Immersive Technologies for Education in Heritage & Design

An online program adapted for the Architecture track in times of COVID-19

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Introduction

Applying imaging to architectural and urban heritage studies is not new. Drawing, painting and photographing, and most recently digital imaging have been applied as techniques for the representation and preservation of heritage buildings, cities and landscapes. New technologies and media in the service of heritage is a fast-growing field, best known as virtual or digital heritage (Wang et al., 2020). Such immersive experiences include Virtual Reality (VR), Serious Geogames have been enhancing and enriching how people experience heritage, improving and upscaling public involvement and knowledge about its cultural significance.

In particular, tourists have been using their mobile phones to share photos and comments of heritage attributes on social media. Such descriptions and hashtags are geo-located and inform what the public value and why, which can be of use to GLAM (Galleries, Libraries, Archives, and Museums) institutions. Similarly, serious geogames (Ahlqvist and Schlieder, 2018), serious/educational games with a geo-location element, and 360º Degree Photos and VR (Shehade and Stylianou-Lambert, 2020), have been contributing to an engaging built heritage virtual simulation, design and decision making practices, whilst attracting younger generations to topics related to conservation and sustainability.

Teaching methodology

The heritage-based design topic through immersive technologies such as serious geogames and virtual reality were the innovation brought to the Bachelor Minor course in Heritage & Design in the Architecture track at TUDelft. Such tools integrated a temporary pilot program as an attempt to raise and keep the engagement of students while attending the learning goals of the course in the Fall semester of 2020 during the Covid-19 pandemic.

The teaching methods applied were knowledge transfer, learn-by-doing and self-learning. The architectural research methods (Groat and Wang, 2013) were Simulation and Modeling (e.g., digital

models, prototyping) and Qualitative (e.g., interviews, visual/narrative devices). The activities were structured in three consecutive phases: 1) Geogames fieldwork in the city of Delft, Netherlands; 2) Minecraft workshop in the city of Florence, Italy; 3) 360º Degree Photos and Virtual Reality workshop of a museum storage in the Netherlands and Belgium.

The phase 1 occurred in the first module of the Minor - City and Transformation (September - October 2020), and phases 2 and 3 in the third module - Architecture and Re-use (November 2020 - January 2021). The workshop sessions lasted 02:45 hours each including 38 students of the 4th year of the Architecture track, but also external students from Landscape Architecture (1), Industrial Design (2), Aerospace Engineering (1), Physics (1) and Chemistry (1).

Results

Geogames fieldwork

This geogaming fieldwork (Figure 1) was self-organized by students in three groups related to three geogames - Pokémon GO, Harry Potter Wizards Unite and Ingress Prime. It was effective in terms of encouraging students to (re)discover the city through a derive stimulated by geogaming mechanics, rather than the traditional map-oriented fieldwork. It was also a great way to kick off the course, and keep students interested in the topic.

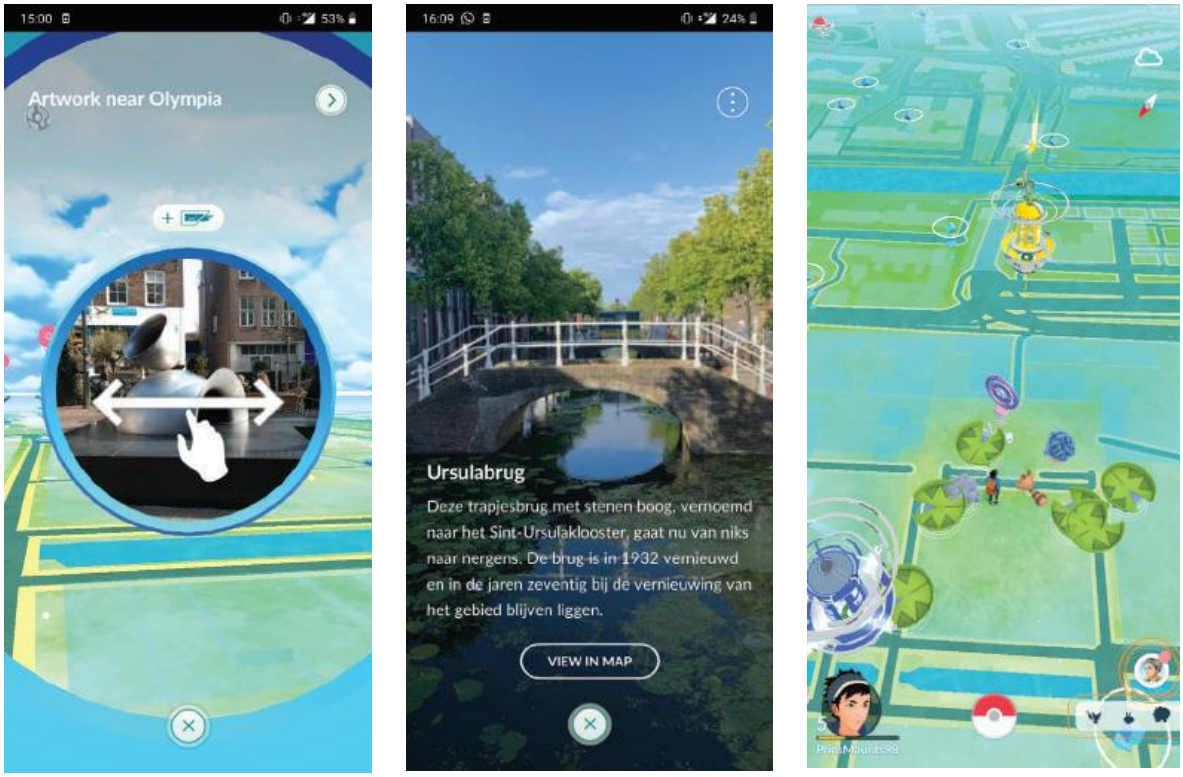


Fig. 1. Documentation done by students playing Pokémon GO.

Minecraft workshop

The Minecraft workshop was evaluated according to the Likert scale related to quality characteristics of the gameplay experience (Abdellatif et al., 2018). The Game design was rated as 4 by 62%, Usability also a 4 by 54%, and both Learning Outcomes and Cognitive Behavior a 3 and 4 equally

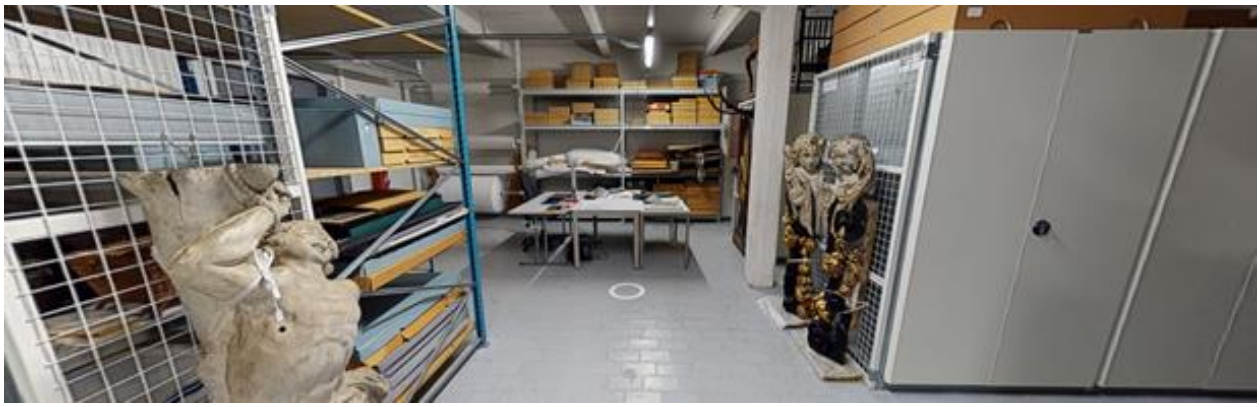
rated 46%. Most designs proposed greening streets and making them car-free zones. Some students proposed to bring back old uses such as a local marketplace. Some found the tool useful for initial design stages that do not require detailing. Others echoed that it is very blocky and not realistic. One student wrote down that “it is visually engaging and easy to change things in, creating easy consensus between a designing and commissioning group” (Fig. 2).

Fig. 2. Example of design intervention articulating values and attributes.

360º Degree Photos and Virtual Reality workshop

The VR workshop was structured as a lecture and an interactive online 360º Degree Photos and VR explorations of museum storages (Fig. 3). After this, from a 5-points Likert scale, students filled out a survey on the topic. Results showed that students found both tools easy to navigate and interactive. For the 360º platform, 65% highlighted its interactive icons, which added information and explanations about the building and the object, implemented by extra pictures and hyperlinks to external data. For the VR platform, 75% recognized its immersive and powerful visualisation experience. Most of them (85%) agreed on the potential of these tools to tackle design problems, to give insights in experiencing a space before/during its construction, and to be able to visit buildings that are not accessible.

(a)



(b)

Fig. 3. a): 360º photo of the storage facility of the Collection Centre Netherlands, Amersfoort. b) Virtual storage facility of the Museum Turnhout (Belgium) (Depot Turnhout, 2020, ICOM Belgium Flanders)

Conclusion

Despite the challenges of working during the COVID-19 pandemic, and not being able to organise and lead fieldwork, the blended methodology of the course has proved to be an alternative to foster critical and creative assignments. This physical-virtual blended approach and/ or some of its tools in different combinations can be useful and relevance for educators, researchers and practitioners of architectural schools. This pilot program is currently under evaluation to define to which extend it can be incorporated in the next two years.

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