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REVAthens: Bringing Athens of the Revolution to Life Through Museum Theatre Methodology and Digital Gamification Techniques

Andromache Gazi¹, Thodoris Giannakis², Ilias Marmaras³, Yiannis Skoulidas³, Yannis Stoyannidis⁴, Foteini Venieri¹, and Stewart Ziff^{3(⊠)}

 ¹ Panteion University of Social and Political Sciences, 136, Syngrou Avenue, 17671 Athens, Greece
² Athens, Greece
³ Personal Cinema, Athens, Greece
⁴ University of West Attica, Agiou Spiridonos, Egaleo, 12243 Athens, Greece

Abstract. REVAthens is a project that lies at the intersection of history, public history, museum theatre, gamification, and digital narration. It aims at creating alternative readings of the Revolution and at highlighting different approaches to it through the narrative of historical characters who lived at the time. REVA-thens aims to renegotiate banal narratives of the Revolution by highlighting new perspectives on historical events and historical subjects that may challenge and/or break down previous perceptions and/or stereotypes. The project utilizes the methodology of museum theater with the aim of shaping examples of historical subjects who lived during the Revolution of 1821 in Athens and who mediate their experiences to a contemporary audience through a digital application with game elements.

Keywords: Museum theatre · Gamification · Digital narration · Public history

1 Introduction

Funded by the Hellenic Foundation for Research & Innovation, within the frame of a large-scale research action for the bicentenary of the 1821 Greek Revolution, REVAthens aims at creating alternative readings of the Revolution and at highlighting different approaches to it through the stories of historical characters who lived at the time.

More specifically, REVAthens is an interactive digital "tour" of historical events that took place during the siege of Athens by Kioutachis in 1826–1827. Selected

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Thodoris Giannakis-3D Artist, Game Developer. Ilias Marmaras-Game Developer and Researcher, Member of the Personal Cinema Collective. Yiannis Skoulidas-Programmer, Game Developer, Member of the Personal Cinema Collective. Foteini Venieri-Post-doc Researcher. Stewart Ziff-Artist, Game Developer, Educator (New and Emerging Media), Independent Researcher, Member of the Personal Cinema Collective.

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characters represent historical subjects who lived in Athens at the time "share" their personal experience with contemporary visitors of the city and present their view of the events. Their stories and narration are based on contemporary historiographical and museological approaches, and will be activated through a digital interactive application, which will make use of gamification and museum theatre techniques.

The application is targeted to a large audience and offers users the ability to connect visible material remains and/or specific historic events with first-person evidence as narrated by different characters who experienced the 1826–1827 siege. In this way, we intend to offer an understanding of the multiple influences (social, economic, and cultural) that the Revolution had on the daily life of the inhabitants of Athens (both Christian and Muslim) and to provide a new interpretive approach to historic events and/or biographies of the period. Our goal is to help a present-day audience to view this significant period in Greek history under new light and to comprehend the changes that such an upheaval brought to the lives of common people. Through the example of Athens, we aim to direct the audience's attention to the microhistory of a national revolution. By choosing the 1826–1827 siege of the Acropolis, in particular, we also want our audience to see the classical monuments through the prosaic eyes of the commoner, an illiterate soldier for example, or a housewife of the early 19th century.

By incorporating contemporary academic research into an application targeted to non-specialists, the project aims at heightening historical consciousness through processes that encourage a renegotiation of the past and, at the same time, a new perspective on the present and the future [1-3].

2 The project's Rationale and Theoretical Grounding

The Revolution of 1821 was a milestone in the formation of the Greek nation-state, the subsequent construction of the official national narrative and identity. This was an ideologically charged period, which in recent decades has been re-framed theoretically and methodologically, resulting in the creation of new readings [e.g. 4-9 p. 233-234, 10, 11]. These new readings have formed a framework within which the dominant historical narrative begins to recede under the weight of the acceptance of alternative stories and interpretations. Traditionally, the historical biographies of the period constitute in their vast majority "an image of unreal heroes, an image of emblematic and timeless figures of the Greek nation" that "the biographers do not integrate organically into the society of their time"; so, they have become "heroes" with non-historical characteristics" [9, p. 234]. On the contrary, social history allows the exploration of how everyday people experienced the Revolution [12-15]. This view is informed by contemporary developments in the fields of history and museum studies and is associated with the emergence of "invisible" aspects of the subjects' experience. It is part of the general context of "history from below" that contrasts itself with the stereotype of traditional political history and its focus on the actions of "great men" [see, among many, 16]. It is also firmly associated with the development of public history as the study and presentation of historical research to non-specialist audiences, in a variety of forms, most often (but not always) falling outside the realm of academic history.

In terms of presentation, public history exploits a broad range of deliverables including museum exhibitions, film, historical fiction, and virtual products [17 p. 50, 18].

Furthermore, the turn towards a more inclusive history goes hand in hand with the trend towards the democratization and "humanization" of museum narratives [19–23]. This view does not aim at a "representation" of the lived past, but at the production of knowledge about it [18, p. 274–282]. In the field of museology, in particular, this trend is accompanied by the search for interpretive tools, able to mediate not only verbally but also tangibly the multi-layered character of experience [see, for example, 24], linking the specific to the general.

This need is well met by museum theater, a form of interpretive theater that can condense and communicate directly multiple levels of historical narrative. Museum theater includes a range of methodological tools that allow for the creative management of narrative material, going beyond the limits of other communicative and interpretive approaches. In particular, it can encourage reflection on the tangible, emotional, aural and visual dimensions of memory [25, 26]. Besides historically, theatre does not merely supply information; it contextualizes information (or objects) "intellectually, emotionally, socially, politically, spiritually and aesthetically" [27, p. 13].

Museum theater has also proven to be a valuable tool for interpreting difficult and sensitive topics [28, 29]. A prerequisite, however, for activating these possibilities is that appropriate planning has preceded it. Museum theater is a medium that can serve a wide variety of purposes and approaches: it can create a "closed" and/or nostalgic image of the past or, conversely, raise questions and reflections about historical narratives, emphasizing the complexity of historical processes [30, 31]. In recent decades, the approach to broader historical and social issues through museum theater has developed significantly, morphologically, and functionally, because of the social and cultural role that contemporary museums¹ and heritage sites are called upon to fulfill. The recognition of the multiple meanings and functions of cultural heritage has led to the formation of an ethical framework, linking culture and society and, consequently, the museum to the social environment to which it belongs [32–37]. This recognition was followed by an investigation of the role of museums "in tackling specific manifestations of inequality, such as racism and other forms of discrimination", and the impact of museum activities in the lives of individuals and communities [36, p. 3].

The methodological utilization of museum theater in our project allows for the creation of digital material, based on primary and secondary research on the experience of protagonists of the 1821 Revolution and residents of Athens at that time. The main merit of this method is that it allows the interpretation of the attitudes, expressions, perceptions, linguistic and extralinguistic codes, and the cultural practices and beliefs that accompany the material remnants of the past. In this way, we may challenge canonized narratives and acknowledge the inherent controversy and dissonance in what is accepted as historical heritage [38]. The following example, which refers to the first

¹ The term "museum" is used in accordance to the definition provided by the International Council of Museums: "A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment" [39].

siege of the Acropolis in 1821, is presented here as indicative of historical accounts that undermine embedded popular beliefs on national history and the national self.

2.1 An Example - The Siege of Athens

Source: [40, p. 8–13]².

"In May 1821, the Muslim inhabitants of Athens were fortified inside the Acropolis. The besiegers were determined to persevere until the siege ended. For this reason, the imprisoned concluded that the only way was to seek military help from other cities. Thus, on the night of May 15, they managed to advance through Greek troops 15 of their fellow citizens who boarded a ship and traveled to Karystos. Finally, they informed the local authorities of Chalkida and requested the sending of military aid. The prospect of the assistance of Ottoman troops revived the morale of the besieged.

On May 27, with the start of the Muslim holiday of Ramadan, the besieged released 30 Greek women who were being held hostage and asked that they be exchanged with their fellow believers. The fighters welcomed their compatriots but did not comply with the request of the besieged, as they considered it [the request] a sign of weakness and physical exhaustion from hunger. Finally, on May 30, the rebels' estimates were vindicated, as some Ottomans left the castle and attempted to transport food into the Acropolis. The attempt was unsuccessful, as fighters repelled them and killed two Muslims.

In June, news of the encampment of Ottoman forces in Boeotia upset and sparked new plans on the besiegers' lines. The water tank of the Acropolis was targeted in their sights, so as to cause water shortages to the besieged. On July 2, despair from hunger and thirst caused the besieged to leave again. The rebels killed an African man of African descent, beheaded him, and placed his head in public. The Muslims responded with retaliation. They beheaded 10 Greeks who were held prisoner in the Acropolis and raised their heads against the revolutionaries. These two practices brought the corresponding results to the morale of both sides. The rebels rushed to the home of the Austrian consul, where 15 Muslim residents of Athens had taken refuge.³"

The descriptions of Spyridon Trikoupis reflect a version of the revolutionary period in which the Acropolis as a landmark delimits relations between Muslims and Christians within the same city. In the everyday reality of the revolutionary period the ancient monuments on the Acropolis stood more as a military fortress than as a monument and custodian of the ancient Greek past. Experiences of hunger and thirst determine the military tactics of those involved, who, to exert pressure, become increasingly violent towards the other side. The tactics of beheading and showing the heads to the other side reveal the uses of the body to enforce the power of each faction. Everyday life in the city seems to be very different and in conflict from what we know.

REVAthens aspires to bring such largely unknown, ignored or even hidden aspects to the fore through different narratives. For example, through the narration of a Greek soldier, an Ottoman resident, a Greek woman, a Muslim servant etc., which the visitor can choose at will, when he/she is in a place of historical reference around the rock of the Acropolis. Thus, according to visitors' choices, different approaches to the

² For a close look at the facts that preceded the siege of Athens, we may take into account the narration of Spyridon Trikoupis (1788–1873). He was a renowned politician of these times (he served at the post of Governor, of Foreign Affairs Minister and in his late years as the Greek Ambassador in London) who participated actively in the procedures that built the first Greek Kingdom.

³ Translated by the authors.

historical experience emerge. The visitors will not only have the opportunity to listen to the narratives, but also watch what is happening on their screen through a series of three-dimensional and two-dimensional simulation scenes with gameplay elements (see below).

Finally, our project proposes a gamified approach to the field of history and heritage interpretation. Gamification is a relatively new term in the lexicon of game studies describing "the use of game design elements in non-game contexts" [41] with broad definition freely encompassing concepts of games and playfulness as fundamental elements of society and culture. While the term finds narrow use in contemporary discourse to describe participatory approaches in consumer marketing practices (eg: collecting frequent flyer reward points, liking and unliking in social media), we consider a more general understanding of gamification, informed by the work of the French sociologist Roger Caillois (1958) who proposed play (in the context of games) as activity that is: free, separate (within defined limits of space and time), uncertain, unproductive (creating neither goods or wealth), governed by rules, and make-believe (invoking the imagination). Caillois' work draws from the earlier ideas of Johan Huizinga (1949) who used diverse examples such as lawsuits, dancing, and the military battlefield to show how civilization arises and unfolds in and as play.

3 Methodology

Our research methodology has been structured as follows:

- 1. Research and application of modern historiographical and museological approaches to the processing of historical material.
- 2. Selection and shaping of subjective narratives with the methodology of museum theater.
- 3. Research and configuration of the digital application.
- 4. Pilot evaluation with members of the public.

Our approach is informed by contemporary research into the overall quality of the experience of visitors in museums and places of cultural reference; particular emphasis is placed on data confirming the dynamics of the personal involvement of visitors with the content of digital applications, as well as their ability to interact with this content in unusual ways. In addition, we exploit the possibilities offered by multisensory experiences to users of digital applications, especially when they are used in a natural environment [42–49].

The methodology for designing subjective narratives includes the following stages: primary and secondary research, role formation, configuration of the script. After gathering the historical material and data, some characters are selected, imaginary or real. The key criterion for the selection is the ability of these characters to illuminate different aspects of historical processes in a critical, reflective, and comprehensible way for different groups of people. "Imaginary" characters are defined as characters that did not exist but could have existed. Such an example is a female character named "Kyriaki" (see below), as, according to testimonies, in September 1826 about 500 women and children remained on the Acropolis [50, p. 153]. It should be noted here that "imaginary" characters are created by using the method of "documented hypotheses" [51]. Finally, the script is developed in three levels: dramaturgic, narrative, emotional.

The selection of characters, locations, scenes, and dialogs is followed by the development of the digital application. This includes shaping the digital environment and the digital characters, adding sounds, music and recorded dialogues, programming in the Unity game engine, programming for application on the android and iOS platforms, and integrating a geolocation system, which will allow the visitor to access the different scenes and subscenes of the application when he/she is at specific places around the rock of the Acropolis.

Finally, the pilot evaluation will employ both quantitative and qualitative methods and will use semi-structured interviews, focus groups and questionnaires with members of the public. In addition, quantitative data on the length of the users' engagement at specific points of interest, the degree of their interaction, etc., will be collected from within the application. Moreover, the website of the application will host a *forum* for exchanging comments among users, while an on-line questionnaire will also be available for their feedback.

4 The Digitization of Subjective Narratives

The digital form of historical narratives in our application is a series of threedimensional and two-dimensional interactive simulation scenes with game elements, analogous to those found in modern historical video games⁴. As already explained, the narrative structures and the historical content will be based on the methodology of museum theater.

Unlike traditional historiographical narratives, historical games have become one of the most widespread and successful forms of public history. This, in combination with the choices of their historical content, may make them particularly influential as narratives, which are also experienced in informal settings [24]. Video games and similar playful applications are a new form of historical text, which changes the ways in which history is perceived by the general public [52]. They are more of a simulation and "modeling" of experience rather than representing it as text and image. Not only do they cultivate the imagination over alternatives, but they provide practical tools that may prove useful for their realization.

⁴ Such as Assassin's Creed Valhalla (2020 Video Game), <u>Ghost of Tsushima</u> (2020 Video Game), <u>Assassin's Creed: Odyssey</u> (2018 Video Game), <u>Call of Duty: WWII</u> (2017 Video Game), <u>Assassin's Creed II</u> (2009 Video Game).

REVAthens' digital application will have two parts: First, a website, which will contain brief explanations of background research illustrating the new interpretive approach to the specific historical material derived from it and intended to be included in the digital simulation scenes of the application. Second, the simulation of historical *loci* and events that will form the main content of the application. The aim is for the player to interact with the elements of the game (game elements) without being disconnected from the narratives of historical events. In other words, the game simulations leave the player free to explore and understand the broader context of historical events.

The website will also host the game elements and code that will be created for the simulation. That is, the characters, objects, architecture, topography, and elements of the natural environment (fauna & flora), which correspond to the historical events that are simulated through the application. The data will be freely available with an appropriate license of Creative Commons in educational and cultural institutions so that they may be applied for possible extensions of the application model in other regions of Greece, or for other creative uses. Commercial use of the data could also be considered after consultation with the project stakeholders.

The application will be available on the website for download, storage and use on mobiles, tablets, and computers. When not in the physical space related to any of the historical events, the user will be able to use it with limited access to the content, either through partial access to the total content of some scenes, or through short animations related to the scenes, or a combination of both. The application will be activated, "unlocked" and fully accessible when the user directly visits the site, with geolocation data enabled.

5 The Structure of the Application

The game-space of the application will consist of two (or more) primary, independent, interactive scenes, and several subscenes related to them. All scenes and subscenes will be based on the approach of museum theater; they will relate to historical incidents as recorded in different descriptions; each incident having occurred at a specific location in the area around the Acropolis.

A primary scene defines the real-time experience by the user of the game scenario and will be located either at the North part of the Acropolis or the South part. The historical content of the narrative embedded in a primary scene will have taken place within these specific locations during the period of the third siege of the Acropolis in 1826–1827. It is at these physical locations where the primary scenes are set, that the geolocation tracking will be activated, and where the player will then be able to run the full section of the application related to that scene and its subscenes (Fig. 1).

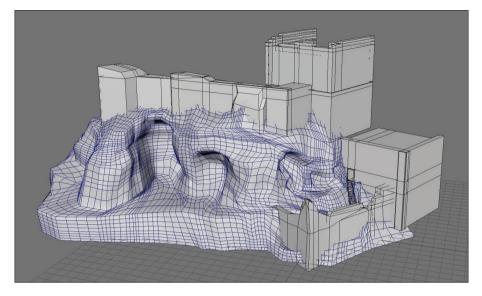


Fig. 1. North side of the Acropolis; game environment, low-detail early model.

A subscene will relate to a primary scene by extending its narrative scenario and gameplay. Subscenes may be situated around the Acropolis, but not necessarily. The potential of digital technology to topologically connect distant geographical areas allows the construction of scenes beyond those that took place at the specific location (of the Acropolis), but that are directly related to it. One such example is the meeting of Kioutachis, Karaiskakis and Derigny at the latter's flagship in the Faliron Bay. This can be named as a moment of great importance, if we acknowledge that most people deem that enemies always meet in fierce battles but never under the same roof. Georgios Karaiskakis was a Greek guerilla uplifted to a General at the time of the siege and represented the side of the revolutionaries. Kioutachis Pasa was a great General of the Ottoman army that claimed Athens in the name of the Sultan. Marie Henri Daniel Gauthier comte de Rigny (known by the Greeks as Derigny) was a brave General and later Admiral of the French Navy. He arrived at the time of the siege of Acropolis and in the battle of Navarino and proved a helpful friend of the revolutionaries. A subscene can be also frame a "leap in time" in which events can be simulated that took place at a different period, e.g. during the first or second siege of the Acropolis (1821–1823) when the Ottomans were besieged by the Greeks. Furthermore, a subscene may simulate other spaces, locations and time periods that are historically related to the social and cultural context of the revolutionary period, and which help to better understand the conditions of the 1826-1827 siege. For example, the visit and stay of FrançoisRené de Chateaubriand in Eleusina around 1803, or the architecture of the Athens market bazaar and the social life of the inhabitants of Athens in the early 19th century.

A primary scene in development is situated around the Klepsydra, a well spring inside a cave located at the North part of the Acropolis near to the Propylaea. It was discovered under the leadership of Odysseus Androutsos most probably in 1822 and is related to various stories and events, e.g. the conflict between Androutsos and his deputy chief Yannis Gouras that led to the imprisoning and finally the death of Androutsos (Figs. 2 and 3).

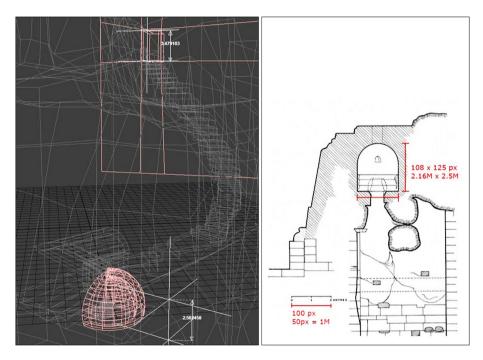


Fig. 2. Klepsydra well-house; development model with source schematic; based on Parsons (1942: 257).

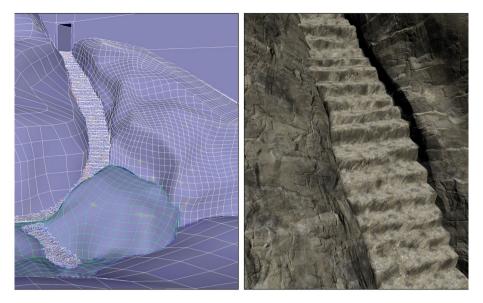


Fig. 3. Klepsydra scene; Stairway working model.

An actual example of narrative action being developed with the methodology of museum theater and taking place in the Klepsydra scene is composed of the following elements. Two main characters, Manolios and Kyriaki, meet inside the cave where Kyriaki is raising water from the well. It is December 1826 and the conditions for the besieged are very harsh. The dialogue that they have, which the player may follow, may be about:

- The development of the siege, and the battles and skirmishes.
- The months long epidemic among the besieged on the Acropolis.
- The doctor who is among them and tries his best.
- Androutsos and his role in the discovery and fortification of the well spring.
- The death of Gouraina (the wife of Gouras).
- The competition and conflict between Gouraina and Androutsaina (the wife of Androutsos).
- The presence of the French soldiers of Fabrier that are with the Greeks on the Acropolis.
- The torture and killing of the historical character Iousouf (Figs. 4 and 5).

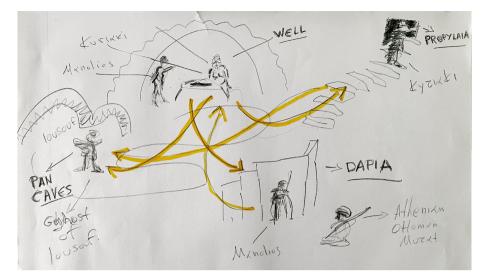


Fig. 4. Klepsydra primary scene, North side of Acropolis, early gameplay representation.



Fig. 5. Klepsydra scene; draft sketch of female figure ("Kyriaki") in the well.

The dialogues in the primary scene of Klepsydra (and generally within all scenes and subscenes) will not only narrate significant events occurring during the 1826–1827 siege: as a matter of gameplay, they will provide hints for the player to understand where to navigate within the simulated game-space, which character (avatar) to follow,

and by doing so, to visit the totality of the simulated terrain. In other words, dialogues together with the simulated environment form an inter-relational network between primary scenes and subscenes that the player can explore, to understand the conditions of the specific momentum of the Revolution (Fig. 6).

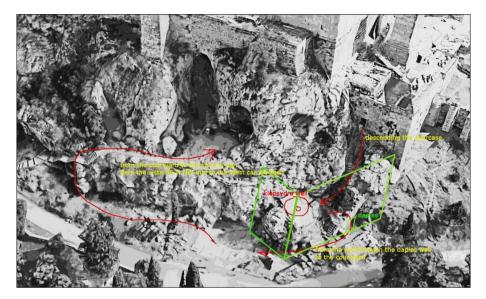


Fig. 6. Klepsydra scene; game play scenario, development map.

It should here be noted that while the creation of the application will utilize the same digital production tools employed by the commercial games and film industry, the development of the project differs from more commonplace approaches with a unique, non-linear methodology to its' workflow; this reflects the inter-disciplinarity of the core team of a historian, a museologist, a museum theater practitioner, and four video game developers. Each member of the team brings to the project their expertise as specialists in their particular areas of practice; however, the process of research and each stage of development is occurring in a collaborative space of ongoing conversational exchange.

6 Application Development and Workflow

Multiple references will be used as source material for simulating the physical environment with an attention to the visual accuracy of the representation. Contemporary maps, aerial photography and other resources will be utilized to model the geological topography of the space (Google Earth etc.). Late 18th and early 19th century drawings, etchings, and watercolors of traveler visitors to Athens together with contemporaneous written accounts and early Daguerreotypes will inform the location, form and accuracy of architectures, objects, and other constructions [53–56, etc.].

The artistic style of the graphics, and the audio-musical part which will create the interactive environment of the application, will play a key role in the user experience differing from corresponding simulations found in commercial historical video games. While the aim is to visualize the space with an informed concern for historical accuracy consistent with the historical and cultural reality of that time, the intention is not to simulate with hyperreal verisimilitude, but instead to consider the virtual space as akin to a theater stage and to digitally paint the environment with the aesthetic of a theatrical look and feel. We note here that the term "hyper-realistic" refers to a specific genre of modeling simulation used extensively in the videogame industry. These graphics aim to simulate the appearance of reality, often aiming to exceed it, showing details of the avatars and the simulated environment to a high degree. The scope of this effort is to captivate players via the verisimilitude of the graphics in the simulation, increasing their immersion in the game/world. Hyper-realistic graphics have been strongly criticized for interfering with the game play, distracting the player, and turning the gamespace of the video game into a mere spectacle [57]. We aim to simulate the historical reality of the period, but not to put the accent on its spectacularisation⁵.

Motion capture techniques will be used to facilitate a naturalism with the movement, actions, and facial animation of the avatar characters. Ethnographic considerations will inform the development of the appearance, personality and character of these virtual actors who will be dressed in common everyday clothes reflecting the distress of ordinary people during a period of revolt and under siege. The creative process of clothing digital avatars is analogous to the use of two-dimensional patterns in theatrical costume design. Real-world costume patterns will be scanned and utilized to digitally model virtual clothing.

Application development with gameplay elements allows for non-linear scene sequencing. This means that a user can make choices regarding pathways and characters to follow. Scenes can be developed that reflect different points of view to simulated events. For example, a user can choose to follow an Ottoman and a narration of his/her account of an event, traversing the environment and encountering activities and spaces that reflect their lived experience; or otherwise to follow that of a Greek engaging with his/her particular perspective and experience, or to follow one after the other. In this way, the player can gain insight into the multifaceted and multimodal record and account of historical events.

A key opportunity for a user of the application is to see for themselves how different the space of historical events appears today from how the space appeared during the revolutionary period. Geolocation data and GPS compass tracking of the handheld device will permit a coordinated registration of the user's line of sight so that the virtual camera of the simulation frames the same point of view the user has of the real-world space they are situated within (Fig. 7).

⁵ *Cf.* "If once we were able to view the Borges fable in which the cartographers of the Empire draw up a map so detailed that it ends up covering the territory exactly [...] this fable has now come full circle for us, and possesses nothing but the discrete charm of second-order simulacra. [...] It is the real, and not the map, whose vestiges subsist here and there, in the deserts which are no longer those of the Empire, but our own: The desert of the real itself..." [58, p. 1].

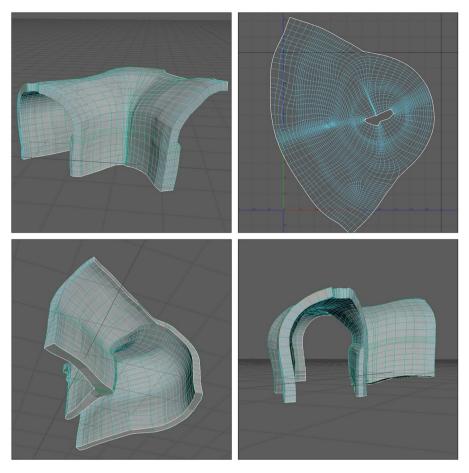


Fig. 7. Klepsydra well-house tunnel; development model.

7 Conclusion

REVAthens aims to fill a significant gap in the research, acquisition and dissemination of documentation related to the 1821 Greek Revolution. It also seeks to place historical episodes of the Revolution into the socio-economic environment of the time so that they are disconnected from the typical national narrative. The project's originality lies in the creation, for the first time at an international level, of a digital interpretive tool assisted by the methodology of museum theater to form new, differentiated views of historical events. These will be accessible to different groups of people and will integrate contemporary historiographical and museological approaches into subjective narratives in a playful and comprehensible way. Through this process an understanding of different aspects of the past and the critical engagement of the visitor with the historical narratives are encouraged. The transfer of historical characters, narratives, the environment and the landscape of the time to the digitally played environment of the scenes that will structure the application, is an experiment of merging elements of environmental art and museum theatre in digital space and time. In this context, the historical and social events concerning Athens during the 1826-27 siege in combination with the landscape, the flora and the fauna, constitute the canvas for highlighting sensory experiences and for offering a multi-layered perception of the events and their effects.

The combination of the users' tour of the natural space of the action (for example, in places around the rock of the Acropolis) with the virtual simulation can connect the spectacle with the experience. Through the application, users can be "immersed" in the historical space-time of the action, without this preventing them from perceiving the present time and space at the same time, thus providing ground for a critical approach.

The potential of the project to realize a new digital genre of encounter with history leverages off emergent advances with the computational technologies of mobile computing to support a portable, immersive, augmented audience experience. This model can then be used by other organizations (e.g. municipalities, museums, cultural agencies, etc.) and/or cultural heritage professionals at relatively low cost, while the application may also be a valuable tool for the development of cultural tourism.

Overall, REVAthens concentrates on the transformation of historical research into subjective narratives, which employ the immediacy of theatrical discourse to give the historical content new perspectives.⁶ It aims at developing a different way of capturing the historical narrative available to different groups of audiences by creating an engaging interpretive tool within the larger field of public history, seen broadly as "all the ways in which history is made available to a non-specialist public" [59, p. 192]. From this perspective, the project is an innovative application in this field and an interpretive "tool" that can be a model for communicating history to a wider audience.

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⁶ Thus far theatrical techniques in Greek museums and heritage sites have been limited to the dramatization of related literary texts. See, for example, "From the silence of the showcase to the theatrical speech" co-organized by the Benaki Museum and the National Theater: https://www.nt.gr/el/news/?nid=1955&st=160, last accessed 2020/11/9.

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