Being There and Then

Cultural Presence for Archaeological Virtual Environments

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In one {LEAP]

- One of the main goals of Virtual Heritage (VH) is currently to build 3D architectural photorealistic reconstructions of Cultural Heritage settings.
- Yet, such 3D models seem to generate only identification of known elements [PE09].
- But VR may also allow an understanding of the culture that lived there. This overlaps with the HCI concept [RCGM02] of Cultural Presence (CP).
- The two-year EU-funded project LEAP (LEarning of Archaeology through Presence) aimed to expand this concept into a new framework for VH.

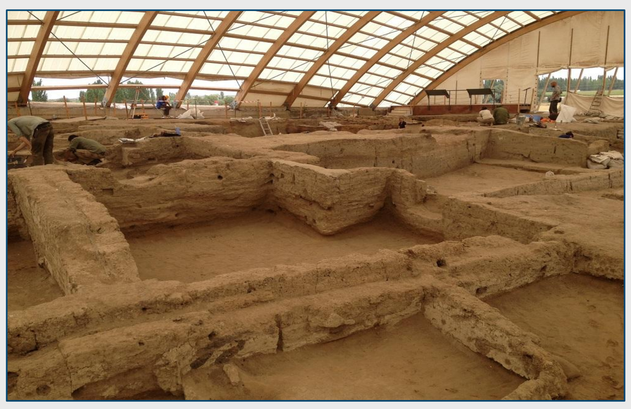

Fig. 1 B49 at Çatalhöyük Neolithic Site (Turkey)

A {LEAP] into the dark

We developed {LEAP] in three phases:

1. Building of an interdisciplinary theoretical and methodological framework with the help of relevant bibliography [PC12].
2. Design and implementation of a VR-mediated experience of the Neolithic site of Çatalhöyük (Fig.1). "ÇH3D" has 2 display modes (immersive and screen-based) and 6 versions (architecture only, objects, hotspots, still characters, scenes, and storytelling) with 5 pre-defined POIs (Fig.2).
3. Assessment of the feeling of CP and learning outcomes by means of a between-subjects experiment with 85 participants (Fig.3). A novel Cultural Presence Questionnaire (CPQ) was built and pilot-tested. Qualitative (e.g. multimodal) and quantitative (e.g. ANOVA, X^2, EFA, correlation) analyses were performed.

Fig. 2 ÇH3D VR-mediated experience

Fig. 3 Evaluation of ÇH3D

The {LEAP] forward

- EFAs indicated the concept of CP is sound and composed by three main factors (Fig.4): 1) Plausibility of the VE + Distinctive cultural elements; 2) Human characters + Sound; and 3) Perception and interaction.
- Correlation analyses showed a positive but not linear relation between learning and CP. Learning was a compromise between richness in content, affordances for exploration, and narrative explanations.
- ANOVAS revealed that virtual reconstructions are not a universal tool. Several user factors should be taken into account: suspension of disbelief, expertise in related fields, experience with computer games, and with IVR.

Pattern matrix[a]

Subscale	Variable	Factor 1	Factor 2	Factor 3
Virtual Env.	VE was culturally plausible	,747	-,190	,001
Cultural Presence	Visited a specific culture	,665	,032	-,040
Cultural Presence	Perceived specific cultural traits	,593	-,071	,023
Virtual Env.	VE scientifically authentic	,558	-,080	-,132
Cultural Presence	Visited an inhabited place	,519	,227	-,017
Virtual Env.	VE behaved autonomously	,470	,109	-,074
Attention	Feeling absorbed	,422	,181	-,380
Virtual Env.	Continuity of events	,341	,130	-,182
Susp. of disbelief	Willing to be transported to the past	,328	,012	,097
Susp. of disbelief	Willing to be in the inhabitants' shoes	,103	,031	,047
Social Presence	Characters behaved in a realistic way	,009	,889	-,078
Social Presence	Characters looked realistic	,096	,842	,050
Social Presence	Presence of people	-,140	,830	-,104
Social Presence	Autonomous characters	,175	,775	,063
Auditory aspects	Surrounded by auditory aspects	-,093	,488	-,035
Auditory aspects	Auditory realism	,047	,460	,149
Interaction	Feeling disoriented	,108	,105	,760
Interaction	Control device interferes with navigation	,023	,237	,712
Attention	Distraction by control device	,075	-,043	,711
Visual aspects	Experience disrupted by display device?	-,035	-,134	,402
Visual aspects	Surrounded by visual aspects	,357	-,098	-,397
Visual aspects	Visual realism	,371	,127	-,386
Visual aspects	Distraction by display device	,022	-,025	,369
Interaction	Naturality of navigation	,285	,226	-,366
Interaction	Exploration of elements	,204	,101	-,300
Cultural Presence	Feeling of seeing everyday life	,257	,269	-,286

Extraction method: Principal Axis Factoring.
Rotation method: Oblimin with Kaiser normalization.

Fig. 4 Results of Factor Analysis

References

[PC12] PUJOL, L., CHAMPION, E.: Evaluating Presence in Cultural Heritage Projects. International Journal of Heritage Studies 18(1): 83-102.
[PE09] PUJOL, L., ECONOMOU, M.: Worth a thousand words? The Usefulness of IVR for Learning in Cultural Heritage Settings. International Journal of Architectural Computing, 7 (1): 157-176.
[RCGM02] RIVA, G., CASTELNUOVO, G., GAGGIOLI, A., MANTOVANI, F.: Towards a cultural approach to presence. In Proc. 5th Annual International Workshop Presence '02 (2002), pp. 305-309.

The research leading to these results has received funding from the EU's Seventh Framework Programme (PIEF-GA-2013-625537).