

A Critical Evaluation of Two Contextualised Digital Heritage Workshops

Descriptions, reflections and future directions

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In the following paper, a description, a comparison, a series of reflections, and future directions of two successful Contextualized Digital Heritage Workshops (CDHW) will be presented. The workshops have been organized during the eCAADe and CAADRIA conferences. The importance of architectural heritage as an expression of a local history and identity in a world that is more and more globalised is evident. Multidisciplinary and interdisciplinary approaches, together with the use of digital technologies open new opportunities in the comprehension, documentation, analysis, reuse and dissemination of architectural heritage. The main concept behind a CDHW is to connect the event (and its wide variety of participants) to a specific local context in a multidisciplinary way. The paper defines and proposes a methodology to critically evaluate the two workshops and their individual aspects in order to identify and investigate ideas that can be explored during future CDHWs.

Keywords: *digital heritage, workshops, context, design, collaboration*

INTRODUCTION

In the following paper, a description, a comparison, a series of reflections about two successful Contextualized Digital Heritage Workshops (CDHW) and future directions will be presented. The workshops have been organized during the eCAADe and CAADRIA conferences. As far as we are aware, the CDHW represents the first initiative to connect a digital heritage

workshop to the architectural heritage of a specific local context in a multidisciplinary way (Di Mascio et al. 2016). The importance of architectural heritage as an expression of local history and identity in a world that is more and more globalised is evident. Multidisciplinary and interdisciplinary approaches, together with the use of digital technologies open new opportunities in the comprehension, documentation, anal-



Figure 1
Photos of buildings' facades along Daru alley in Suzhou (China) (Source: personal archives of the authors).

ysis, reuse and dissemination of architectural heritage. Usually, workshops organised during international conferences and events are strictly focused on technical demonstrations and tutorials, or group discussions that are completely detached from the location where the events take place. This seems a lost opportunity. Conferences and similar international events attract to the same place scholars from all over the world. Each scholar has a different cultural background, points of view and knowledge in terms of digital technologies and methodologies. Hence, each of those events can represent a precious opportunity for the workshops' attendees, both organisers and participants, and for the local community in order to share and investigate ideas, methodologies and tools around selected local architectural heritage.

The main aims of this piece of writing are as follows:

- To define a methodology to evaluate the two CDHW;
- To critically reflect upon the two events and evaluate the different aspects that constituted the workshops;
- To elaborate and summarise ideas that can be explored during future workshops.

Descriptions, comparison, reflections and definitions

of future directions for next Contextualized Digital Heritage Workshops have several values that are not limited to this series of workshops. The content of the paper will be valuable to a wide range of scholars and can inspire other events. The action and value of reflecting on the work done have been already highlighted in several publications, including in "The reflective practitioner" by Donald Schon (1991).

METHODOLOGY: A WAY OF CRITICALLY EVALUATING TWO WORKSHOPS

The methodology described in this section was defined in order to reply to the following question:

- How to critically evaluate two Contextualized Digital Heritage Workshops?

First, all the available information for each workshop was gathered, such as:

- The accepted proposals published on the respective conferences websites;
- All the materials and files produced during the workshops days;
- Some reflections exchanged afterwards with the workshops' participants and between the organisers.

Once the material was collected, it was decided to reply to the above question by structuring the piece of writing in four main steps, namely:

- Descriptions of the workshops;
- Critical evaluation;
- Future plans;
- Conclusions.

The two Contextualized Digital Heritage Workshops presented some similarities but at the same time some relevant differences. For this reason, in order to compare and critically evaluate the two events, it was necessary to describe them by following the same logical order. The selected framework is constituted by seven aspects that represent all the key features of each workshop:

- Introduction: an overall introduction about the event;
- Participants: general information about the participants and their background;
- Aims: the main aims of the workshop;
- Presentations;
- Case studies: a general description of selected case studies;
- Description and workflow;
- Outcomes.

By using the same framework in order to describe each workshop, it is possible to evaluate and compare them in the section that covers the critical evaluation of the two events.

DESCRIPTIONS OF THE TWO WORKSHOPS

CDHW - Oulu (Finland)

Introduction. The first Contextualised Digital Heritage Workshop was held at the University of Oulu in Finland over two days in August 2016 as a precursor to the eCAADe conference paper sessions. To the authors' knowledge, it was probably the first such event to connect a digital heritage workshop to the architectural heritage of a specific local context in a multidisciplinary way.

Participants. The workshop attracted eleven participants from several international institutions who were able to introduce themselves and their research interests linked to digital heritage as part of the timetabled events. Support was also given by architects and academics from Oulu who shared detailed local knowledge of the case study sites.

The workshop attracted a wide range of participants' interests, which were later presented in the paper sessions at Oulu University. These included the use of photogrammetry and smartphone based augmented reality as a low cost approach to documenting our built heritage (Gulec Ozer and Nagakura 2016) as well as high cost techniques such as laser scanning (Webb et al 2016), immersive virtual reality (Kreutzberg 2016), methodologies for digitally reconstructing lost buildings (Di Mascio et al 2016), building information modelling (Kepczynska-Walczak 2016), interactive software to enhance understanding of heritage sites (Lee et al 2016), the integration of computational design technology in undergraduate education (Varinlioglu et al 2016) as well as Massive Open Online Courses (MOOC) in CAAD education (Kovács 2016).

Aims. The main aim of the workshop was to exchange and develop ideas during a contextualized digital heritage exercise having no prior expertise or knowledge in local heritage specifics.

Presentations. During the workshop, we had different kinds of presentations. At the beginning of the first day, the event started with a general introduction to the workshop's theme, goals and programme followed by participants' introductions. Each participant introduced their research interests in the topic through a five-minute PowerPoint presentation. The case studies were introduced by two local experts (an architect and a student). At the end of each brainstorming session, each group presented its posters to the other group. A final presentation/discussion summarised the event and closed the second day of the workshop.

Case Studies. Two historical buildings were selected for the workshop; Oulu cathedral and Oulu castle/ob-

servatory (Figure 1), which were both located within a walking distance of the conference venue. A local architect involved in the renovation of the cathedral and a local student with knowledge of the castle/observatory gave introductions about the two historical buildings and guided the workshop participants during site visits. Oulu cathedral was initially built in the late eighteenth century; however, the timber upper structure was destroyed by fire in 1822. The cathedral was subsequently rebuilt in stone to the drawings of Carl Ludvig Engel on top of the surviving stone foundation walls [1]. The evolution of the design from timber to stone structure proved stimulating in workshop discussions. A castle in Oulu was established as early as the fourteenth century, with an evolving design over the centuries. In the late nineteenth century, an observatory for sea captains was built on one of the castle walls, which from 1912 to the present day has been serving as a café [2]. During the site visits, a few participants documented the two case studies with panoramic 360 photos.

Description and workflow. The workshop aimed to provide a balance of on-site visits, presentations and brainstorming sessions. The first day focused on introductions, which enabled initial participants' positions and viewpoints to be heard, as well as case study site visits where observations such as notes, photographs and sketches were taken. In Oulu, unlike the second workshop in Suzhou, we did not digitally survey the case study sites and were instead using them as examples to suggest tools, techniques and methodologies for later research. For the second day participants shared and applied their knowledge during three pre-planned brainstorming exercises (Figure 2) defined by related research questions using their specific and related knowledge:

- What and why: which are the most relevant features of the buildings, whether in their existing state, or previous existing states, and why is it important to study them?
- Approaches, methods and tools: which theoretical approaches, methodologies and digital tools could be applied to document or ana-

lyze the previously selected features?

- Visual communication of the ideas: all the ideas elaborated during the previous two practical exercises should be visually organized for the final presentations.

Outcomes. The workshop was particularly successful in terms of networking and gaining detailed knowledge of practices used by researchers and educators working in related digital heritage fields. Collaborating and brainstorming ideas using the two case studies also helped to highlight individual researcher's strengths and enabled the sharing of good practice. This was achieved primarily through poster brainstorming, where ideas were documented in small groups. For example, in the second pre-planned session suggesting approaches, methods and tools; participants could then investigate each of these themes based on their own prior knowledge. Once completed, each group presented their findings to the rest of the workshop participants. A PowerPoint presentation was also given later in the week during the main eCAADe conference reporting on the workshop activities and findings, as an initial dissemination method. It is worth noting that the international team, derived from various universities and different research background and methodologies built a significant added value to the whole process.

CDHW - Suzhou (China)

Introduction. The second Contextualized Digital Heritage Workshop was organized in Asia, and continued and merged the path started by two successful workshops held during the previous eCAADe (Oulu, Finland) and CAADRIA conferences (Melbourne, Australia). It kept the central concept and structure of the first Contextualized Digital Heritage Workshop and introduced some practical elements inspired by the workshop (organized during the CAADRIA 2016 conference) titled "Interaction design for user engagement in Digital Heritage with Hyve-3D" which was more focused on the technological aspects.

of the case study and provided a brief tutorial about photogrammetry. The other three lectures (including an invited skype presentation), covered theoretical and practical topics linked with architectural heritage, Digital Heritage, representation and game design. Other interactive tutorials explained how to use 3D modelling software and UNITY.

Case Study. For the case study, we wanted to explore something different from the case studies investigated during the previous workshop in Oulu. Together with the support of a local academic (in this regards, special credit should go to Glen Wash, who also supported the organization of the workshop), we explored several options in Suzhou from gardens (and their historic buildings) to historic streets. In the end, after some reflections, a historic alley in Suzhou's old town was selected as a case study. The final choice was also influenced by several factors, including the day of the workshop, Sunday, when the streets are usually very crowded. Daru alley (Figure 3) is a small street vehicle accessible: when it intersects the canal at one of the two far ends, it presents a small pedestrian area and stone bridge that crosses the canal and connects to another pedestrian alley that is perpendicular to Daru alley. The street presents a good variety of buildings' facades on both sides; each building has a different number of floors and details.

Description and workflow. The workshop was split into two days and presented several activities. The main ones can be summarised as follows:

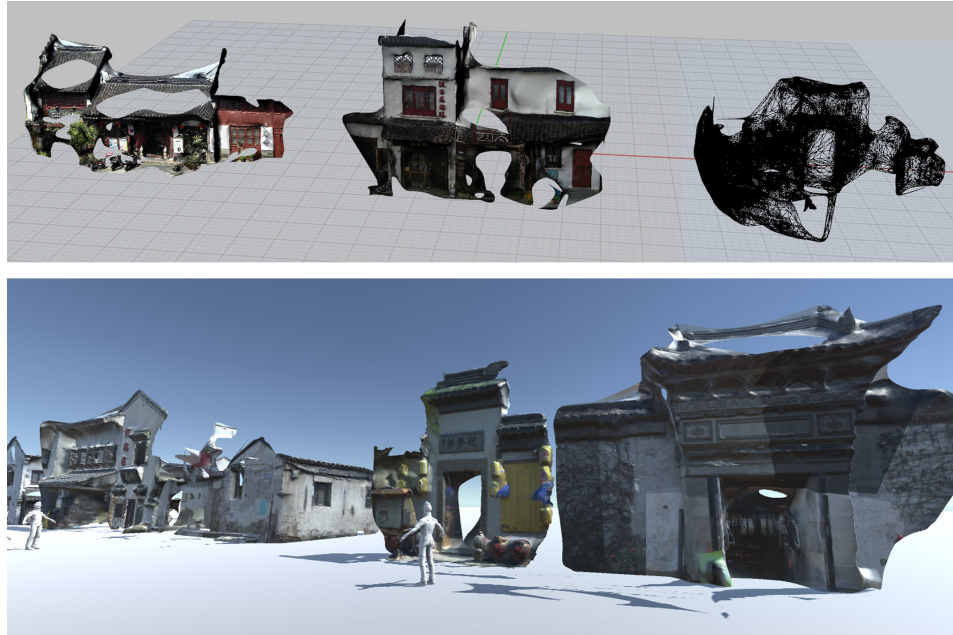
- Presentations;
- Site visit to have a direct experience of the architectural heritage and collection of information such as: notes, sketches, pictures, audio files, videos;
- Photogrammetric modelling;
- Post-processing of 3d mesh models;
- Creation of a basic 3d navigable environment with interactive elements in UNITY (the portal).

The main idea was to balance and integrate different kinds of activities and make the whole event and

learning experience more engaging. After a general introductory presentation about the workshop and before the site visit, the basic principles of photogrammetry and how to take proper sequences of photos in order to create good meshes in Autodesk Recap were introduced. During the site visit, participants collected several pictures of various facades of the buildings along the street. Once back in the workshop venue, after a short demonstration of Autodesk Recap, they used the software to explore photogrammetric modelling of the facades of their choice. Once the mesh models were generated, they were exported into files formats that were opened within different 3d modelling packages. Participants were asked to bring their laptops with the useful software pre-installed. However, because they used both PC and Mac, they had access to slightly different software packages. The mesh models were opened within 3ds Max, Rhino, Cinema 4D and SketchUp. Within the 3d modelling software, the meshes were post-processed and textures applied. Once the 3d mesh models were ready, they were imported into the Game Engine UNITY for the creation of a basic 3d navigable environment (the portal). Each participant created a basic navigable environment where it was possible to walk around their imported models. In the end, all the main models were collected and imported into the same virtual environment in order to create a virtual version of the street in Suzhou (Figure 4).

Outcomes. The final outcome of the workshop was constituted by a poster and a slideshow projected onto the poster. The slideshow was constituted by a selection of images (group pictures, pictures of the historical street in Suzhou taken during the site visit, photos taken during the presentations in the classroom, images of the photogrammetric models, wire-frame images of the models within the 3d modelling software, rendered images of the 3d mesh models, screenshots of the virtual environment in UNITY).

Figure 4
(Top) 3d models
produced in
Autodesk Recap
and fixed in a 3d
modelling software;
(Bottom) image of
the virtual
environment in
UNITY (Source:
personal archives of
the authors).



CRITICAL EVALUATION

The two workshops presented several differences on various levels. The reflections focus on the same aspects presented in the description of the two workshops.

Introduction. Both workshops were organized during two international conferences, one in Europe (during the eCAADe conference) and another one in Asia (during the CAADRIA conference). The first workshop held in Oulu was the first of the series, and it was useful in order to test the overall idea and format, and participants' response. The second event in Suzhou kept the main ideas from Oulu's workshop and merged them with elements from another workshop and research projects.

Participants. The first workshop was mainly addressed to academics, and this led to interesting discussions and brainstorming sessions where each participant brought his/her own precious knowledge. During the second workshop, the number of stu-

dents was higher than the number of academics.

Aims. The first workshop idea was to create a collective knowledge and expertise based on academics' background and prior experience. Each participant interpreted the case studies differently and proposed ways of documenting and analysing tangible and intangible aspects of the selected architectural heritage based on their expertise. Moreover, the brainstorming sessions allowed the development of new ideas generated by the exchange of reflections among people with different cultural and academic backgrounds, experiences and skills. On the contrary, the use of a well-defined scenario in Suzhou allowed the participants to concentrate on exploring and learning different software packages and ways of exchanging information between them.

Presentations. Both workshops benefitted from several presentations. Introductory presentations about the event were similar to both workshops. Researcher presentations in Oulu were useful to under-

stand each scholar's experience and interest in the topic. This also informed some of the other conversations. The presentations at the end of each brainstorming sessions triggered further discussions and exchange of ideas. On the contrary, because students largely constituted the group of participants, the presentations in Suzhou were more like lectures aimed to provide information about specific topics and give a theoretical background to the practical exercise. Moreover, because the workshop was more focused on a practical application, it was essential to provide a sort of tutorial sessions in order to allow participants to perform their tasks correctly.

Case studies. Site visits characterise case studies. Different phases constitute each site visit and are influenced by the nature of the sites. Before the site visit, there is a phase of preparation. The more formal (with PowerPoint presentations and sharing of archival material) and interactive introductions (with Q&A sessions) of the two historical buildings in Oulu provided information that fed discussions and sites visits. Each site visits in Oulu also triggered ideas about ways of gathering, interpreting and representing information; all these elements fed the subsequent brainstorming sessions and generation of ideas and digital outputs. The site visit of the historical alley in Suzhou was less structured and mainly focused on gathering photos and other kinds of information useful in the development of photogrammetric 3d models and the virtual environment.

Description and workflow. The workshop in Oulu was mainly focused on brainstorming sessions that were totally absent in the second workshop. On the other hand, the event in Suzhou presented a scenario and practical uses of different software packages that were missing during the first workshop. The use of several software packages, an online service (Autodesk Recap) and laptops with different operating systems (Windows and Mac) gave a few challenges that slowed down the practical exercise.

Outputs. The brainstorming sessions undertaken during the workshop in Oulu produced a good amount of ideas explored and recorded on A1

boards, whilst the second workshop in Suzhou allowed the participants to explore software, methodologies and make models and a virtual environment in a game engine. Both experiences had their benefits. However, both workshops allowed participants to see the selected case studies through new perspectives. While the first workshop was research-based and concluded with sharing collected expert knowledge the second focused on practical technical exercise.

Challenges. Each workshop presents various challenges. The workshop's location may trigger some of them. The location of the case studies may not allow the use of specific equipment such as laser scanning technologies. Weather conditions may also limit site visits. Access to specific hardware and software may also be limited. Free software can be easily installed also during the workshop, but other software packages may not be available because of costs, etc.). During the workshops in Suzhou, we have experienced issues related to different platforms (Mac and PC) used by the participants and the availability of certain software packages only on one of those platforms (for example 3ds Max not available on Mac). Participants' knowledge can also represent another element to take into consideration. The brainstorming sessions benefit from participants that have diverse cultural backgrounds, skills and experiences. In this way, it is possible to explore more diverse ideas and generate original approaches and solutions. To some extent, a purely academic point of view, may also be a limitation because sometimes it may be linked to preconceived ideas, hence it may limit ways of looking at a specific situation. In this regards, students may be open and bring alternative ideas.

FUTURE PLANS

Taking into account all the previous reflections, in this section, a series of ideas that can be included and investigated during future workshops will be presented. In the title we used the work "directions" because future Contextualized Digital Heritage Workshops can explore different paths. Each category may

influence the selection of aspects within the other categories.

Introduction. Future workshops can be linked to international conferences (eCAADe, CAADRIA, etc.), connected to other events, or be an independent event hosted by private or public institutions (Universities, City Councils, Museums, etc.).

Format and participants. So far, we always had a two days' event. However, there may be two parallel sessions, one with only academics and another one with both academics and students. Furthermore, the two parallel sessions may also be split into two days, the first day with only academics and the second day with both groups (academics and students). Another option is that it may be a workshop led by academics where students and/or academics benefit as participants experimenting with new technologies.

Participants. The workshops can also engage other participants besides academics and university students, such as school children under 18 and professionals (which can be linked to public or private national or international institutions such as RIBA CPD, English Heritage, Museums and Galleries). The workshop should also be always open to multidisciplinary approaches, namely professionals from other disciplines such as archaeology.

Aims. The event can have different aims and explore aspects that are more theoretical, practical, and technical (for example to explore the functionality and integration of different software packages), or a mix of some of all of them.

Presentations. The number and content of each presentation can vary considerably. Presentations can provide useful information about specific topics, and in this case, instead of presentations, we can talk about lectures. Presentations of works produced during the workshops can foster discussions, exchange and development of ideas. Other presentations are more like tutorials, useful to explain how a specific software package or process works. During future workshops, for their introductory presentations, participants may also bring and present some of the dig-

ital tools that they applied to their research projects. Another idea is to organise presentations of specific digital technologies during site visits.

Case studies. Any building or place can represent a possible case study to be investigated during future workshops. A case study can be self-selected by the organizers, selected with the help of other scholars or via local knowledge (members of local universities or other public or private institutions). The selection of case studies may be influenced by any other aspects such as aims, participants, local importance etc.

Each workshop can take shape from any of the above points. Hence, there is not a single starting point; the selection of any of them can influence all the other aspects. The following meta-diagram summarizes the main components of a Contextualized Digital Heritage Workshop (Figure 5).

CONCLUSIONS

This paper presented a comparison between the first two Contextualized Digital Heritage Workshops organised during the eCAADe and CAADRIA Conferences. To critically evaluate the two events a methodology was defined. This reflective piece of writing is useful in order to explore ideas and address possible future directions for next CDHWs. The idea is to create workshops with well-balanced discussions, exchange practical and theoretical knowledge, and undertake practical exercises using digital tools.

One of the key factors while planning CDHW is time. The concept must be carefully prepared to accommodate all activities in two days only. Thus, in the open format of the event, presented by the Oulu case, it was a level of uncertainty to what outcomes it would lead at the end. On the contrary, in Suzhou, it was far easier to predict outcomes since the task was of technical nature and participants performed similar skills. What is more, they knew prerequisites and the range of software required to take part in the workshop. In this respect, another conclusion might be formulated that both, the prerequisites as well as the way how detailed the task is formulated and tools suggested influence the final results.

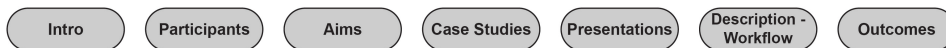


Figure 5
The main
components of a
CDHW.

The CDHW generate values for both the wider audience and the field of digital heritage and computational architectural design. The field of Digital Heritage can still be considered, to some extent, novel and emerging. There are several research paths that still have to be defined and explored. In this specific field, research through design (including collaborative and participatory design) and research through contextual designing have not been explored to the depth it deserves. Our research not only contributes to this area, but has also shaped the definition of Digital Heritage that can be design-led.

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