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ONLINE COLLABORATION FOR SOUTH-NORTH HISTORIC SITE RECORDING TRAINING OF EMERGING PROFESSIONALS

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ABSTRACT:

This contribution offers insights into delivering a Historic Site Recording course entirely over the Internet using video conferencing and sharing tools. The opportunities and challenges will be described, and the approaches used to ensure meeting realistic learning outcomes by offering a meaningful student experience will provide digital tools and cloud services. The classroom was staged at the students' homes. Immediate surroundings of their countries in Latin America (Argentina, Bolivia, Chile, Guatemala, Peru, and Mexico), and the teachers were based in Santiago (Chile), Ibague (Colombia), Barcelona (Spain), and Ottawa (Canada) and video conferencing, collaboration tools and social media made the connections. Two introductory courses for 13 weeks were delivered, followed by an advanced course in heritage recording tools. At the end of the introductory course, students provided a heritage recording proposal for a site in their own countries

1. INTRODUCTION

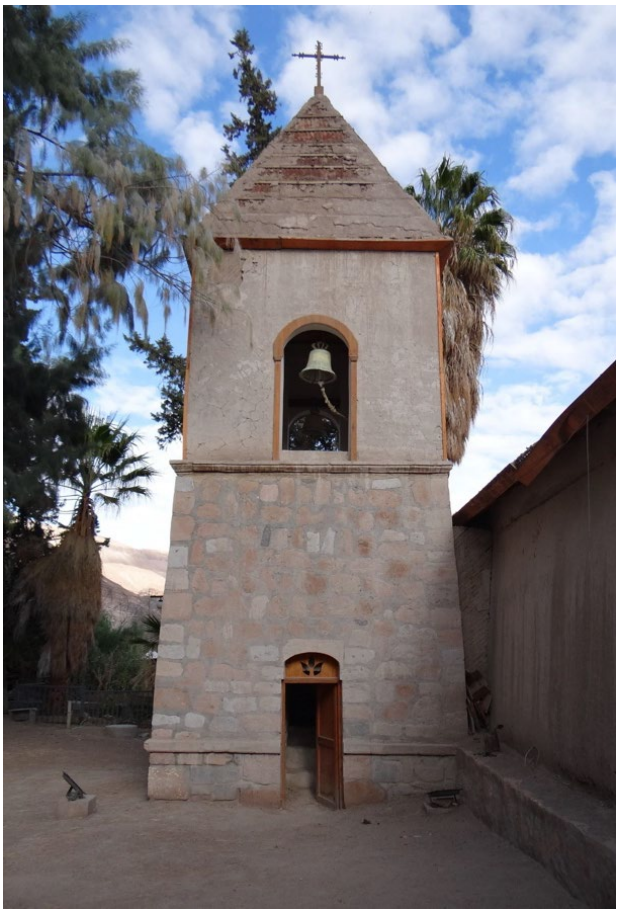

Figure 1: Character-defining element: San Juan de Huaviña church bell tower, Huaviña, Tarapacá region, Chile, photography exercise, Christian Pavez Aguirre, 2022.

The remote forms of collaboration that were implemented and accelerated because of the pandemic strongly impacted the transformation of teaching and learning models at all levels of training and in all fields of knowledge worldwide. Therefore, this transformation generated a series of opportunities that prompted the Centro del Patrimonio Cultural (UC) to diversify its offer of specialization courses. In this new scenario, the limitations are idiomatic and not geographic, expanding the teaching model and increasing the opportunities for the institution and all people who can now receive professional training in areas of knowledge that previously belonged only to a niche.

Since 2021, a new strategic partnership led by the Centro del Patrimonio Cultural (UC), Pontificia Universidad Católica de Chile (Chile), with the Universidad Ibague (UI) (Colombia) and Carleton Immersive Media Studio (CIMS) at Carleton University (Canada) was established. The collaboration allowed the launch of cultural heritage recording online courses for Latin American students and other professionals.

Given the unprecedented impact of the COVID-19 pandemic and quarantine lengths, social distancing, and mobility restrictions have substantially affected how hands-on training can be delivered, the Centro del Patrimonio Cultural, Pontificia Universidad Católica de Chile decided to offer these training courses under their continuing education program, which not only offers courses in heritage documentation but in a variety of hybrid-modes in other various heritage conservation topics.

Centro del Patrimonio Cultural´s educational programs are structured in following four axes:

- Heritage Conservation;
- Dissemination and Promotion of Heritage;
- Heritage Documentation; and
- Heritage Management.

The main objective, transversal to those four axes, is to offer training programs that are accessible to the community, fundamentally to ensure accessibility through online platforms and the inclusion of people from various Spanish-speaking areas. Furthermore, allow access to study programs through scholarships to outstanding students with a strong interest in specific study areas. These strategies enable a diverse group of participants to enrich the classroom experience and foster a virtual community of experts.

The objective of these four specialization axes is to create a community of experts and professionals who are sensitive to the problems of cultural heritage and capable of facing the challenges of safeguarding, conserving and activating it.

Having this critical mass in Chile and the rest of Latin America is a fundamental step towards placing cultural heritage at the center of public agendas and government plans and programs at the national, regional, and local levels.

The first two introductory courses called "Introducción al Levantamiento y documentación para la conservación de sitios y edificaciones patrimoniales" offered from 2021 provided online training with one in-person activity in Santiago (Chile) to over 50 emerging professionals in Latin America. Given the success of the introductory version, an ongoing advanced course was offered and completed in February 2023.

The introductory courses were converted entirely to distance learning, moving from the classroom to video conferencing facilities over the Internet. This contribution offers insights on how to deliver a course entirely over distance during lockdowns, meeting learning outcomes and expectations of students. The activities were delivered late afternoon to allow professionals to attend after working hours.

The UC proposed this introductory course of the professional update to promote the knowledge of survey techniques and cultural heritage documentation for its conservation, monitoring and presentation.

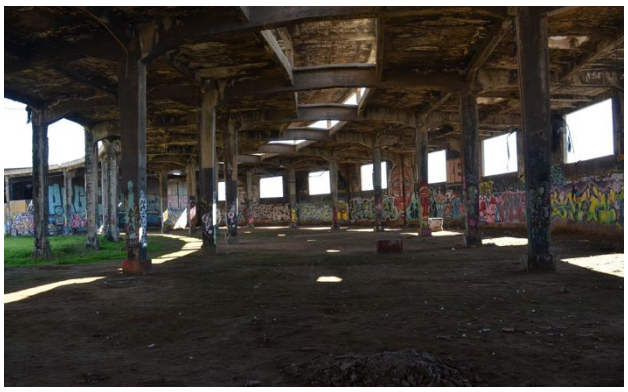

Figure 2: digital photography of an abandoned historic place in Valpaiso, Rens Veninga and Paulina Lobos.

In this course, new and technological techniques were introduced to provide essential tools for the recording and documentation of the conservation of heritage sites and buildings.

The documentation becomes a fundamental factor for developing conservation and intervention projects of these sites and buildings due to the current awareness processes in protecting cultural heritage, especially in Latin America, where there is a massive gap in capacity building in heritage conservation.
Documenting the physical characteristics of a heritage building for repair, preventive maintenance or monitoring is one of the most relevant activities in conservation. The information produced is key to decision-making by owners, site managers, public officials and conservators. Rigorous documentation can also be used to create a documentary archive and generate instruments for disseminating the heritage value of the object of study.

This course had two objectives: on the one hand, to introduce participants to a wide range of survey and documentation techniques, and on the other hand, to provide students with the skills to effectively use these techniques in their professional field to conserve heritage sites or buildings. The contents of the course are based on Santana Quintero's "teaching approaches" (Santana Quintero, 2007).

Figure 3: group photography using the tiny planet feature on a 360 panoramic camera during an in-person session, Mario Santana Quintero.

The teaching was designed to create a virtual classroom with remote Instructor-led Training (ILT) that meets the "minimal and acceptable" requirements to deliver comprehensive training in recoding historic places in Latin America. A simple platform

with Dropbox and google docs was created, zoom as conferencing tool was used to connect with participants, and the sessions were recorded and published upon demand of the participants. The exchange was conducted using WhatsApp messages, and assignments were delivered using these online contribution tools. The course was delivered in Spanish.

Emerging professionals lead the courses with solid heritage recording experience. The training program benefitted from instruction in various documentation tools and applications.

Although the intensive online course had a time constraint, participants worked in teams, weighing the strengths of various methods before applying them. A low-cost but innovative tool, such as mobile phones for Structured from motion photogrammetry and panoramic photography with cloud services to create virtual visits, was shown. A takeaway from this experience is that distance learning can be done without sophisticated tools to have a meaningful capacity-building initiative in these pandemic restrictions overcoming the physical distance preventing one-to-one training.

The core of the course was to emphasize the ethical requirements of having appropriate qualifications for conducting the historic site recording of heritage places, the importance of having technical knowledge about the tools, and the purpose of conservation and respect for communities.

Also, the ICOMOS Ethical Principles "need for capacity building" (ICOMOS 2014) and the Seville principles statement, "heritage recording is a discipline that requires specific training" (International Forum of Virtual Archaeology, 2011), were introduced.

1.1 Learning outcomes

For the introductory course, at the end of the activities, participants should be able to:

- Write an inventory sheet that documents basic information about heritage sites and buildings.
- Create a three-dimensional model of a detail of heritage sites and buildings that can be used in conservation projects.
- Develop a virtual tour platform with panoramic photographs to access such sites in the event of a pandemic.
- Develop a photographic heritage register of heritage sites and buildings that can be used in conservation projects.
- Learn about the use of Building Information Modeling (BIM) for heritage documentation.

For the course, the selection of heritage buildings and elements to produce the learning outcomes depended on the pandemic situation and each student's personal situation in their country.

2. COURSE APPROACH

The first course was organized in 2021 and consisted of 13 weeks. Each week, a one-day intensive training for three hours length was delivered.

The first weeks were devoted to teaching principals and techniques for 3 hours session lengths using the Zoom platform. All the classes were recorded to provide students with the capacity to recap the contents upon request only, as online participation was mandatory.

2.1 Course preparation

The course was tailored to provide basic knowledge on heritage digital documentation to a heterogeneous group of students while accommodating their unique needs. To that end, two specific decisions were considered. First, students were given a "skill form" to understand their capacities and knowledge and customize the learning approach. All the lectures were adapted, focusing on their educational and professional background and understanding of digital technologies. Second, all the assignments and deliveries were adjusted to online learning. Individual and group work was also facilitated to develop the exercises, being flexible with the object of study. Accordingly, the practical dimension of the course was adapted to the student's interests and situations while keeping the didactic objectives.

Moreover, different alternatives with free and open-source software and technological equipment were presented during the course to develop the exercises. For example, the photogrammetric technique and process were presented using proprietary software, a DSLR camera, open software, and a camera phone. The objective was to combine theory and practice while understanding the principles of each technology presented in the course to foster the documentation of historic sites.

2.2 Delivered contents:

The contents were split in five modules:

- Introduction to digital heritage documentation.
- Conventional survey tools (e.g. hand survey, photography, and total station).
- Advanced survey tools (e.g. photogrammetry, aerial photography, and 3D Scanning);
- Information and dissemination tools (e.g. Computer-Aided Drafting (CAD), Geographic Information Systems (GIS), and BIM); and
- Practical workshop.

2.2.1 Introduction to digital heritage documentation: This module introduced participants to the following topics:

- Current threats to historic places.
- Basic concepts and heritage enhancement.
- Objectives in heritage documentation for conservation, monitoring and presentation.
- The heritage inventory.
- The heritage file.
- Challenges and opportunities offered by technology.
- Workflow in a documentation project.
- Ethical considerations in the survey of historic sites.

2.2.2 Conventional survey tools: This module introduced participants to the following tools:

- Digital photography.
- Field notes, manual survey, sketches and profiles 2.3.
- Electronic total distance measuring station without reflector.

2.2.3 Advanced survey tools: This more advanced module introduced participants to the following tools:

- Digital photogrammetry.
- Terrestrial 3D Scanning.
- Aerial photogrammetry using an RPAS (UAV or drone).

2.2.4 Information and dissemination tools: For reference, participants were given notions about the following platforms:

- Heritage information systems.
- Platforms for remote visits to heritage sites (online).
- Introduction to 3D modelling tools for heritage sites (e.g. CAD, GIS, and BIM).
- Emerging techniques for presentation of sites: virtual reality and mixed reality.

2.2.5 Practical workshop and guided tutorials online: This module deals with one-to-one training online to provide support on the tools taught during the course and includes the following skills:

- Report describing the site and its heritage value.
- Field notes and sketches.
- Preparation of a photographic dossier of the historic site.
- Photogrammetry for the elevation survey of a historic building.
- Creation of custom materials including their physical properties with BIM methodologies.
- 3D modelling through CAD, GIS, and BIM using point clouds as information source.
- Bi-Directional interoperability between CAD/GIS/BIM/Parametric software.
- Virtual tour platform with panoramic photography.
- 3D presentation of models using a cloud platform (SketchFab).

2.3 Course participant profile

The courses are intended for participants with a background in architecture, history and civil engineering interested in historic surface conservation and knowledge of traditional survey techniques.

Using CAD and Photoshop is incredibly beneficial but not indispensable. They are specifically aimed at architects, civil builders, engineers, restorers, heritage conservators, cultural managers and those interested in conserving cultural heritage.

2.4 Course format

Presentations, analysis of cases by the instructors, discussion of texts, debates and others were carried out in digital format, favouring the exchange and collaboration among course participants.

In its online modality - live classes, this course was taught with synchronous classes through the Zoom platform and complemented with the course Intranet, where the readings, PowerPoint presentations and complementary material will be available.

There were assignments in which students could put the contents into practice using a smartphone and/or camera, test software, a tape measure and cloud systems on the internet.

2.5 Evaluation of participants

The course evaluation was split in participation on class debates, weekly exercises (homework), presentation and t submission of a "Heritage Recording Proposal on a selected historic site" by groups of students.

2.5.1 Exercises (homework): Two types of exercises were assigned to participants. The first group were homework tasks, which they selected a historic character defining element of a site in their premises and prepared a digital asset. This involves working with digital photography, freehand sketching, photogrammetry and 3D modelling in the software Blender. Models were then made public online using the 3D viewer SketchFab.

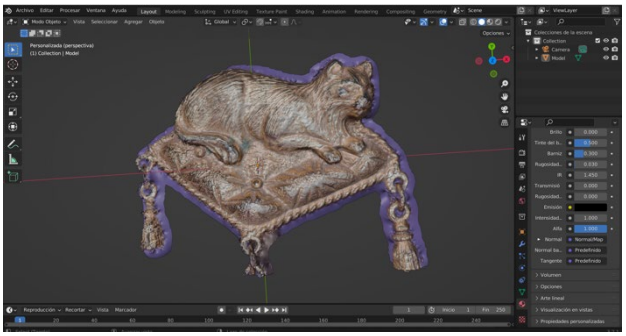

Figure 4: An historic ceramic fragment (Chile), Daniela Canales (Blender).

Figure 5: a free hand Sketch of the Bell Tower and Apse of the Church of San Miguel (Chile) by Rens Veninga Fergadiott.

2.5.2 Heritage Recording Proposal on a selected historic site: The Heritage Recording Proposal on a selected historic site was requested to evaluate the skills learn using a real heritage place.

Participants chose a site in their immediate surroundings, some students collaborated with others in other cities. Some groups selected archaeological sites, industrial complexes, residential buildings and education institutions among others. In places such as a train station and The Concepción Elevator in Valparaiso (Chile), road graves (Chile), Pukara de San Lorenzo archaeological site (Chile), the modern heritage site of the Pre-University Business School Manuel Belgrano (Argentina), among others.

The reports contained the following topics:

- General information about the site.
- Condensed description of the historic site.
- Suggested Heritage Value and Character Defining Elements.
- Geographical location of the site.
- Scope of work.
- How would you document this site.
- What technical drawings and other products would the group propose?
- Bibliography.

Figure 6: Exterior view of part of the Franciscan Convent (Chile), 2022, Anabella Benavides.

2.6 Course platforms

The course introduced the following software and application in relation to the documentation of heritage assets:

- Manual Photography of different quotidian situations through App ProShot and Yamera, used to simulate several photography conditions such as aperture, shutter speed, and depth of field.
- Architectural surveying of home spaces through Trilateration and CAD.
- 360 Photography of public spaces through Pix4D Catch to manage the image capture and Hugin Stitch to process the 360 Panorama.
- Virtual 360 tour with the previous 360 images, managing all the information through Kuula web page.
- 3D Scanning and processing of selected historic places' character defining elements through Agisoft Metashape and Pix4D Mapper, then meshing modification with Rhinoceros3D, Blender and diffusion with SketchFab.
- 3D modelling and compilation of specific elements through Archicad, Rhinoceros3D and Grasshopper.
- Publication, information sharing and feedback over Dropbox and Google Drive.

The course mainly relied on student licenses, free software and application, or trial versions available for the length of the course. This decision allowed students to familiarize themselves with the various software and digital workflows presented during the course.

Figure 7: Digital photography of the Manuel Belgrano School of Commerce (Argentina), Juan Cruz and Victoria Mohr.

3. COVID-19 IMPACTING TRAINING

During the course, a discussion about the impact of COVID19 and the role of technology in the presentation and access to heritage sites was conducted, these training activities were launched during the pandemic and they have continued until today, the use of distance learning to reach Latin American students have proven efficient.

4. CONCLUSION

The content of this paper presented the online transition of the heritage documentation online training course developed in the Centro del Patrimonio Cultural (UC), Pontificia Universidad Católica de Chile (Chile), Universidad Ibague (UI) (Colombia) and Carleton Immersive Media Studio (CIMS) at Carleton University (Canada) since 2021.

The impossibility of developing the course in person made it necessary to adapt different parts by introducing new equipment, software, tutorials, exercises, and case studies that assure the final learning outcomes. Besides, this paper also emphasized the relevance of identifying the ethical obligations of heritage recording specialists during the documentation process. The online was taken as an opportunity to continue discussing how it would be possible to ensure that the records produced are shared in the present and future for conserving heritage places within sustainable strategies.

This work emphasizes the need to develop Latin American principles, guidelines and standards for utilizing digital workflows in recoding heritage places for their conservation by providing capacity to emerging professionals in the region.

Finally, the activity described in this manuscript demonstrates how knowledge and its transmission is an opportunity to democratize access to job opportunities in a global world. The network of professionals, academics and those interested in information technologies, and their contribution to the concrete problems of cultural heritage configured within the framework of these programs, is a capital gain at the international and specifically Latin American level.

FURTHER STEPS

The South North partners are currently developing the following future tasks:

- Explore the use of immersive training tools, perhaps over metaverse, use of augmented reality or virtual reality for teaching.
- Promote membership of emerging professionals in heritage recording in the ICOMOS/ISPRS Scientific Committee in heritage Documentation (CIPA) in the Latin American region.
- Organize more training courses to provide capacity on advanced knowledge of recording techniques, heritage inventories and application of information systems in heritage protection.
- Set up a regional UNESCO Chair on Digital Twins for Climate Adaptation of heritage Places to increase opportunities for collaboration and exchange of professionals between the contributing academic organizations.

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