MemorHirpos: a mini-game for kids on Cultural Heritage of Alta Irpinia.

Mario Casillo
DiSPaC
University of Salerno
Fisciano (SA), Italy
mcasillo@unisa.it

Francesco Colace
DiIn
University of Salerno
Fisciano (SA), Italy
fcolace@unisa.it

Constanza Fiorella Duarte Petti
Interamerican Open University
Buenos Aires, Argentina
constanzafiorella.duartepetti@
uai.edu.ar

Annachiara Guerra
DiSPaC
University of Salerno
Fisciano (SA), Italy
anguerra@unisa.it

Michele Pellegrino
DiIn
University of Salerno
Fisciano (SA), Italy
mipellegrino@unisa.it

Giusy Strollo
DiIn
University of Salerno
Fisciano (SA), Italy
g.strollo9@studenti.unisa.it

Abstract – **The digital environment and serious gaming offer valuable opportunities for enhancing and engaging with cultural heritage. Web-based platforms such as MIT App Inventor support the development of custom educational mini-games through a client-server architecture and visual programming, enabling deployment on mobile devices and fostering interactive learning. In this context, a game specifically designed around the cultural heritage of Alta Irpinia serves as a tool for educational outreach, combining technological and humanistic expertise to strengthen the connection between communities and their historical landscape, and positioning museums as dynamic cultural hubs.**

Keywords – gamification, serious game, cultural heritage, archaeology, edutainment

I. Introduction

The pedagogical potential of play-based experiences is increasingly recognized in contemporary education, especially through gamification and game-based learning, which promote knowledge acquisition via digital tools. Edutainment and serious games integrate educational principles to facilitate interactive and engaging learning, representing innovative instructional designs that foster active participation [1, 2].

Advancements in immersive technologies and virtual reality have elevated edutainment games to a strategic role in museum communication, offering alternative engagement methods primarily aimed at younger audiences. The appealing nature of video game language and gameplay dynamics helps sustain attention on exhibits both on-site and remotely, encouraging active interaction with Cultural Heritage (CH) content [3].

A variety of game formats can be adapted to museums on CH [4], ranging from simple quiz and puzzle minigames to complex narrative adventures and simulations within photorealistic digital environments [5]. In these immersive formats, exploration and problem-solving drive the user experience.

In this paper, it is proposed the development of a mini-game dedicated to the archaeological CH of Alta Irpinia region (Campania, Italy), aiming to enhance and disseminate knowledge of its archaeological treasures through an interactive and accessible gaming experience.

II. Why a memory game for CH?

Europeans' museums and archaeological parks have shown growing interest in adapting video games for cultural heritage contexts [6]. The adoption of quiz and puzzle-based gameplay, including riddles, matching, and sorting applications, has been driven by the intuitive and familiar mechanics such games offer, especially to younger users. The educational objectives pursued are supported by immediate visual graphics and a simplified content structure, thereby fostering cognitive learning processes through game levels designed to stimulate logical reasoning and visual-spatial skills [7].

Among the most effective educational game models in the quiz/puzzle category for engaging children aged 4 to 10 are memory games [8]. These formats promote cognitive training by encouraging participants to recall and match items based on their content, thereby transferring new information and enhancing memory retention in a playful, stimulating context.

III. Tools and Methodologies

In the design of this game, three fundamental elements were taken into consideration: the minimum pedagogical level to be achieved through gameplay, employing simplified language and concepts to facilitate better assimilation of content; the design level, encompassing graphic elements and interactive features; and the methods of presenting educational content, with particular attention to how key concepts are integrated into the game in order to enhance comprehension and learning effectiveness.

MIT App Inventor is a visual development environment for Android apps, structured on a client-server architecture that

ensures usability and computational robustness [9]. It features two core components: the Designer, for creating user interfaces with modular elements, and the *Block Editor*, which uses the *Blockly library* to support event-driven programming. The components of the app themselves are defined in Java, while the web interface of the development environment is implemented in HTML5 and JavaScript.
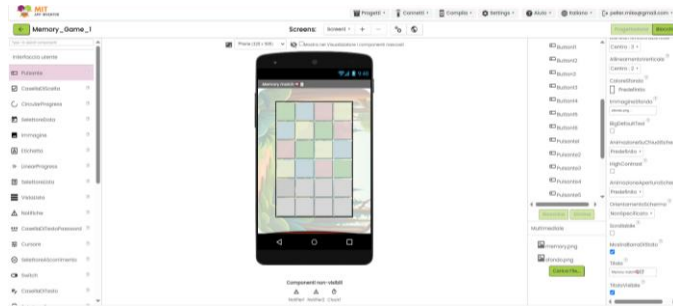

Fig. 1.   Game development in MIT App Inventor platform.

Once the basic rules are understood and the player accesses the game layout, the board displays nine pairs of matching cards, shuffled and placed face down. The back of each card features a geometric pattern reminiscent of vintage playing cards, evoking the domestic play environment and intergenerational experiences, particularly with grandparents.

The front of the cards presents a selection of symbolic archaeological finds from Irpinia, ranging from Prehistory to the Roman period [10]. These include a Neolithic lithic axe, an *anforetta* with complex handles from the Oliveto-Cairano culture, a bronze anthropomorphic pendant and *tutulus*, an Apulo-Corinthian helmet, a silver Neapolitan *didrachm*, *a volute* oil lamp, a black-and-white mosaic fragment, and an idealized rendering of the Via Appia. Each object reflects key aspects of the Alta Irpinia region's material culture and historical landscape.

Fig. 2.   Screenshot of the card-based playgame.

For each successful match, the game displays an enlarged image of the associated artifact along with a brief description.

This mechanism, based on trial and error, links visual memory to educational content, fostering active learning and enhancing engagement with the region's cultural heritage.

The minigame, currently in its beta version and undergoing final testing, will be released as a free application on the Google Play Store. It will be made available to major museums in the province of Avellino and to primary schools interested in developing educational approaches to Irpinian's archaeological heritage.

IV. CONCLUSION

The advancement of digital technologies has significantly influenced the dissemination and enhancement of cultural heritage. Virtual museum projects increasingly integrate interactivity into visitor engagement strategies, enriching the spatial and temporal depth of traditional narratives and meeting the growing demand for digital access to heritage.

New forms of storytelling and reinterpretation of cultural content foster creative and social interaction with cultural heritage and the landscape. Through the inclusive potential of digital tools, museums are strengthening their role as dynamic centres of cultural production, effectively reaching diverse audiences and encouraging deeper community involvement with local history and identity.

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