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Art Noveau heritage towards Education for Sustainable Development: a mobile augmented reality game under the EduCITY App

João Ferreira-Santos[†,1], Lúcia Pombo[1]

1. University of Aveiro - Campus Universitário de Santiago, 3810-193 Aveiro, Portugal

* Corresponding author; † Presenting author; Education.

Abstract. The urge for an effective Sustainable Development has enabled the recognition of new resources, as Heritage. In fact, since the 1970s, the relevance of Heritage, tangible or intangible, has been recognised as a space of memory, identity (Choay, 2021), learning and action for the global development of the society (CE, 2005). By promoting and valuing, in specific, built heritage, it has been possible to preserve the past while creating bridges to the future. This process, not always linear, has a special impact on the dynamism and development of cities. Cities must be safe, sustainable, accessible, enhancing creativity and providing wealth for all (UN, 2015). Combining the potentialities of Heritage with the fundamental role that Education plays as an enhancer of change, it becomes essential that Education takes place in new realities and spaces that are not restricted to schools grounds (UNESCO, 2021). To this end, Technology, especially through the use of mobile devices, allows educational spaces to emerge in the proximity of the experiences of students and their families. Combining Mobile Learning with the potential of Augmented Reality, we are witnessing a connection between (new) educational spaces and (new) realities simultaneously. Hence, this research aims to promote key competences for Education for Sustainability (Wiek et al., 2011) through the use of smart technology, such as Mobile Augmented Reality Games based on challenging paths that takes education out of the school grounds in an interdisciplinary way. For this purpose, an educational mobile game will be developed, comprising Aveiro Art Noveau built heritage raising awareness about its protection, reinforcing its value and importance for the community. This educational mobile game is part of the EduCITY mobile app, which arises in the scope of the R;D project "EduCITY", which allows the creation of a smart learning environment in the city of Aveiro. The game contents will be triggered near the Art Noveau style landmarks around the city. The game development follows the dynamics of design-based research, considering several cycles of improvement, under a pragmatic approach of mixed paradigms and methods (Creswell ; Creswell, 2023). Data will be collected through the development of a quasi-experimental, sequential and explanatory research plan involving four classes (experimental and control groups) and their teachers. Data will be triangulated using surveys and focus groups. Findings are expected to contribute to Education for Sustainable Development through the role of built heritage as an innovative resource that can be useful worldwide.

Keywords: *Cultural Heritage, Education for Sustainable Development, Mobile learning; Augmented Reality, EduCITY*

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