

# Place, Sense of Place and Presence

---

*Author list*  
*Affiliations*

## **Abstract**

Re-creating real places – as distinct from virtual spaces or environments – using virtual reality technology raises a series of significant challenges. Fortunately there is a large body of existing research into the experience of place which might reasonably contribute to our understanding of the task. This paper reviews key aspects of the ‘place’ literature, relates them to the concept of presence, and then illustrates their application in the context of virtual reality. We conclude that some modification of existing theories of sense of place is necessary for this context and outline proposals for further work.

## **1 Introduction**

The BENOGO project, which is part of the EU-funded Presence I initiative, aims to develop and apply its real time image-based rendering technology to the task of photo-realistically recreating specific places. These 360° photo-realistic visual representations of places will be supplemented by an appropriate soundfield and augmented computer-generated objects. Computational aspects of the project are discussed in detail elsewhere (e.g. Bakstein and Pajdla 2003; Feldman *et al.*, 2003). The authors of this paper are part of a team tasked with the evaluation of these re-creations.

While many of the established virtual reality evaluation techniques (e.g. Witmer and Singer, 1998; Lessiter *et al.*, 2001; Slater *et al.*, 1994) seek to capture the degree to which people feel present in a given virtual environment, they lack the specificity we require. Our challenge was to explore specific questions which might lead to the conclusion that people using the BENOGO technology actually felt as though they were in (a re-created) Notre Dame, or Trafalgar Square, or the Botanical Gardens in Prague. Clearly the definitions of place and sense of place and how these concepts are related to presence need to be established as a baseline or benchmark for this evaluation. Fortunately there is abundant empirical work conducted by sociologists, geographers, environmental psychologists and a host of other researchers from the social sciences into place and sense of place – a cross-section of which is reviewed in section 2. However none of this is immediately usable for the following reasons:

- (a) real places are enormously richer and more *sensuous* than anything which can (as yet) be created with technology;
- (b) sociologists and humanistic geographers, in common with other social scientists, have methodologies, viewpoints and philosophical positions (Denley and Long 2001: 129) which vary significantly both between disciplines and more strikingly with the theory and practice of virtual reality researchers; and
- (c) our exposure to real places tends to be significantly longer in duration than a typical virtual reality episode, consequently studies of place and sense of place tend to be predicated on longitudinal exposure (years rather than minutes).

However despite these caveats, this social scientific research is too rich and detailed to dismiss and its potential usefulness is illustrated in two small, exploratory studies presented in section 3. These studies employed the BENOGO technology to re-create a botanical garden and part of the interior of a building, namely a major staircase. Participants in these studies

were either asked to verbalise while using the technology or interviewed afterwards. These data were then analysed using a grounded theoretic-like approach. We conclude with a discussion of possible further work.

## 2 Place and Presence

### 2.1 What is a place?

A real place is a particular space which is overlaid with meaning by individuals or group. This has been expressed succinctly as “place = space + meaning” (Harrison and Dourish, 1996) and in the words of the pioneering humanistic geographer, Relph (1976: 29) “Places are sensed in a chiaroscuro of setting, landscape, ritual, routine, other people, personal experience, care and concern for home and the context of other places”. To create a place thus poses a considerable challenge to virtual reality. Technology alone cannot create *places* but may be used to help *re-create* actual places. The prospect of being able to re-create actual places is, of course, very appealing. The re-creation of ancient or fragile sites (e.g. Aztec temples, Stonehenge, the Great Barrier reef) which one could explore freely is very attractive not only to the would-be virtual tourist but also to the geographer, anthropologist, historian or archaeologist. Making such experiences available to the infirm or the housebound adds to this. Another strand of application lies in the re-creation of public buildings or workplaces for training purposes (as in the recent EU-funded DISCOVER project, which used virtual ships and offshore oil platforms to train officers in emergency management). Finally, environmental psychology researchers are using virtual reality to model the appearance of real places (de Kort *et al.* 2003).

This review of the established place literature has been divided into three themes – the phenomenological, the sociological and the psychological.

### 2.2 Phenomenological perspectives: Relph and Tuan

Perhaps the earliest – and still much cited – text is Relph’s (1976) monograph *Place and Placelessness*, a seminal work informed by introspection, observation and other writings on the nature of place. Relph identifies three broad dimensions of ‘place identity’. In his own words (our italics):

“...the static *physical setting, the activities and the meanings* – constitute the three basic elements of the identity of places. A moment’s reflection suggests that this division, although obvious, is a fundamental one. For example, it is possible to visualise a town as consisting of buildings and physical objects, as is represented in air photographs. A strictly objective observer of the activities of people within this physical context would observe their movements much as an entomologist observes ants, some moving in regular patterns, some consuming objects and so on. But a person experiencing these buildings and activities sees them as far more than this – they are beautiful or ugly, useful or hindrances, home, factory, enjoyable, alienating; in short, they are meaningful.”

Relph, 1976:47

There are two immediate comments to make on Relph’s work in the current context: firstly, he is writing of *place identity*, which is a subtle aspect of sense of place. Secondly, his phenomenological perspective is high level and holistic. The component *physical setting* is arguably the most concrete of the three dimensions but the associated attributes of beautiful, ugly, useful and so forth are necessarily highly subjective.

Tuan’s work (Tuan, 1977) has been a parallel source of inspiration for place researchers. For Tuan, place entails a continuing relationship: “What begins as undifferentiated space becomes place as we get to know it better and endow it with value.” (Tuan, *ibid.*: 6). Tuan explores how

the freedom and threat of unknown space acquires the security and stability of place as the environment acquires meaning for the growing child, the fundamental relationship between concepts of place and the human body (an aspect which again poses issues for the more constrained forms of virtual environments), and the connections between space, place and time. Above all, spaces need to become meaningful to become places.

### 2.3 A sociological perspective

The work of the sociologist Gustafson (2001) provides a representative example of a more data-driven approach to place. This is now outlined because it is a particularly detailed and relatively recent instance of the genre, rather than a framework which needs to be understood for the purposes of the current discussion. Gustafson’s model for understanding the mapping of meaning to places is reproduced in Figure 1.

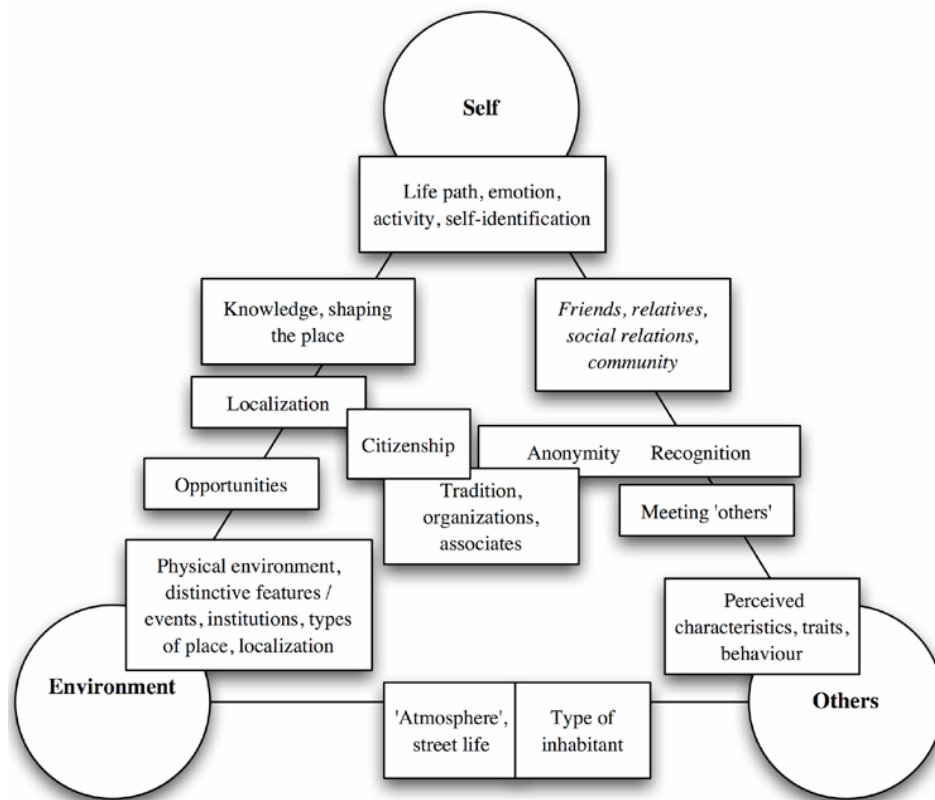


Figure 1: A three-pole model of the meanings attributed to place, redrawn after Gustafson, 2001

The model is based upon a semi-structured interview survey of fourteen people who were asked about places which were important to them and a review of related work by other authors. Using a grounded analysis of these data and aiming at “analytical not statistical generalization” (p.9) Gustafson identified main three themes comprising self, environment and others. Self includes an individual’s *life path*, *emotions*, *self-identity*, and one’s own *activity*. Environment takes in the *physical features* of the place and its *institutions* and *events*. Finally other people (others) comprises their *characteristics* and *behaviour*. Further factors such as *social relations* and *atmosphere* belong to the relationship between these dimensions<sup>1</sup>.

<sup>1</sup> To take the self-environment relationship as an example, Gustafson observes that in some cases places acquire meaning to their inhabitants through activities such as land cultivation, or through the particular activities which the place affords.

While it is interesting to note the recurrence of Relph's three key dimensions of physical setting, activities and meaning, it is equally clear that Gustafson's model poses a number of problems for the VR researcher. It is at once too elaborate and too vague (how, for example, would "opportunities" be translated into a design feature of a virtual environment); it is also based on long term exposure to places; and its many social dimensions are problematic for single-user VR applications.

## 2.4 Psychological perspectives

The work of environmental psychologists includes the study of place. For example, Sixsmith (1986), in a study of the meaning of 'home', identifies a number of personal, social and physical dimensions. She concluded that home is a multi-faceted concept with no single attribute making a place a home but conversely, the absence of any one potentially rendering a home a 'non-home'. Similarly Canter (1997) has developed a 'facet theory' of place which includes activities (one of the facets), physical characteristics, the individual, social and cultural experience and the scale of the place. More recently, Jorgensen and Stedman (2002) nicely illustrate the empirical approach in this domain. The authors propose that the interpretation of sense of place could benefit from treatment as an *attitude*. Just as any other attitude, sense of place has cognitive, affective and conative (or behavioural) components. Supporting data was obtained from a questionnaire survey of over 200 owners of rural second homes. It is suggested that the attitudinal components of sense of place are: (i) beliefs about the relationship between self and place (the cognitive component); (ii) feelings towards the place (the affective component) and (iii) behavioural exclusivity of the place compared with alternatives (the conative component).

## 2.5 Sense of place

From this brief review, it is apparent that irrespective of organising framework, methodological and philosophical differences the components of sense of place generally comprise:

- The physical characteristics of the environment;
- The affect and meanings including memories and associations, as well as connotations and denotations;
- The activities afforded by the place;
- The social interactions associated with the place (considered by some authors as a subclass of activities).

Downing's discussion of the role of designers' memory of significant places in creating meaningful environments is also helpful here. She observes:

"Although each individual image of place is unique, patterns of recurring domains emerged from this process; the secret place, the Arcadian place, the ancestral place, the shared place, the alone place, the intimate place, the gregarious place, places that stretch to meet the horizon line, and places that enclose and protect. Domains are symbolic of a quality of life; contact, retreat, participation, identity, love, grace, sensuousness, intelligence, fear, intimacy, growth, expansiveness, reflection, communing, and loss."

Downing, 2003:216

The opening clause of this extract emphasises another key element of the experience of place: its essentially personal nature. Most authors stress that while some generalisations are possible, sense of place remains *an emergent property* of interaction between an individual

and the environment, and while there are some shared elements, the experience of place is fundamentally unique to each of us. Place results from our experience of a space, our memories and emotional attachment to that space and the meanings we attach to it. Indeed, this view of sense of place parallels the constructivist view of presence as expressed, for example in Spagnolli, Varotto and Mantovani (2003), who propose “an agenda that focuses on the nature of presence, its coordinates and construction” as contrasted to “measuring the degree of presence felt by users” (*ibid*: 816). Our own work with sense of place adopts a similar focus, with the eventual aims of (i) understanding the nature of sense of place in virtual environments (ii) clarifying the relationship between place and presence, and ultimately (iii) informing the design and evaluation of virtual environments where a strong sense of place is important.

## 2.6 Relating Sense of Place to Presence

Many authors have presented reviews of presence and it is not the place of this paper to duplicate this. Rather than trying to relate sense of place to definitions of presence such as the *perceptual illusion of non-mediation* (Lombard and Ditton, 1997) or the *sense of being there* (e.g. Steuer, 1992 and many others) we consider place as a factor which might influence it. Factors influencing presence are manifold as the following list from Ijsselsteijn *et al.* (2000) demonstrates: extent and fidelity of sensory information, including vividness; match between user actions and display; ‘content factors’ including objects, actors, events, interactivity, autonomy of environment and agents, reactions of others, nature of task, meaningfulness; and finally, user characteristics. From our review of the place literature, we propose that sense of place might reasonably and usefully be considered as a further ‘content factor’. Indeed there is some indirect evidence of this in existing presence questionnaires. From Slater-Usoh-Steed’s questionnaire (their *italics*):

- Question 3. When you think back about your experience, do you think of the office space more as *images that you saw*, or more as *somewhere that you visited*?
- Question 5. Consider your memory of being in the office space. How similar in terms of the *structure of the memory* is this to the structure of the memory of other *places* you have been today? By ‘structure of the memory’ consider things like the extent to which you have a visual memory of the office space, whether that memory is in colour, the extent to which the memory seems vivid or realistic, its size, location in your imagination, the extent to which it is panoramic in your imagination, and other such *structural* elements.

And from Kim and Biocca’s questionnaire

- Question 1. When the broadcast ended, I felt like I came back to the “real world” after a journey.
- Question 7. The television-generated world seemed to only “something I saw” rather than “somewhere I visited”

Having concluded this survey of the existing place literature we now present its use in the analysis of two small, exploratory studies of re-created places using the BENOGO photorealistic technology.

### 3 Two exploratory studies

The two small studies of re-created place occurred early in the project and were intended both to trial the technology *per se* and to allow us to establish the usefulness of a qualitative approach to its evaluation. As Spagnolli and her colleagues (*ibid.*) propose, techniques from the social sciences have much to offer in this kind of research. These include direct observation or more commonly, video-recording, although free-form or semi-structured interviews and the collection of relevant artefacts also play significant roles. Accompanying these qualitative data elicitation techniques are a raft of methods for their analysis. Of particular interest here are discourse analysis approaches which are used to identify higher-level discourse fragments and action sequences. The approach is one of identifying themes and regularities from the data, rather than formal hypothesis testing. Grounded theory, comprehensively described in Glaser and Strauss (1967), and usefully summarised in Giles (2002) is one such technique. Prior applications of such techniques in presence-related work can be found in the use of a close discourse analysis in Spagnolli *et al.* (*ibid.*) in their ethnographically-based study of interaction in a virtual library, and in the work of Murray *et al.* (2000) whose analysis focuses on the identification of emergent themes in interview and observational data from participants' exploration of a virtual city.

The work described below analyses data from participants' subjective reports of their experience. The subjective/objective debate remains a lively topic in the Presence community. We maintain the position that both types of data are necessary to further a full understanding of experiential phenomena such as presence and sense of place. This issue is revisited in section 6.3.

### 4 Study I: In amongst the plants

Study 1 placed participants in a photo-realistic re-creation of a glasshouse in the Prague botanical gardens. Participants experienced a 360° strip of the interior of the tropical glasshouse via a head-mounted display (see figure 2). The V8 HMD used has a resolution per eye of ((640x3)x480) and a 60° diagonal field of view.

A restriction of the image capture and processing process was that no moving objects – including people – could be included in the panorama. Participants could move their heads to look all around them, but not move 'into' the environment, nor touch any objects therein. External speakers provided a spatialised soundtrack of sounds considered appropriate to the setting – primarily birdsong and moving water. The photorealistic scene was augmented with a synthetic object (a 3-D rendered abstract sculpture) to assess its perceived integration with the overall scene.



Figure 2: a 'strip' from the Botanical Gardens panorama

#### 4.1 Participants and method

Twenty-seven volunteer participants took part in the study, of whom 21 provided usable data for the current work<sup>2</sup>. They were drawn from the academic, administrative and student communities of the Aalborg University, Denmark where the BENOGO hardware was located.

---

<sup>2</sup> Some of the recordings proved to be inaudible.

All participants had a good command of English, the language used for the study. Each participant was randomly assigned to one of two conditions – concurrent verbalisation (providing a running commentary on the experience) or a post-trial semi-structured interview. These conditions were designed to produce complementary data. Concurrent verbalisation as employed here aimed to elicit phenomenological data (from the immediate contents of awareness or consciousness). While it is recognised that (e.g. Russo *et al.*, 1989) that the activity of verbalisation can interfere with memory intensive tasks, it is not clear whether this would be the case in this instance. This problem is avoided in retrospective accounts – such as being interviewed after the VR episode, but these too can be subject to distortion by participants attempting to ‘make sense’ of their experience, or omitting material which may seem inappropriate, irrelevant or simply silly.

The participants were required to stand in a central position surrounded by four speakers and to wear a head mounted display. They were informed that they could turn 360° in either direction and look up and down. The participants were given ten minutes to experience the virtual environment.

#### *Concurrent verbalisation*

Fourteen participants were asked to provide a concurrent commentary on their experience as they explored. Participants were gently prompted (“please speak aloud”) if they fell silent and an audio recording of each session was made and subsequently transcribed. Eight sets of usable data from six males and two females were obtained.

#### *Interview data*

The remaining thirteen participants took part in individual semi-structured interviews. They were asked open-ended questions about the main features of their experience and their responses to it, together with more specific questions probing reactions to aspects of the virtual experience of interest to the VR implementation team such as perceived sense of scale and freedom of movement. Again a recording was made. Thirteen sets of usable data from nine males and four females were obtained.

## **4.2 Analysis methods**

Analysis of both data sets adopted the following procedure (in common with many other studies using a qualitative approach).

- (i) Familiarisation with the video/audio taped material and the resulting transcriptions;
- (ii) Identification of discourse fragments corresponding with the dimensions of sense of place noted at section 2.3; identification of any themes which did not fall into these dimensions;
- (iii) Review of the categorisation of discourse fragments to dimensions; revised categorisation where necessary.

The final set of dimensions were:

*Physical attributes:* Identification and description of features in the environment, typically plants, a bridge, paths and the ‘augmented’ synthetic object. Also including sounds and smells, and features whose absence was remarked upon.

*Activities:* References to actual or desired activity in the environment.

*Meanings and affect:* Being reminded of other similar places, typically other botanical gardens, other personal experiences, positive or negative emotions.

*Social interaction:* References to other people in the environment, whether seen or heard, reactions to other people, references to joint activities.

And *artefacts of the study:* Comments relating to the experience of taking part in the study together with observations and reactions to the technology, typically the headset and its cables, and the technical aspects of the representation of the environment, typically clarity, realism and distortion.

### 4.3 Results

Both concurrent vocalisation and interview data included instances of each of the place dimensions and the further dimension of artefacts of the study. While our analysis is primarily qualitative, a simple count of the instances of each dimension and the distribution of these instances between participants is useful in illustrating their relative frequency. Table 1 holds the result of this analysis.

	<i>Concurrent vocalisation</i>		<i>Interviews</i>	
	Frequency	Mentioned by <sup>3</sup>	Frequency	Mentioned by
Physical attributes	66 (57.4%)	8 / 8	183 (68.0%)	13 / 13
Meanings/affect	19 (16.5%)	6 / 8	13 (4.8%)	8 / 13
Activities	9 (7.8%)	5 / 8	2 (~1%)	2 / 13
Social interaction	1 (<1%)	1 / 8	1 (<1%)	1 / 13
Artefacts of the study	20 (17.4%)	7 / 8	70 (26.0%)	11 / 13

Table 1: A summary of the number of instances mentioned by the participants

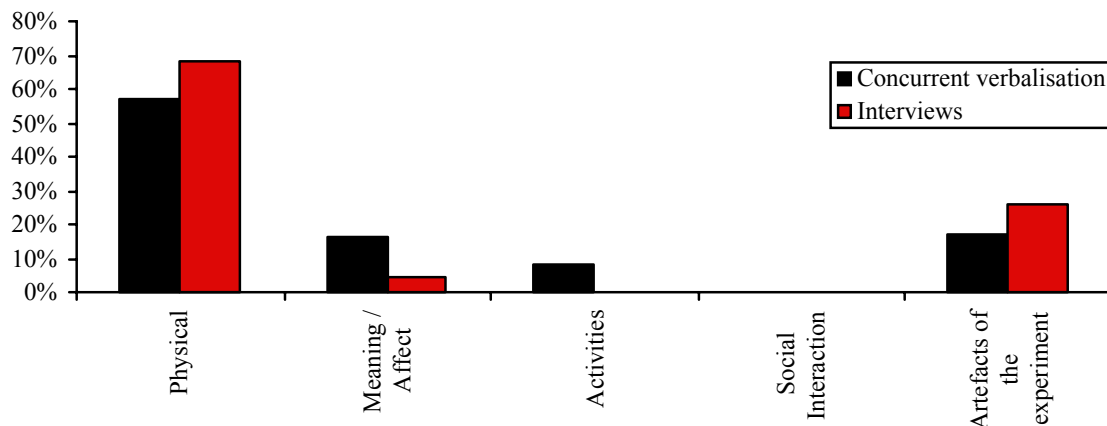


Figure 3: Findings from study I

Examples of discourse fragments for each dimension are set out below.

#### *Physical characteristics*

All participants commented on visual features such as trees, plants, water and paths.

I see a garden with a bridge and an object, looks like coming from a leaf, staying in the middle, then I see the sun on the leaves. I hear some water. I see the roof.

Some remarked on other sensory phenomena, most commenting on sound and a few on other modalities.

<sup>3</sup> That is, all 8 participants of the 8 in the study and so forth.

I can hear the water, something is dripping on the right side.

The light of the sun is nice, warm, it's warm.

But more commonly, sensory input other than vision and sound was remarkable by its absence.

I have been to a botanical garden and some of the most distinct things about that is...the warmth and the water in the air and the smells that make a big impression when you are there and I needed that to make this seem more real.

There is no moisture in the air, in my breathing or sensing on my skin.

#### *Meanings and affect*

There were mentions of associations with other botanical gardens and in one case, holidays, and several people remarked that they found the experience enjoyable in a low-key fashion.

It reminds me of a place, a museum in Copenhagen which has a kind of indoor garden like this. It's not the same actually but it sounds very much the same. So it kind of reminds me of that place and I am associating, trying to draw on my experiences of being in a place like that...

It reminds me of being on a holiday in a different place.

Relaxing, taking a break from daily routines and looking at something very pleasant.

#### *Activities*

Frustrated attempts to move and mentions of wanting to move or explore were voiced by most participants. No other activities were mentioned beyond wanting to inspect the flora more closely and look for animals, mentioned by one participant in each case.

I get the feeling of being attracted to walking over the bridge or trying to step down on some other place maybe walk round, to explore it even more

I miss some action like I could pick some flowers or there were labels on the flowers then I could explore.

#### *Social interactions*

As we have already noted, the restrictions on moving objects in the photo-realistic environment precluded the inclusion of other people. Only one person remarked on their absence, and no-one voiced a desire to participate in any form of social activity. One other participant inferred the presence of unseen people.

Yes there is no movement in the scene but there is a lot of people making noise.

#### *Artefacts of the study*

Finally, many people noted the physical sensations of wearing the headset and being aware that they were tethered by its cables.

I'm kind of chained to this place. I would like to explore.

## **4.4 Discussion of results**

The four-dimensional account of real places appears to be a useful framing device for these kinds of qualitative data. The most striking result is the predominance of comments on the physical appearance of the virtual scene. This may reflect the visual immediacy of the VR experience and is consistent with our earlier study of place (Turner and Turner, 2003). Participants also appeared, once one visual feature had been mentioned, to be drawn into compiling a lengthy list of other features.

With the caveat that our sample size was small, there appeared to be no qualitative or quantitative difference between the data elicited using concurrent verbalisation and post-trial interview. Of what people mentioned or remembered, the physical appearance was the most

common, then attributed meanings and affect, then the range of possible activities and finally, social interaction. The order was the same for both conditions. While there is no particular overhead in using concurrent verbalisation, there is no particular advantage either.

As to the question, “Did the technology re-create the sense of being in a glass house in the real botanical gardens in Prague?”, the answer must be – not proven. It may be that the technology reproduced the appearance of the glass house but not a sense of being there.

## 5 Study II: Sitting on the stairs

This second study used a photo-realistic re-creation of an elegant stairway and landing at the Technical University of Prague. This scene was augmented by a computer-generated desk placed on the landing. The stairway was viewed by means of a head mounted display, specification as in Study I. The audio environment was designed to be silent except for the sound of breaking glass – the reasons for this are explained below. Unlike study I where the re-created scene was limited to a narrow strip, this study re-created a 360° spherical image of the stairway which also permitted the participants to either sit or stand. We also introduced a contextualising narrative or scenario. Participants were asked to imagine themselves as a security guard sitting at a desk on the landing of the stairs and to report any untoward events to security control room staff (played by a member of the project team). Participants sat at a real desk placed to correspond with the position of the synthetic desk in the re-creation. The sound of breaking glass was introduced part way through the ten minutes experience to enhance the scenario.

### 5.1 Participants and method

Twenty participants took part, drawn from the same population of university academics, administration staff and students as Study I. Although most were Danish, as before all had good spoken English. Participants were familiarised with the VR technology as in study one, with the additional information that they could rise from their initial sitting position to look around from a (stationary) standing position. They were also briefed with the scenario and their role in it. The experience commenced with the participant sitting at the security guard’s desk. Data collection methods and analysis procedures were as study I and the data obtained is reported as for that study.

It should be noted that sounds of conversation and human activity in adjoining (real) rooms were also audible during these studies. While this was an unintentional artefact of the physical arrangements for the study process, many participants appeared to integrate these unwanted sounds seamlessly into their experience<sup>4</sup>.

### 5.2 Results

Table 2 holds the quantitative results of this analysis.

	<i>Concurrent vocalisation</i>		<i>Interviews</i>	
	Frequency	Mentioned by	Frequency	Mentioned by
Physical	37 (42.5%)	10 / 10	101 (43.3%)	10 / 10
Meanings/affect	1 (1.1%)	1 / 10	36 (15.5%)	10 / 10
Activities	24 (27.6%)	10 / 10	32 (13.7%)	8 / 10
Social interaction	7 (8.0%)	7 / 10	7 (3.0%)	4 / 10
Artefacts of the study	18 (20.7%)	2 / 10	47 (24.4%)	4 / 10

<sup>4</sup> The *impression* from the verbal protocols was this was very reminiscent of how external sounds (e.g. a passing emergency vehicle) can be integrated seamlessly into the dreams of a nearby sleeper.

Table 2: A summary of the number of instances mentioned by the participants

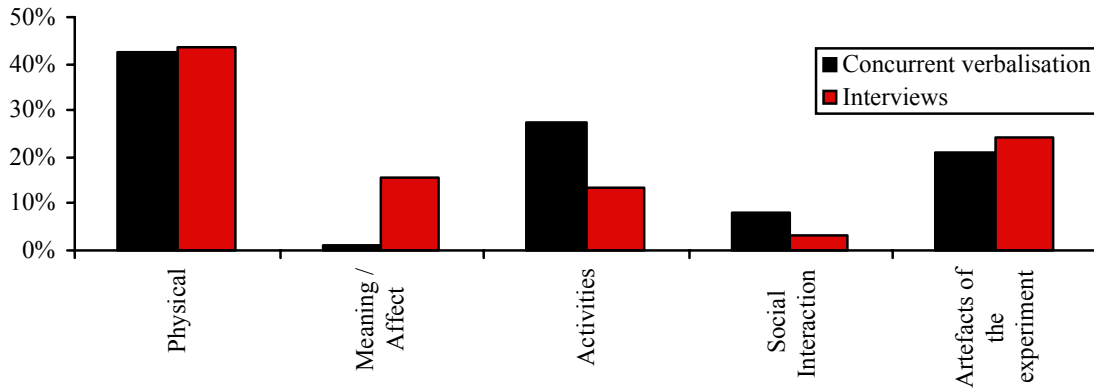


Figure 4: Findings from study II

### *Physical characteristics*

As for study I all participants remarked on the visual characteristics of the space. The sound of breaking glass was also noted by all.

I could see the entrance with the desk clerk down at my right hand downstairs and continue up past me up until some exhibition room behind me I had some boards with notices on, all sorts of notice boards some coloured, some white and if you proceed up from the stairs, up from downstairs ... from the main entrance, you could go up a level on the same side, go above the entrance ...

I hear something, there was some glass breaking or something.

### *Meanings and affect*

As can be seen from figure 5 below, the room had a good deal of character. This appeared to prompt associations.

Oh I love the room, it was ... the style was *errm*... yes old fashioned but it was good ... it was a light room ... but also because there was ... because of the walls and the floors and something it was a hard room the noises inside the room was hard and cold, if you can say that...

... it was very empty I think, am, very ... very impersonal feeling...

...a French university in Paris, for instance, I just visited a university in Paris and they had this kind of hallway just like that and the sounds in that specific university would be just like I heard it here, so it was very much like that experience.



Figure 5: a view of the stairwell

Unfortunately, the most intriguing comment here is omitted as a direct quotation because the sound quality does not permit a completely confident transcription – the participant seemed to be describing the room not at all *hygge*. *Hygge* is the highly useful Danish term embodying concepts of cosiness, warmth and friendliness.

#### *Activities*

In this study participants appeared to take on their job as a security guard with some relish. Most reported activities – largely looking and listening - related to this, coupled with more generic (frustrated) desires to move around.

... my job to ... yes to be the security guard ... and see what happened ... listen to the sounds in the room ... coming from the other rooms and so on and so on...

I think it took a lot of my attention just looking down, if anybody were coming in or going and then of course I was listening to all these... these voices around ...

...had the feeling I wanted to stand up and walk around in the room...

#### *Social interaction*

This category is almost entirely confined to mention of making sense of voices in the background elsewhere in the (real) room which were unintentionally audible to participants. The third comment reported here is interesting as it suggests less superficial human associations. It is however the only example of this type.

...it was such a big mix of many conversations, you couldn't make any sense out of them, so it was just, it was just human noise.

it reminds me about a school I used to go to ...ah... got me thinking of the people I met at that school ...very institutional.

#### *Artefacts of the study*

Comments here focussed on the quality of the VR representation and the physical sensations of wearing the HMD.

The table here looks really like the table I am feeling, but the shadows here look a little bit clumsy.

it was totally like I was there ... only the helmet is way too heavy

A few remarks falling into this category were queries about what a participant should be doing.

I notice that the light changed. I don't know if that is something I should report or not.

### **5.3 Discussion of results**

Unlike the first study, these data are more difficult to interpret. While the physical characteristics of the re-created place again dominate both conditions, greater mention of possible activities is made than in study I. Only one person, however, mentioned meanings and affect in the concurrent verbalisation condition compared with everyone who was interviewed. Why this should be so is not clear and again it should be recognised that these data should be treated with caution given the small sample size. As for the scenario: from participants' comments it appeared to increase involvement very strikingly, but whether or not involvement enhances a sense of place requires further investigation. Relph (1976) certainly includes involvement as one of the factors leading to a sense of feeling 'inside' a place (as contrasted to a sense of 'outsideness' or alienation) but cites no empirical data to support this. Finally, "Did the technology re-create the sense of being seated at a desk on a staircase in Prague?", the answer is again not proven.

## **6 Discussion**

This paper set out to review the literature relevant to place (and sense of place) and to determine whether this is of value to the presence / VR researcher. Four dimensions of place were identified which have provided an organising framework for the qualitative data which we have reported. We found that people did describe the physical characteristics of the glasshouse and staircase and voiced the desire to explore and move around: activities which were appropriate to these places. Memories and associations were triggered and particularly with the staircase, affective qualities described. While no other people were present in the environments, we have some evidence for participants characterising their experience in terms of social interaction: there was attribution of 'noises of' to the background presence of others and in one case, a participant 'saw' a shadowy figure. The use of the scenario had a striking effect but may have simply increased the sense of involvement rather than enhancing sense of place.

The place literature has thus provided a starting point for conceptualising the problem of place in virtual environments and a convenient means of structuring data analysis. However, existing place theories and empirical work lack a consideration of how people experience places which are only encountered relatively briefly, rather than being the subjects of long-established residence or long-term attachment. Such aspects of place experience are much more directly equivalent to most VR experience.

Some of the issues we anticipated in the introduction were encountered. Having at the outset noted that sense of place was highly personal, this did indeed appear to be a complicating factor. Participants varied widely in the expressiveness, effusiveness or economy of the descriptions they produced, which ranged from the deeply textured to the flat and dull. We have noted this range of individual differences in elicited descriptions of place elsewhere (Turner and Turner, 2003). However, places themselves also differ widely in the richness of experience reported, as we discuss in section 6.1. and this may also have influenced our results.

Secondly, as the virtual re-creations are relatively impoverished, direct comparison with how people experience real place is necessarily always unfavourable. The challenge is to identify which aspects of place can best survive their translation into virtual reality given its

constraints. Some brief indications as to how this might be approached are below at 6.2. and 6.3.

## 6.1 Not all places are equal

A discussion of individual differences should not be confined to people. All places, by definition, are individual. However, this is not necessarily true of the experience of place. Relph (*ibid.*) describes certain types of places as being *placeless* while Augé (1995) uses the term *non-place*. Examples of placeless places are fast food restaurants, the uniformity of ‘new towns’, shopping malls and airports, or places characterised by abandonment or instability. Indeed, in everyday language we may speak of hotel rooms as being ‘neutral’ or ‘harmless’ and ‘could be anywhere’. Relph writes that the ‘inauthentic attitude of placelessness’ is due our ‘superficial and casual involvement’ with that place (*ibid.*: 80).



Figure 6: A corridor of cabins in a North Sea ferry – July, 2003



Figure 7: A synthetic rendering of a corridor of cabins (screenshot from the DISCOVER project).

“Superficial and casual involvement” seems like a fair description most people’s use of VR systems and the problem of placelessness in virtual environments is not unknown – one consequence of which is difficulty in wayfinding. It may be that, unintentionally, the locations chosen for the studies discussed above were intrinsically placeless in character.

## 6.2 ‘Minimal’ Places and Chiaroscuro

We have considered two alternate strategies to the computationally demanding photo-realistic approach to re-creating places. Firstly, if recreating the full richness of real places is beyond our reach can we select places which are in some sense restricted? One kind of real place which limits interaction is, paradoxically, a scenic viewpoint. We are directed to viewpoints – often on roadsides – as being places where we are invited to stand and stare. Figure 8 is an image taken from a fairly typical roadside viewpoint. This viewpoint allows us to look at Torghatten – a hat-shaped island. There are no other associated senses (smell, sound and so forth are irrelevant) and no interaction with the island is possible.



Figure 8: Torghatten

Perhaps viewpoint-like places such as this could reasonably be recreated using photo-realistic technology. These ideas are developed more fully in Turner *et al.* (2005).

Secondly, place is a chiaroscuro. Technically, chiaroscuro is the use of dramatic contrasts of light and shade in paintings and drawing to create the illusion of depth and volume. The artist J. M. W. Turner's work, for example, takes the traditional technique further through fine gradations of colour and light. His portrayals of Venice are a compelling instance of the creation of a sense of place through a 2-dimensional canvas. In many of his works, Turner's Venice is conveyed through impressionistic sketches, details are absent or vague, the edges of the space ill-defined. Yet the spectator is transported to the Rialto or St. Mark's Square.

Similar everyday miracles are achieved by stage designers with sound, lighting, props and scenery, and by travel writers, novelists and other writers simply through text. None of these are photorealistic. We propose that adopting a lighter weight but multi-sensory chiaroscuro, coupled with an embedding narrative, may be a useful, complementary approach to recreating virtual places.

### 6.3 Subjective And Objective Perspectives

While the focus of this paper has been on the dimensions of the experience of place it should not be forgotten that BENOGO is a presence research project. Indeed we have also argued that sense of place may be a content factor in the experience of presence. All of the work presented here has been qualitative - for some readers 'unscientific' - and unapologetically subjective. This issue is not unique to presence research. Varela and Shear (1999:1) in their introduction to an issue of the *Journal of Consciousness Studies* contrast first- and third-person perspectives: by first-person perspectives "we mean the lived experience associated with cognitive and mental events" – this clearly includes presence. In contrast, third-person descriptions are concerned with the study of other natural phenomena which are "not clearly or immediately linked to the human agents who come up with them". The philosopher Thomas Nagel sees this a little differently when in his *View from Nowhere* (1986) he writes, "this ... is about a single problem: how to combine the perspective of a particular person inside the world with an objective view of the same world, the person and his viewpoint included" (p.3). He also notes that if we could we could say how the internal and external viewpoints are related, how each of them can be developed and modified in order to take the other into account, [...] it would amount to a worldview. So here we have it: presence and sense of place are first-person perspectives while the models of presence are objective and scientific. This is not a problem for the social scientist or the technologist but for both.

## Acknowledgements

We gratefully acknowledge the support of the EU for the BENOGO project, the contribution of our other BENOGO partners and in particular Fiona Carroll, Rod McCall and Shaleph O'Neill at Napier University for the collection of the data.

We would also like to thank the anonymous reviewers of earlier versions of this paper for their invaluable comments.

## 7 References

Augé, M. 1995. *Non-places: Introduction to an Anthropology of Supermodernity*. Trans. J. Howe. London: Verso.

Bakstein, H. and Pajdla, T. (2003) Rendering novel views from a set of omni-directional mosaic images. In *Proceedings of Omnivis 2003*. Los Alamitos: IEEE Press.

Canter, D. (1997). The Facets Of Place. In G. T. Moore and R. W. Marans, (Eds.), *Advances in Environment, Behavior, and Design, Vol. 4: Toward the Integration of Theory, Methods, Research, and Utilization*. New York: Plenum, 109-147.

Denley I. and Long, J. (2001) Multidisciplinary Practice In Requirements Engineering: Problems And Criteria For Support. *People and Computers XVI – The Proceedings of the Joint HCI-HMI Conference*, 125-138.

Downing, F. (2003) Transcending Memory: Remembrance And The Design Of Place, *Design Studies*, **24(3)**, 213-235.

Feldman, D., Assaf, Z., Weinshall, D. and Peleg, S. (2003) New View Synthesis with Non-Stationary Mosaic-ing. In *Proceedings of Mirage 2003*, INRIA, France.

Giles, D.C. (2002) *Advanced Research Methods In Psychology*. Routledge, 167-180.

Glaser, B.G. and Strauss, A. L. (1967) *The Discovery Of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine

Gustafson, P. (2001) Meanings of place: Everyday experience and theoretical conceptualizations, *Journal of Environmental Psychology*, **21**, 5-16.

Harrison, S. and Dourish, P. (1996) Re-Place-ing Space: The Roles of Place and Space in Collaborative Systems. *Proc. CSCW'96*. ACM Press.

Jorgensen, B.S. and Stedman, R. C. (2001) Sense of place as an attitude: Lakeshore owners attitudes towards their properties. *Journal of Environmental Psychology*, **21**, 233-248.

Kim, T. and Biocca, F. (1997). Telepresence Via Television: Two Dimensions Of Telepresence May Have Different Connections To Memory And Persuasion. *Journal of Computer Mediated Communication*, **3(2)**: <http://www.ascusc.org/jcmc/vol3/issue2/kim.html>

Lessiter, J., Freeman, J., Keogh, E., and Davidoff, J. D. (2001). A Cross-Media Presence Questionnaire: The ITC Sense of Presence Inventory. *Presence: Teleoperators and Virtual Environments*, **10(3)**, 282-297.

Nagel, T. (1986) *The View From Nowhere*. Oxford University Press.

Relph, E. (1976) *Place and Placelessness*, London: Pion Books

Russo, J., Johnson, E. and Stephens, D. (1989). The Validity Of Verbal Protocols. *Memory and Cognition*, **17**, 759-769.

Sixsmith, J. (1986). The meaning of home: An exploratory study of environmental

- experience. *Journal of Environmental Psychology*, **6**, 281-298.
- Slater M., Usoh M. & Steed A. (1994). Depth of presence in virtual environments. *Presence, Teleoperators, and Virtual Environments*, **3**, 130-144
- Spagnolli, A., Varotto, D. and Mantovani, G. (2003) An Ethnographic, Action-Based Approach To Human Experience In Virtual Environments. *Int. J. of Human-Computer Studies*, **59**, 797-822
- Tuan, Y.-F. (1977) *Space and Place*. Minneapolis: University of Minnesota Press.
- Turner, P. and Turner, S. (2003) Two phenomenological studies of place. *People and Computers XVII – Proc. HCI Conference*, 21-35.
- Turner, P., Turner, S. and Carroll, F. (2005) The Tourist Gaze: Towards Contextualised Virtual Environments. In P. Turner and E. Davenport (Eds.) *Spaces, Spatiality and Technology*. Springer, 281-297.
- Varela F.J. and Shear, J. (1999) First-Person Methodologies: What, Why, How? *Journal of Consciousness Studies*, **6 (2-3)**, 1-14.
- Witmer, B.G. and Singer, M.J. (1998) Measuring Presence in Virtual Environments: A Presence Questionnaire. *Presence: Teleoperators and Virtual Environments*, **7(3)**, 225-240.