

SENSE OF PLACE IN VIRTUAL HERITAGE ENVIRONMENT: A REVIEW

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Abstract. The use of computer technology is becoming a necessity to many organizations particularly as a means of representation and visualization. In the context of culture and heritage it is often developed in the form of virtual heritage. This is due to the fact that some of these intangible values are faded or even lost in museums they are placed, or buried in its physical remains and ruins. The concept of portraying the richness of sense of place via the use of virtual reality (VR) technology is seen to be of great potential to give value to the heritage sites. Thus, VR allows a unique representation of the intangible heritage elements while evoking the user's senses, emotions, memories, meanings and interpretations, though these are arguably complex to accomplish. This paper reviews literatures on factors that influence the character of place and sense of place, and the use of VR technology and virtual world design to suggest presence for virtual heritage development.

1. Introduction

The use of the computer technology in the field of cultural heritage broadly defined as virtual or digital heritage is seen as the new 'movement' in cultural heritage domain, contributing towards research and development of state-of-the-art applications ranging from 3D laser scanning technology, virtual reality, 3D modeling and visualization. Virtual heritage (VH) attempts to enable visitors at remote locations to experience the feeling of

co-presence, and to have a sense of being fully immersed in another time and place (Kenderdine et al., 2008).

VH of cultural heritage sites, monuments or buildings are often developed as high dynamic range imaging (HDRI), realistic virtual environment (VE), virtual reality modeling language (VRML) and 3D walkthroughs. The needs of such alternatives are mainly carried out due to the pressing demand of global expansion that could potentially destroy some of the world's cultural heritage sites. Kalay (2008) highlighted that cultural heritage sites all over the world face rapid decline due to aggressive urban expansion, speculative development, wars, and general neglect. He further explained that in other places, artifacts are moved into (sometimes remote) museums, thereby separated from the context in which they were found.

One of the key values that have great potential to portray the richness of the cultural heritage is highlighting the sense of place. According to Malpas (2008a), the loss of a sense of place of the object threatens a loss of the sense of place of the subject, and with it, a loss of a proper sense of heritage. The importance of sense of place in VH environment has also been an issue of debate in literatures by Champion (2010), Rahaman and Beng-Kiang (2009), Chen and Kalay (2008) and Malpas (2008b). Sense of place has also been a key issue in presence research, focusing on human experiences in a computer-mediated environment which also offers a diverse range of definitions similarly to its 'physical' counterpart. Slater (2009) defined presence as a phenomenon is that when you are going into an artificially created simulation and you take it as real; not that you believe that it is real but you respond as if it is real.

2. The Complexity of Place and Sense of Place

Previous studies in place and sense of place were commonly associated with the disciplines of geography and planning (Relph 1976). Although there is no absolute and uniform definition of sense of place, numerous studies have evolved from various disciplines such as architecture, urban design, environmental psychology, sociology, literary and media theory (Benyon et al., 2006). Perhaps the inherently segregated nature of various disciplines, due to their differences in philosophical orientation (Puren et al., 2006) contributed to the vagueness of the subject as well as its known subjective and intangible nature.

In the opening chapter of *Genius Loci: Towards a Phenomenology of Architecture*, Norberg-Schulz (1984) stressed on the meaning of place as something more than an abstract location but a totality made up of concrete things having material substance, shape, texture and color. Similarly Relph (1976) noted the genuineness of place as not abstractions or concepts, but are directly experienced phenomena of the lived-world and hence full with meanings, with real objects, and with ongoing activities.

Interestingly throughout time, place association and its concept evolved beyond its physicality. With the advent of new digital technologies, place transcends the limits of the real physical place or space. Internet technologies have given birth to cyberspace that allows us to break all of the physical boundaries of communication and interaction between users of different geographical locations. The potentials of new media and digital technologies has also sparked interest from other place related research communities delivering novel terms such as cyber-places (Kalay and Marx, 2003), virtual and smart places (Mitchell, 2000) among others, extending the definitions of place and space.

2.1. DEFINING REAL AND VIRTUAL SPACE

In the context of VH environment, virtual places reflect within VE of a designated cultural heritage location, monument or building of a particular time or period. Although there is no clear or published definition found for a VH environment, one could employ Sherman and Craig (2003) definitions of VR as a medium composed of interactive computer simulations that sense the participant's position and actions and replace or augment the feedback to one or more senses, giving the feeling of being mentally immersed or present in the simulation (a virtual world).

The term virtual world (VW) and VE are sometimes used interchangeably in numerous studies and articles in VR which may cause some confusion in its definition. Realizing the need for a more common definition, Bell (2008) suggested a more insightful definition of VW as a synchronous, persistent network of people, represented as avatars, facilitated by networked computers. Bell's definition might be considered more focused but perhaps too fixated in the creation of a world consisting of avatars which would be more suited to an online multi-user collaborative environment such as in *Second Life* (<http://secondlife.com>) (See Figure 1) or *Activeworlds* (<http://www.activeworlds.com>).



Figure 1. A screenshot of Second Life.

Nevertheless in searching for sense of place in the VE, avatars could provide the necessary element in evoking presence of life and increase realism (Thalmann and Musse, 2007). Perhaps a more suited definition for VH environment is as suggested by Bryson (1995), the use of various computer graphics systems in combination with various display and interface devices to provide the effect of immersion in an interactive three-dimensional computer-generated environment in which the virtual objects have spatial presence.

Among the key contributing factors in Bryson's definition are the elements of immersion, interactivity and spatial presence that characterized the places in the VW design. He also highlighted the importance of meaningful contents to evoke the feeling of being immersed as well as creating presence in the designated virtual environment. This is crucial towards evoking the sense of place in which the simulated environment should initially trigger the sense of presence and immersion in order to further provide the supporting interactions for the user.

2.2. CONSIDERATIONS IN REAL AND VIRTUAL PLACE CREATION

Although there are several published articles on cyberplaces (Kalay and Marx, 2001, 2003), and virtual places (Li and Maher, 2000), this section selects and summarizes literatures that mostly contributed towards the development of the paper.

According to Lawson (2001), human perceived space and place through the sensation of sight, sound, smell and touch, though in normal situation human effectively experience space through sight and vision (Lawson, 2001). He further explained that the mechanisms of perceiving space through vision encompasses several notions such as size and distance, scale, color, foreground and background, symmetry, verticality, meaning and context.

On the other hand, Turner and Turner (2006) during the course of developing a virtual place project, reviewed an array of established place literatures from the phenomenological, sociological and psychological perspectives, thus suggested four general components of sense of place:

- i. The physical characteristics of the environment;
- ii. The affect and meanings including memories and associations, as well as connotations and denotations;
- iii. The activities afforded by the place;
- iv. The social interactions associated with the place (or some considered as sub-class of activities).

In a more recent publication, Champion (2010) described five major features of real place experiences to consider in virtual world design:

- i. Places are dynamic and changeable, their boundaries may be vague and amorphous;
- ii. Places can range from the comforting to the uncanny, the sublime, the terrifying;
- iii. A place is full of references and evocations of related places via the movement of people and their artifacts. It may also evoke images of its previous self, related activities, or other places;
- iv. A place constrains, suggests and localizes activities. The constraints may be highly variable, and affect the physical, conceptual, or cultural sides of human experience.

Other related studies explored sense of place in real and VEs such as the BENOGO (Being there, NO need to GO) project by Benyon et al. (2006). Similarly to Turner and Turner (2006), the three components of place identity by Relph (1976) had greatly influenced the development of the project. The components referred are:

- i. Physical setting;
- ii. Activities afforded by the place;
- iii. Meanings and affect attributed to the place.

It can also be argued that most of the related literatures presented in this section highlighted the importance of the interdependency between the elements of settings, activities and its meaning towards a more meaningful sense of place. Thus, Relph's (1976) model of place would provide the foundation for developing the basic framework for the proposed case study data collection that would be further discussed in the subsequent section.

3. Data Acquisition

The scarceness of virtual place literatures in prescribing the preliminary steps in data acquisition process proved to be a challenge in designing the case study research. While some literatures in sense of place studies seems to be more associated to the domain of the planning and environmental psychology (Puren et al., 2006, Smaldone et al., 2005), there is also a need to assemble a more comprehensive body of knowledge in designing virtual place.

Most virtual place recommendations are either too conceptual or descriptive to guide developers and researchers in a more practical and prescriptive manner, often described as VE development and evaluation techniques. These may provide assistance during the evaluation stages of the experiment but more descriptions are also required on the early development stages particularly the preliminary stage of data gathering. The objective of the case study is to gather the necessary real-world data focusing on the sensory elements that would support the suggestive presence of sense of place in the intended VE for the later stages. This research also has identified key attributes adapted from Edward Relph's (1976) model of place, discussed in the preceding section.

3.1. THE PHYSICAL ENVIRONMENT

This consists of the physical settings, characteristics, geographical features and weather of the chosen setting. Lawson (2001) highlighted the importance of settings which constitutes the element of space, its surrounding and contents, as well as the peoples and their activities, and in turn, places are formed. This research also suggests that as for buildings, observation and digitally capturing architectural details are required especially on elements such as ornaments, carvings, colors and unique markings (see Figure 2). Pavlidis et al. (2007) made clear distinctions between the process of 3D digitization of objects and monuments. Although 3D scanning techniques may have some advantages in its high accuracy in geometry measurements, the method may only be useful in specific applications and objects due to its high cost and its difficulties in portability and autonomy compared to the conventional empirical techniques (Pavlidis et al., 2007).

In this context, original building blueprints or measured drawings based on the original forms and compositions will be used to develop the 3D models. Other references include video and audio capturing data to identify the existing ambience and movement of the building's fixtures such as windows and doors. One example is the work of Turner et al. (2003) that documented soundscapes to give a strong impression of a place and

concluded that it could create a sense of being somewhere to represent the experience of real place.



Figure 2. A snapshot of Kampung Keling Mosque, Melaka (UNESCO World Heritage site) showing a unique architectural detail

3.2. THE ACTIVITIES

Another important aspect is activity on-site. It is important to consider original activities to be simulated in later stages as to provide the authentic experience of a cultural heritage site. Historical buildings such as mosques and other religious places could demonstrate the original activities as it is unlikely to function differently than it was originally intended. This may be supported with a secondary perspective to gain originality of the activities simulated. Authentic data would need to be gathered from trustful sources such as museums and archaeological databases, interviews with the owner, local communities, relevant stakeholders, original inheritors or descendants, and others could offer a more diverse interpretation of the native activities conducted in the past.

3.3. THE MEANING AND AFFECT

In the context of VH environment, Champion (2010) identified the difficulties in offering interpretations of past and present cultures. Nevertheless, Relph (1976) noted the interrelation between the three place components and their fusion is what actually constitutes the place identity. Considering these factors, the research proposed a case study that consists of an in-depth evaluation of an architectural heritage building while still

functioning to the local community. Apart from these, architectural heritage embodies more than its obvious palpable elements and physical entities, artistic expressions, colors, textures, scale or styles. According to Rusalić and Radojičić (2009), it denotes its intangible qualities of memories, symbolism, meanings, emotions and senses.

4. Conclusion

This paper has suggested a conceptual idea of sense of place via physical and VW arguments. These critical discussions are useful to represent heritage as means of expressing idea and suggesting presence in the VE. The main challenge lies in representing the intangible heritage elements to evoke the qualities of meanings and senses to its user within the VE. The subsequent stage in this research continues to focus on the development of the prototype based on the architectural VH model.

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