irinimempu

Narrative Function

Amun discovers the ornately carved coffin of Irinimempu, which holds the image of another fake door. He decides to examine the sarcophagus to learn the meaning of the symbols depicted on it, but a dangerous spirit is lurking in the shadow.

Interactive Elements

Participants will engage in activities that explore the significance of ancient symbolism related to Egyptian funerary practices and believes towards the afterlife. The game encourages players to inspect closely the artefacts' details and find clues on their meaning, to answer questions and riddles. Part of this section is dedicated to mythology and provides captivating information about the primary deities of the Egyptian pantheon.

FOURTH EPISODE – The Stele Papyrus of Djedkhonsuiufankh

Narrative Function

To banish the spirit, Amun finds and reads a spell from the ancient Stele Papyrus. This artifact introduces the concept of ancient Egyptian magic and the power of written incantations.

Interactive Elements

Children will compose a spell by solving puzzles and games, and they learn about the role of papyrus in preserving knowledge, experiencing the importance of ancient Egyptian texts and the use of magical spells in mythology. In the game, children embark on a quest to compose the spell that will free both Amun and Djedkhonsuiufankh from Pep, the demon of the underworld. After a brief introduction, the user encounters a MetaHuman reconstruction of Djedkhonsuiufankh. The character interacts with the user to welcome him through a voice over registration and the user gets introduced to the first game.

Figure 21: MetaHuman reconstruction of Djedkhonsuiufankh.

Through an engaging activity, they piece together fragments of a papyrus to reconstruct the entire spell. By correctly associating fragments with the complete photo and answering quiz questions related to ancient funerary papyrus, children earn the words needed to assemble the spell sentence.

FIFTH EPISODE – The Relief of Nectanebo I

Narrative Function

The fifth episode enables the user to learn about the legacy of Pharaoh Nectanebo I, gaining insight into his impact on Egyptian history. The final challenge requires Amun to solve some tasks that grant access to the deepest chamber of the tomb, where the treasure room awaits. Successfully completing this puzzle is essential for Amun to fulfil his final mission before returning home.

Interactive Elements

This episode corresponds to the fifth display of the exhibition, featuring the relief of Nectanebo I. Following a general description of the artifact, the user encounters a MetaHuman reconstruction of Nectanebo I, based loosely on the artifact's realistic portrayal[8]. The character interacts with the user to welcome him.

Figure 21: MetaHuman reconstruction of Nectanebo I.

[8] Cfr. paragraph 1(e).

Subsequently, information about the demon-guardians is provided, conveying the message that these figures symbolize a profound bond between the pharaoh and Egypt's divine protectors. Following this, details about some of the hieroglyphics – Ankh, scarab, hawk, goose – surrounding the four scenes on the relief are presented, prompting the user once more to identify and locate these symbols on the relief. Finally, the user is tasked with identifying the demon-guardians based on their animal heads and choosing the corresponding descriptions:

- Lion Demon-Guardian → Protects Pharaoh in battles and healing;
- Three-Headed Snake Demon-Guardian → Guardian symbolizing vigilance;
- Open-Jawed Crocodile Demon-Guardian → Symbolizes the protective power of Sobek;
- Closed-Jawed Crocodile Demon-Guardian → Represents fertility and the protective power of the Nile.

After solving the tasks linked to the Relief of Nectanebo I, the story unfolds as Amun stumbles upon a dazzling treasure room. Inside, he finds his lost ball now soaked with magical energy, symbolizing the fulfilment of his quest and his newfound knowledge and courage.

The experience concludes with Amun's return to his familiar world, enriched by his journey through ancient times. The storyline reinforces themes of exploration, bravery, and learning, inspiring children to embrace curiosity and adventure.

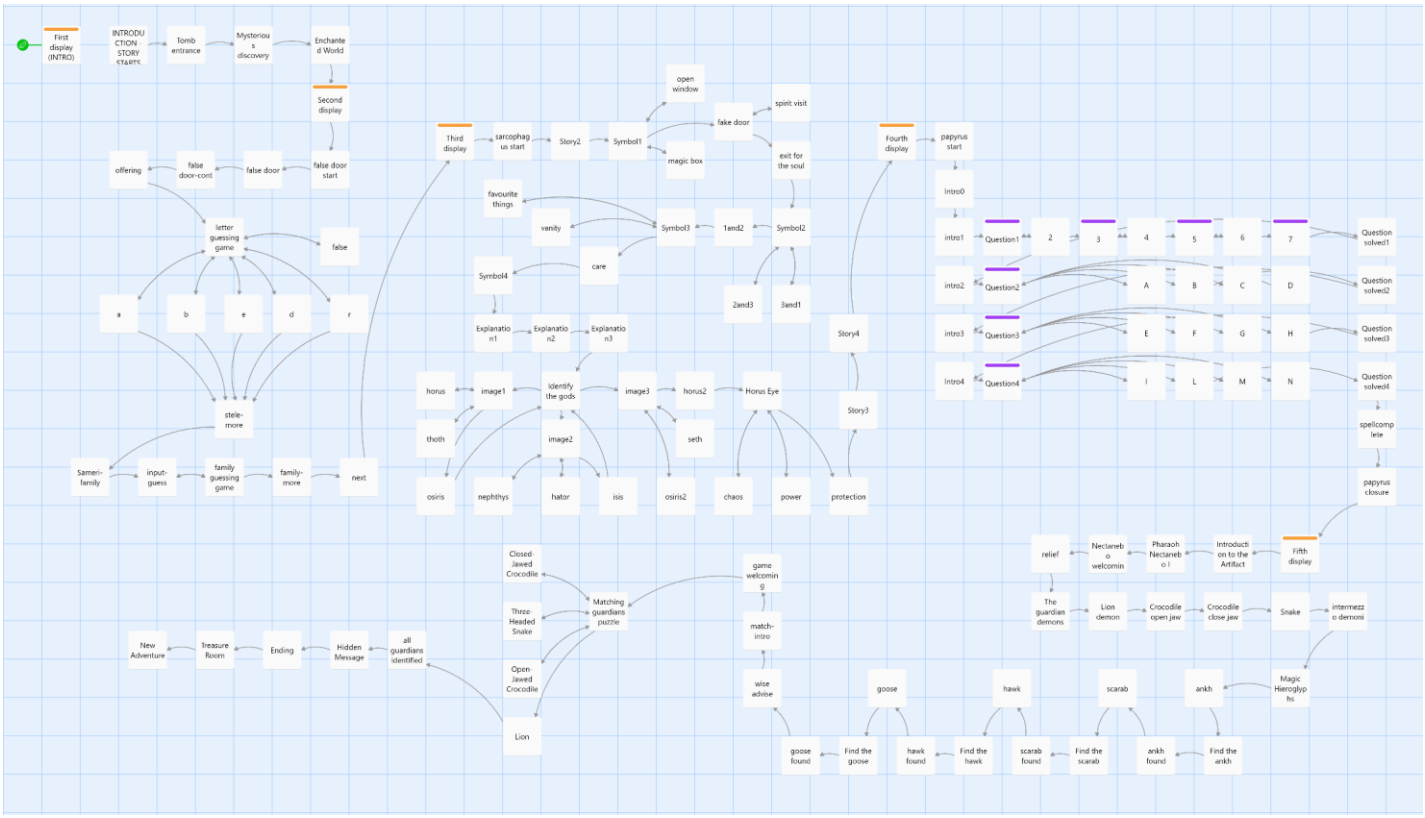


Figure 20. DIVE's Twine overview.

Fictional Personas

To illustrate the user experience, the team created two fictional personas, which are concrete portrayals of the diverse visitors' demographics the experience is targeting, accompanied by their experiences.

PERSONA EXPERIENCE 1 – Martina Rossini

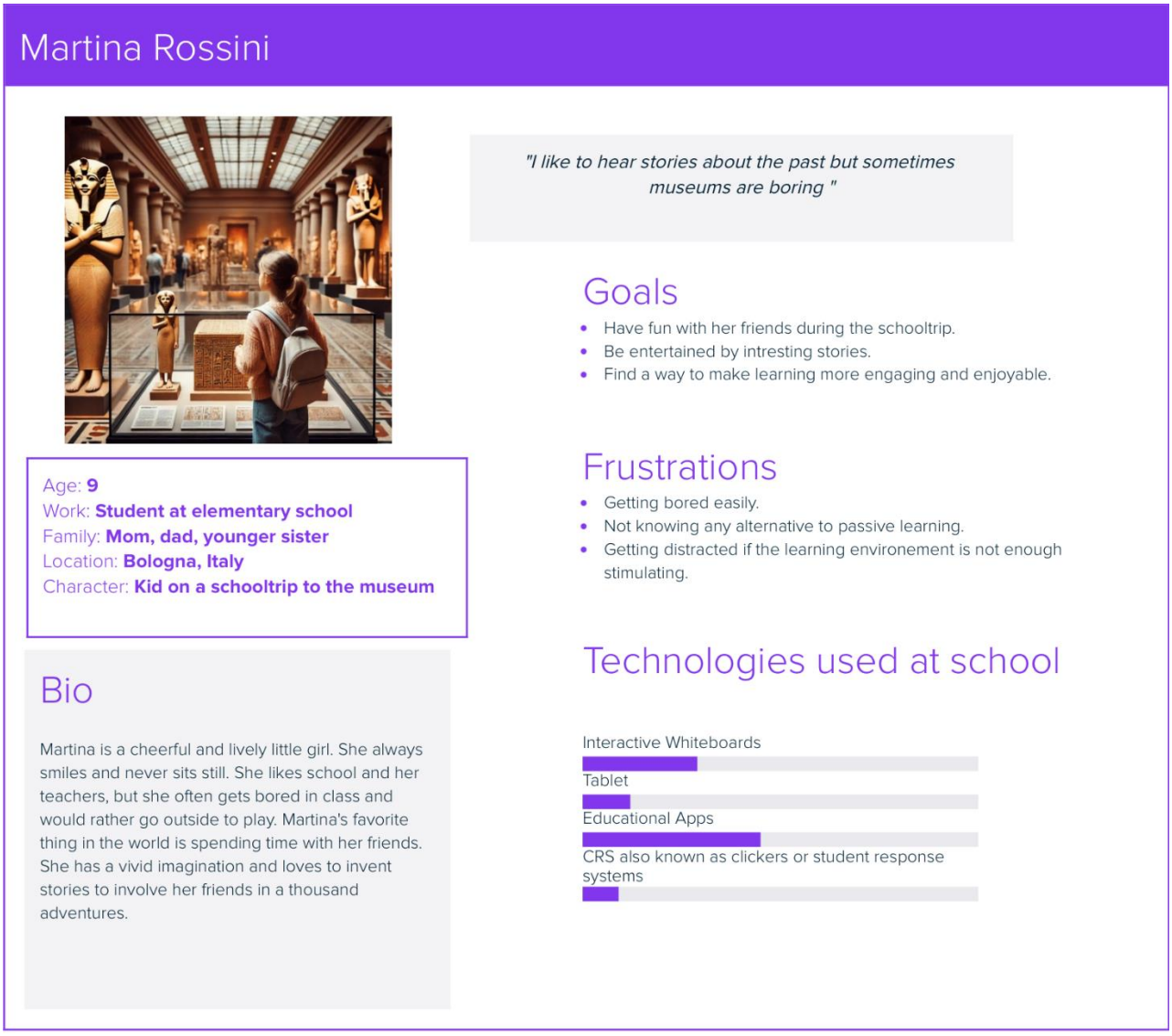


Figure 21: Persona template for the user experience: the student.

Martina represents a typical student who may happen to visit the museum with their class. She loves school trips because they are a fun way to spend time with her classmates while escaping the routine of school. While she finds the artifacts in museums interesting, her idea of a museum visit is just standing still, being quiet, and listening to a guide. This type of setting doesn't stimulate her enough, even though she is curious and eager to learn.

An interactive experience would engage Martina much more effectively. She would become an active participant in activities, following a story that sparks her imagination and satisfy her desire for adventure. This approach keeps her entertained while helping her retain information better. Playing games that require her to put the knowledge she acquired into practice would make learning feel useful and rewarding, as progressing through the story depends on

answering questions correctly. Teaming up with her friends to solve riddles and quizzes will make the experience even more enjoyable, creating a playful atmosphere that fosters collaboration and team spirit.

However, Martina might initially be too distracted by the interactive elements to focus on the actual explanations. But she would soon realize that understanding the information is crucial for playing the games and proceed through the storyline, making the learning process an integral and enjoyable part of the experience.

PERSONA EXPERIENCE 2 – Luca Bianchi

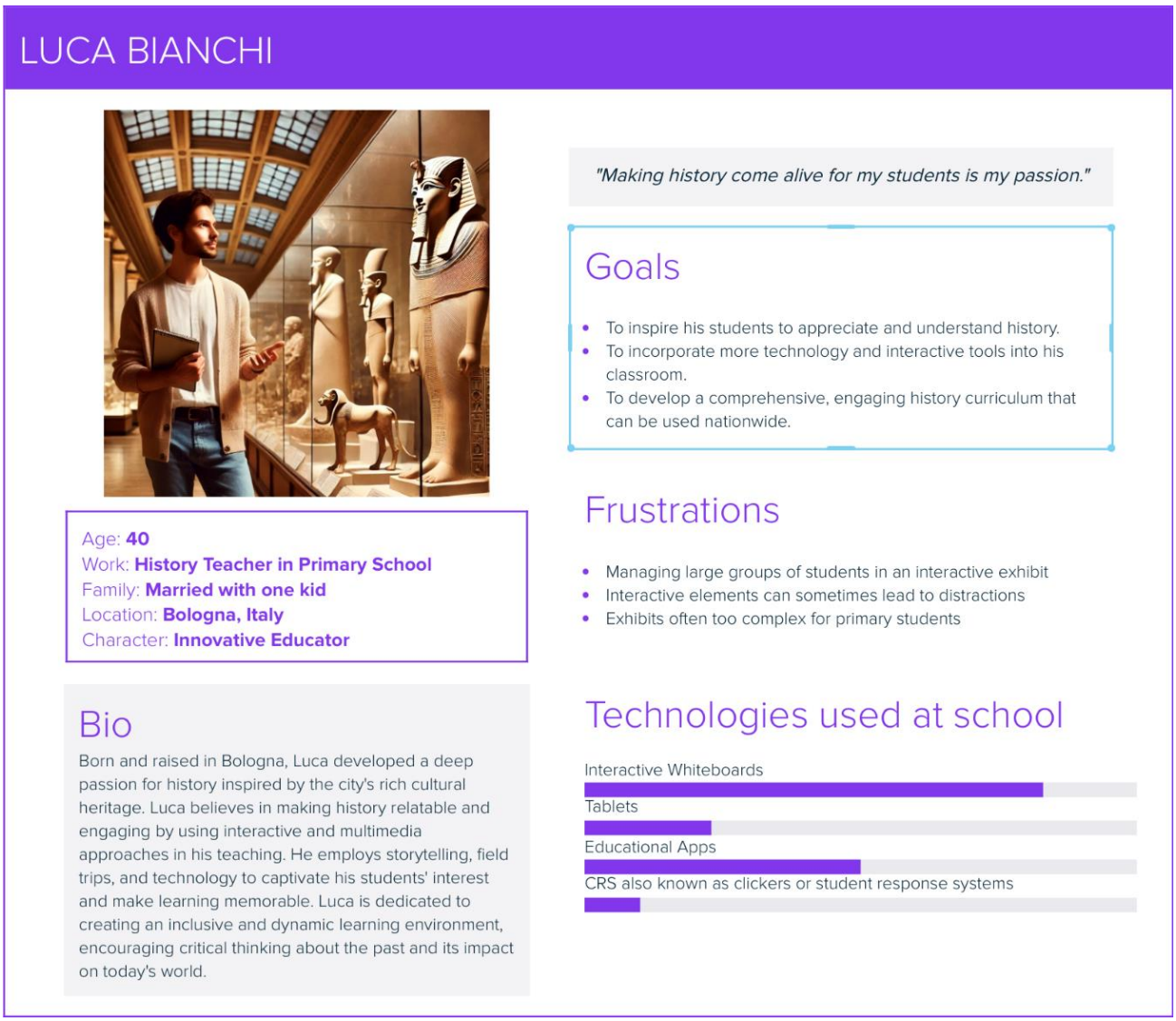


Figure 22. Persona template for the user experience: the teacher.

Luca Bianchi is an ideal persona representing a history teacher visiting the Archaeological Museum of Bologna with his class. His background in history and dedication to innovative

teaching methods make him a prime candidate to engage with the museum's interactive educational tools.

As a primary school history teacher, Luca takes pride in organizing field trips to enrich his students' learning experiences. He views these trips as opportunities to merge his love for history with his goal of making education exciting and accessible. However, the complexity of the information presented in the exhibits, though designed to be engaging, might still be too advanced for primary school children. This often requires Luca to provide additional explanations or simplify concepts on the spot.

The games and interactive elements at the museum are designed to be flexible and adaptable, catering to a wide age range. While logic and reasoning skills develop rapidly at this age, the games are designed to be playable with accurate explanations, even for children as young as six.

Managing a large group of students in an interactive exhibit can also be challenging, especially when it comes to ensuring that all students have equal access to the answering parts and interactive elements without causing congestion. Despite these challenges, Luca will particularly appreciate the touch screens placed next to key exhibits. These screens allow him to integrate digital content with his teaching, aligning with his goal of incorporating more technology into his classroom.

While Luca is dedicated to engaging his students, maintaining their attention throughout the visit might be difficult. Interactive elements, though helpful, can sometimes lead to distractions if not well-managed. Nevertheless, Luca values teamwork and collaborative learning. The museum's setup, which encourages group participation in solving puzzles and answering questions, promotes a collective educational experience, reinforcing Luca's commitment to fostering a dynamic and interactive learning environment for his students.

(c) Conceptual map

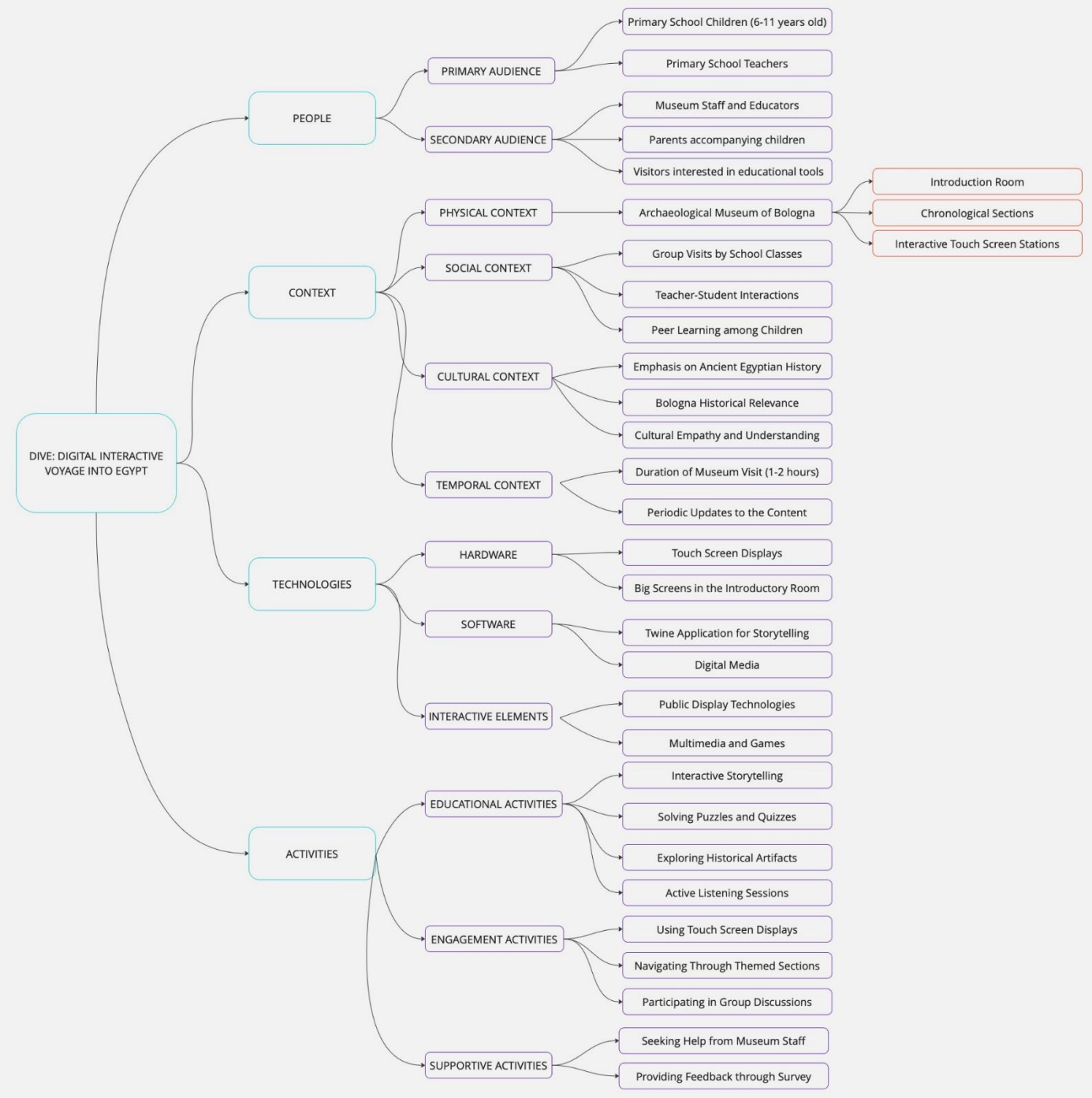


Figure 23: The conceptual map.

(d) The story

This project aims to develop a gamified museum experience centred around the Egyptian collection, specifically designed to captivate children through an engaging storyline and interactive activities. The experience aims to educate children about four significant artifacts by

blending them into an adventurous narrative that balances entertainment with informative content.

Figure 24: Amun, the protagonist of the story.

Introduction

Once upon a time, in ancient Egypt, there lived a young boy named Amun. One day, while playing in the desert near the great pyramids, Amun stumbled upon a hidden entrance to a mysterious tomb while searching for his ball.

Curious and adventurous, Amun decides to look for the ball and to explore the tomb, unaware of the dangers that lay ahead. As soon as he enters the tomb, he jumps into a parallel dimension where time and space are suspended.

Chapter 1: The Mysterious Fake Door of Sameri

As he ventures deeper into the dark corridors, he encounters ancient hieroglyphics, perils and puzzles. Amun finds himself in front of an ancient fake door. The door, covered in hieroglyphics and symbols, was once used as a magical portal for spirits in ancient times.

As Amun studies the door, he accidentally activates its hidden mechanism. A golden light envelops him, and he is transported to the mystical afterlife. To return to the living world, Amun must find another fake door hidden within the depths of the pyramid.

His journey begins, filled with both wonder and peril.

Chapter 2: The Coffin of Irinimempu

Amun discovers a beautifully ornate sarcophagus. The coffin belongs to Irinimempu, a noble from ancient Egypt. As he examines the intricate carvings, Amun notices a depiction of a fake door similar to the one he activated earlier.

Touching the door's image on the sarcophagus, Amun is magically transported back to the world of the living, emerging from the coffin itself. However, his actions have not gone unnoticed – a sinister spirit has followed him from the afterlife. To protect himself from the ghostly pursuer, Amun must find a powerful spell hidden somewhere in the pyramid.

Chapter 3: The Stele Papyrus of Djedkhonsuiufankh

Determined to rid himself of the spirit, Amun runs away and stumbles upon an ancient papyrus scroll. The Stele Papyrus of Djedkhonsuiufankh contains sacred spells and incantations used by priests. Amun reads aloud the spell from the papyrus, invoking ancient magic to banish the wicked spirit back to the afterlife.

The spirit dissipates, leaving Amun free to proceed on his quest. The papyrus, with its faded yet powerful words, serves as a reminder of the enduring power of ancient knowledge.

Chapter 4: The Relief of Nectanebo I

Amun's adventure leads him to the final artifact, a stunning black relief depicting Nectanebo I, a great pharaoh of Egypt. The relief hides a complex puzzle that Amun must solve to unlock the deepest chamber of the hidden tomb.

After decoding ancient symbols, Amun solves the puzzle. The walls of the chamber part, revealing a dazzling treasure room. Gold and jewels glimmer in the light, and ancient artifacts resonate with a mystical glow.

Conclusion

In the centre of the treasure room, Amun finds his lost ball, now glowing with a magical aura. The ball, having absorbed the tomb's ancient magic, symbolizes Amun's bravery and ingenuity.

With the enchanted ball in hand, Amun prepares to return home. As he exits the pyramid and steps into the familiar sands of Egypt, he knows his journey is just beginning.

Amun walks home under a twinkling night sky, ready for future adventures, filled with endless tales of ancient wonders and magical mysteries.

(e) Interaction between the application and the users

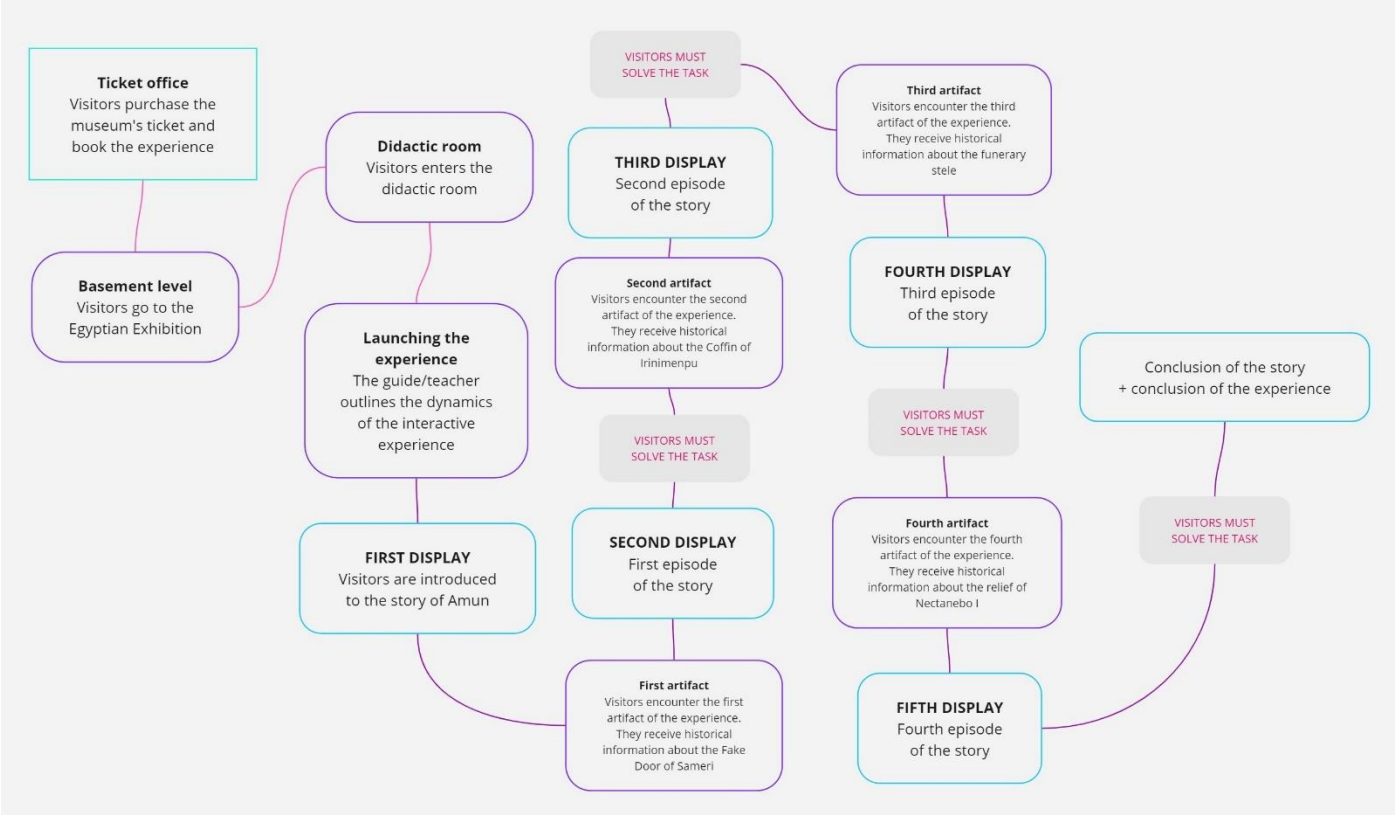


Figure 25: Interaction diagram of the on-site experience.

The interactive experience is designed as a continuous narrative journey from the beginning to the conclusion. This ongoing flow ensures that the storyline progresses naturally as children explore the artifacts. Throughout the experience, guides or teachers have the flexibility to pause the experience at any time to provide additional historical context or elaborate on specific artifacts or sections of the exhibition. This feature facilitates a dynamic learning environment where educational insights can be integrated organically into the adventure, enhancing both engagement and understanding.

(f) Foreseen workflow

This interactive experience is designed for implementation at the Archaeological Museum of Bologna, with primary school children as the main audience. However, it is versatile and can

also be available for booking by single groups and families, but this decision will ultimately be taken by the museum.

The navigation within the Twine application is intuitive, allowing users to interact with it freely. If the museum prefers, visitors can engage with the content without restrictions. However, to ensure the smooth handling of the devices and to maintain order, the presence of guards or attendants in the room will be necessary. If the museum decides that unrestricted interaction with the Twine application is inconvenient, the devices can display an informative screensaver instead. This screensaver can feature photos, information, or short videos, all curated with input from Egyptologists and historians.

The project is designed to function as an educational activity for school groups, enhancing their learning experience with interactive storytelling and historical exploration. The application can also be adapted for individual visitors or families who book the experience, providing a flexible and engaging tool for a wide range of audiences.

In summary, this interactive Twine-based project offers a versatile and educational experience that can be customized to the museum's preferences, ensuring both educational value and operational flexibility.

(g) Set-up: Foreseen hardware, software and Media

The DIVE project is designed to deliver an immersive, interactive narrative experience through the strategic use of hardware, software, and digital media assets. Here's a breakdown of the key components required for successful implementation:

The project requires essential hardware to facilitate user interaction. Specifically, five large touch screens, each at least 42 inches, will be installed in thematic rooms. These touch screens will provide supplementary information and assistance, enhancing the overall user experience.

For the development of the demo, several software tools were utilized:

- Twine: to craft the narrative experience.
- MetaHuman Creator[9]: for creating realistic digital characters.

[9] https://metahuman.unrealengine.com/.

- DeepAI[10]: an open platform that offers a suite of artificial intelligence (AI) tools to enhance creativity for artists, writers, designers, and other creatives. We used this tool for the creation of images, sounds and brief animations for the Twine implementation;
- TTSMP3[11]: a text-to-speech converter that we used to create dialogues of characters inside our story.

At the heart of this initiative are digital media assets that support an interactive narrative approach. Key components include:

- Educational Games: Gaming consoles set up in designated areas of the museum will host educational games related to the Egyptian collection, allowing visitors to engage with the content in a fun and interactive way.
- Interactive Displays: Touch-screen devices strategically placed throughout the museum will offer detailed information about the exhibits, including high-resolution images, videos, and animations explaining the historical context and significance of the artifacts.
- Interactive Screensavers: If full interaction with the Twine application is not feasible, the screens can display informative screensavers featuring photos, details, or short videos curated by experts. The museum will decide on this approach as needed.
- MuseOn App: Smartphones will also be utilized through the museum's existing *MuseOn* app, which provides a wealth of information about the Egyptian collection and can be used by visitors to enhance their experience both during and after their visit.
- Website Prototype: A website prototype of this project can be developed where, by sending a link, all screens are already set up for the interactive experience. This can serve as an additional resource for users to engage with the content remotely.
- Google Form for Feedback: After the user experience, a Google Form[12] will be sent via email to the teacher. This survey will gather specific feedback on the narrative components of the interactive experience with Amun, helping assess the effectiveness of storytelling and quizzes in engaging children.

[10] https://deepai.org/.

[11] https://ttsmp3.com/ai.

[12] https://forms.gle/D5PdCV5vPUfewt2G6.

By leveraging these comprehensive digital media assets, the DIVE project not only boosts educational value but also ensures a captivating and interactive user experience, making history accessible and engaging.

(h) Further development and maintenance issues

To ensure the DIVE project remains engaging, accurate, and educational, several development and maintenance issues need to be addressed.

A thorough validation process with subject matter experts is established to maintain content accuracy and relevance. Historians and Egyptologists review all content to guarantee accuracy and authenticity, supported by an advisory panel for ongoing guidance and review of new content. Ideally bi-annual content audits are scheduled to ensure the material reflects the latest research and discoveries in Egyptology, with a system for quick updates in place to address significant new findings or corrections.

The narrative and interactive elements are regularly tested with children to measure engagement and educational impact, with educators providing feedback to improve the educational effectiveness of the content. User feedback is collected through surveys and feedback, and analysis are done regularly to identify common themes and areas for improvement. To gather specific feedback on the narrative components and the interactive experience with Amun, a Google Form[13] is sent via email to the teacher after the user experience. This form helps assess the effectiveness of storytelling and quizzes in engaging children. The team created this form to gather the perspectives of children and adolescents on guided museum tours and interactive exhibits. The guide or teacher receives the form and makes it available for the children to fill out after their experience at the museum. This collected feedback is then analysed to continuously improve and update the interactive experience.

6. Disruption scenarios

Addressing potential disruption scenarios is also crucial for the project's sustainability. The team has identified different issues, described as follows.

[13] https://forms.gle/SyjLVMyvQTXgUYgF6.

CONTENT - MODERATION

Problem: Limited simultaneous device interaction and the need for expert content moderation during the experience.

Solution: Considering that the experience already requires mandatory booking, a potential solution might involve offering the option to book a museum guide as part of the ticket, so that visitors without a teacher or external guide can benefit from the dedicated assistance of a professional who can ensure content moderation during the experience while also compensating for expertise and assistance.

CONTENT – SHELF LIFE

Problem: The content of the game will become obsolete over time, which could make the content outdated and the experience repeated.

Solution: Updating the content of the experience regarding the narrative and the games about the objects could solve this problem.

RESOURCE – FUNDING

Problem: The project is designed to be experience through several displays placed inside the museum, so the funding required to install the displays could be a problem.

Solution: Applying for government grants, collaborating with private sponsors or receiving funding from corporations could cover this issue.

RESOURCE – RELIANCE

Problem: The experience needs the mediation of a physical guide, that can either be a professional from the museum or the teacher responsible for the children, so it is a problem if there's no professional guide provided by the museum.

Solution: Reaching to an agreement with the schools and/or teachers responsible for the children to be the main source of guidance throughout the experience and decreasing the number of professional guides from the museum or not assigning any guides at all could be a solution.

RESOURCE – SCALABILITY

Problem: If the experience becomes very popular, the current infrastructure of the exhibition can't handle an increasing audience because the physical space of the museum and the number of devices is limited.

Solution: Especially for larger group of visitors, making the booking required or requesting additional fees could help with this issue.

TECHNOLOGY – ENERGY USE

Problem: Consumption of energy by the display devices could potentially be problematic in the long term.

Solution: Using renewable energy sources to power the devices, such as solar panels installed to the appropriate physical space on the museum building, could solve this problem.

TECHNOLOGY – MAINTENANCE

Problem: Day-to-day maintenance of the display devices could be a problem.

Solution: Providing training to the staff and/or the guides for the maintenance of the devices and hiring technicians to take care of the device maintenance could be a solution.

ENVIRONMENT - DISTRACTION

Problem: The physical space of the exhibition can get very crowded and noisy with many groups of visitors going through the experience.

Solution: Designating a number for the maximum people allowed to be in the exhibition or providing bookings with different start times that are separated from each other by a certain amount of time, i.e. 30 minutes, could cover this issue.

TRAJECTORY – CONFIGURATION

Problem: The display devices are only accessible by booking specific time slots, which is designed to accommodate large groups of visitors, so potentially smaller groups of families with children can't access the devices.

Solution: Booking slots specifically reserved for the small groups of people could be allocated. If the reserved slots are full, the visitors could use the website application via their smartphones.

TRAJECTORY – NARRATIVE

Problem: For the visitors to go through the narration of the experience properly, different elements of the experience must be completed in a specific order, which could potentially be difficult to figure out or find.

Solution: Placing numbers on the display devices according to the order they should be interacted with could fix this issue.

7. Team roles and work

Valentina – Workflow Design, Documentation (3. The Concept), Twine storyline (Coffin of Irinimempu), Child/student Persona template

Elena – Workflow Design, Documentation (2. The Audience, 5. Ideation), Twine storyline (Funerary Papyrus), Photographic acquisitions, Teacher Persona template

Ezgi – Workflow Design, Documentation (4. Requirements, 6. Disruption), Twine storyline (Fake Door of Sameri)

Lucrezia – Workflow Design, Documentation (Abstract, 1. The context, 5.e Interaction Diagram), Google form, Media Research, Twine storyline (Relief of Nectanebo), Photographic acquisitions, Website presentation

The digital asset of this project is available at the following GitHub repository:

- https://github.com/4-SEASONS/DHDK-DigitalHeritage-gp24.

8. UX Scenario in Twine

Here you can find the link to the Twine scenario:

- https://4-seasons.github.io/DHDK-DigitalHeritage-gp24/Twine.html.

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https://museoegizio.it/esplora/notizie/visita-il-museo-egizio-con-le-bussole-di-carta/

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