Triangulation *In* Practice

Phil Turner, Susan Turner

School of Computing, Napier University Edinburgh, UK
{p.turner@napier.ac.uk, s.turner@napier.ac.uk}

Abstract

Triangulation is the means by which an alternate perspective is used to validate, challenge or extend existing findings. Triangulation is used in disciplines as diverse as astrophysics to a number of the social sciences. It is used when the field of study is difficult, demanding or contentious and few would disagree that presence research meets these criteria.

*The alternative perspective we have drawn upon is an analysis of the word **in** as found in Heidegger's famous dictum "being-in-the-world". This <u>ontological</u> analysis reveals that **in** embodies both the concepts of spatial presence and of involvement – and, by extension, various forms of engagement. We show how this analysis is consistent with the epistemological findings of empirical presence research. Finally, we also offer our own simple qualitative study of why people play (video) games and triangulate these findings using this ontological analysis.*

We conclude that Heidegger's ontological work does (at last) have a place alongside empirically-driven presence research.

Keywords --- **Triangulation, Involvement, Engagement, in, Heidegger, Game Playing**

1. Introduction

There is an understandable pre-occupation in presence research with clarifying terms and reviewing and re-reviewing the many definitions of presence (e.g. [1]). Faced with such difficulties it is equally unsurprising that researchers have turned to a number of other disciplines including philosophy (e.g. [2], [3], [4], [5]) to help elucidate the task of delineating presence. However this presents us with the so-called *socio-technical* gap which refers to the differences and difficulties in establishing a common language, conceptual and theoretical framework between the two disparate disciplines. However, it may be possible to make a virtue of this very difficulty as philosophy, in this instance, offers a means of *triangulating* existing findings in the corpus of presence research.

Triangulation refers to using an alternate perspective on a difficult or contentious area of research to validate, or challenge, initial or existing findings. To date the study of presence has been from a scientific (epistemological)

perspective. From the time of Aristotle, scientific knowledge - episteme – has been characterised as universal (in the sense that observations hold from all points of view[21], invariant, context-independent, detached[22] and based on a general analytic rationality [6]. And this approach has served us well. However a number of areas within the social sciences employ triangulation as a means of validating or confirming methodological or empirical findings. Given that presence research has had problems in the past in even defining what it is about, it is not unreasonable to suggest that triangulation might be a useful tool in not just validating existing findings but perhaps challenging or extending them too.

2. Triangulation

The purpose of triangulation in research is to increase the credibility and validity of the results. Cohen and Manion [7] define triangulation as an "attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint" (p.254). Similarly, Altrichter, Posch, and Somekh, [8] regard triangulation as a means to achieve "a more detailed and balanced picture of the situation" (p. 117). Denzin [9] describes four different forms of triangulation:

---

[21] Stenger (2006) explains that the power of currently accepted models of physics arises from what he calls "point-of-view invariance", i.e., they have the ability to make the same predictions regardless of where or when an observer is taking measurements.

[22] Detachment is another important distinguishing characteristic of the epistemic perspective and as Spinosa et al. (2001) have noted on this issue, "to understand what is happening, say, in a bustling port or on a battlefield, a port supervisor or a general who is seeking detachment would find high ground from which to view operations below in their interrelations as a whole" (p.6). As they further observe, detachment also "enables us to extract ourselves from the passions of the moment". For example, we typically dismiss, or at least treat with caution, statements spoken in the heat of the moment. TV newsreaders are seen to be delivering the news objectively and accurately providing they do not show emotion. Speaking passionately is less valued (at least in the West) than a passionless, calm and detached appraisal. Finally, Spinosa et al. note that "detachment reaches its final form when we privilege the instrumental view that comes when we look at things with foreign eyes" (p.7). This instrumental detachment has allowed us massive strides forward in physics, chemistry and the other natural sciences. Indeed physics has totally de-contextualised the building blocks of matter into n-dimensional vibrating strings expressed in a mathematics understood by very few.
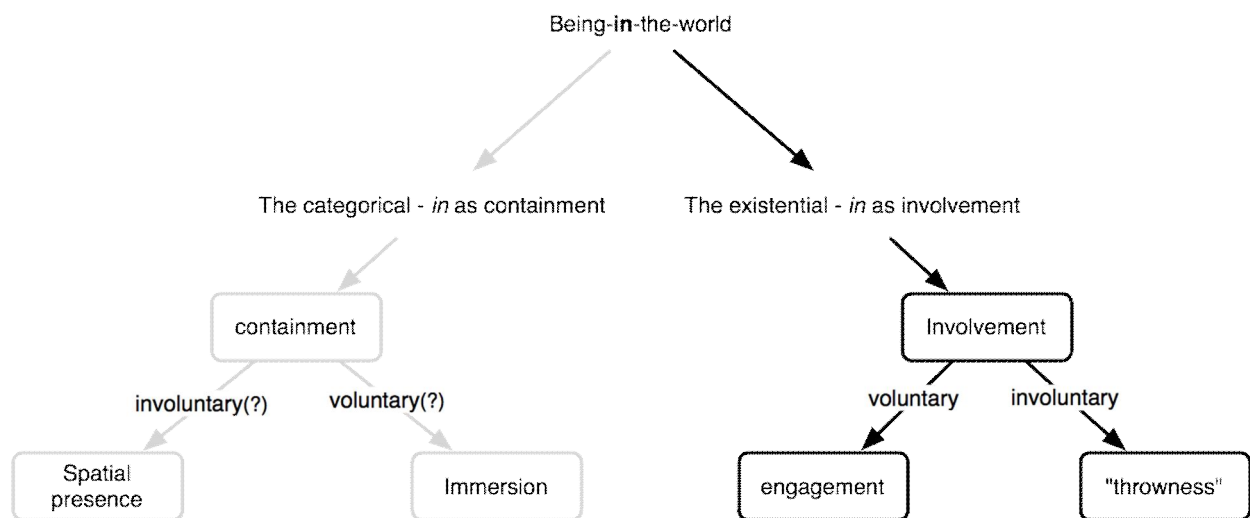
Figure 1 An initial ontological analysis of involvement

Data triangulation – the use of heterogeneous data sources which may be qualitative and quantitative, and /or gathered by different methods or by the same method from different sources or at different times.

– *Investigator triangulation* which involves the use of multiple researchers in an empirical study.

– *Theory triangulation* which involves using more than one theoretical framework in the interpretation of the data (such as this).

– *Methodological triangulation* which involves using more than one method to gather data.

Triangulation, in whatever form, is based on the assumption that using several data sources, methods and even investigators will obviate any bias found in an existing data set. Thus, by using several different methods in the investigation of a phenomenon we can increase the confidence we have in our conclusions [10]. This does, of course, raise the spectre of confirmation bias – which was clearly present in a number of the social science studies we have reviewed – and a point to which we will return in the final section of this paper.

Now let us consider whether presence is an appropriate domain for triangulation. Presence, the ISPR site tells us, is a psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience. And an experience is private, personal and not directly accessible. Writing of experience, Davis [12] notes, it is not an object (or even a collection of objects), but a process; and experience is an intangible process of interaction among humans and the world that has its existence in human minds. We could go on, but no one is going to deny that this is a demanding and

contentious domain. Faced with such difficulties it would be prudent to triangulate our epistemic findings with another perspective.

We now turn to our proposed the alternate perspective, namely, the ontological.

3. *In* – an ontological perspective …

Ontology refers to the study of the nature of being and as such is distinguished from epistemology, the study of the nature and character of knowledge. A number of ontological arguments and positions have already appeared in presence research ([4], [13], [14], [15]) and while they are of considerable interest they are not directly relevant here. Indeed rather than arguing for an ontological account of presence *per se*, we are interested in the instrumental use of ontology.

The ontological argument we develop is based on Heidegger's analysis of being [16], so let us take a moment to remind ourselves of that. First of all, Heidegger's philosophy focuses on the ontology of human beings (who he describes as Dasein[3]). In doing so, he distinguishes and distances himself from those who are concerned with epistemology which he regards as "disinterested and theoretical knowledge". To be a human being - *Dasein* - is to be 'in-the-world' which is a fundamental fact of our being. This world comprising everyday practices, equipment and common skills shared by specific communities. Thus Dasein and world are not two distinct entities (hence Heidegger's use of hyphens) but one which is a direct result, a direct consequence of Dasein's *involvement* with it. However rather than focussing on *being* or *world*, we

---

3. Dasein is from da-sein, which literally means being-there/here, though Heidegger was insistent that the term was to be used un-translated.

consider the apparently insignificant preposition, *in*.

Figure 1 is an initial hermeneutic analysis of this word. The first distinction we make is between *in* as a categorical and *in* as an existential. We can clearly distinguish between the categorical sense of *in* as *in*clusion, being-in ("she is in the office") from the existential sense such as "she is in the mood"; "she is in management". Thus the categorical use of *in* is clearly related to the Aristotelian concept of containment. (We have greyed-out the left hand side of the diagram as we will not be discussing this in detail). Indeed Heidegger himself is more interested in the existential sense of in than the categorical. He uses etymology to demonstrate what he describes as the primordiality of *in* as meaning *involvement*. By primordiality he is underlining the most fundamental nature of in; or the aspect of *in* which does not rely upon other concepts. He writes: *In' is derived from 'innan' – 'to reside', "habitare", "to dwell". 'An' signifies 'I am accustomed', 'I am familiar with', 'I look after something' ... The expression 'bin' is connected with 'bei', and so 'ich bin' ['I am'] means in its turn 'I reside' or 'dwell alongside' the world which is familiar to me in such and such a way.* Dasein's way of being-in consists in dwelling or residing, that is, being 'alongside' the world as if it were at home there. So in contrast to mere containment the existential aspect of *in* is better understood in terms of *in*volvement. It is the *in* of being in love, of being in business, of being *in* the cinema (i.e. involved with the movie rather than sitting in row g).

Involuntary involvement or *throwness* to use Heidegger's terminology refers to our unwitting participation in a situation. We find ourselves thrown into a situation. We cannot, for example, choose not to understand our native language; in the context of a meeting most of us cannot let a clearly incorrect assertion go by without objecting to it; we cannot help jumping at scenes in scary movies. All of these examples illustrate the fact that we cannot help but be involved in certain situations. This is not to suggest that we cannot 'tune' out, direct our attention elsewhere and be voluntarily involved. For the purpose of this argument we shall define voluntary involvement as engagement. I can choose to read a novel / watch a movie – whatever - which, if suitable structured and presented, will engage me. I can sit working at a piece of academic writing until my engagement with this is interrupted by the tap on the door of a hapless student.

We return to this ontological analysis after we have considered the equivalent epistemological perspective.

4. … the Epistemological view

The dominant paradigm in the empirical development of theories of [spatial] presence has been to hypothesise the dimensions of, or contributory factors to, presence, to create experimental conditions where presence may be experienced, to vary those conditions appropriately, to measure and analyse the results, and to produce a modified theory. Questionnaire instruments have played a major role in this classically empiricist approach, both as ready-to-hand tools and as the basis for theoretical contributions through the delineation of the dimensions of presence which is inherent to their development. It is this identification of the dimensions of presence, typically resting on the results of factor or cluster analysis, which is of interest to us here.

An early example of this process, Witmer and Singer's [17] presence questionnaire is derived from their theory the presence is a product of immersion and involvement. The initial factors suggested were 'control', 'sensory', 'distraction' and 'realism', these being modified to 'involved/control', 'natural' and 'interface quality' after cluster analysis, and eventually to, 'involvement', 'adaptation/immersion', 'sensory fidelity, and interface quality after the meta-analysis reported in Witmer, Jerome and Singer [18]. Another early project, the Igroup Presence questionnaire developed by [19] drew on established instruments but added items covering technological and context variables. A factor analysis suggested three factors relating to presence: 'spatial presence', 'involvement' and 'realness', distinguishing also five further factors pertaining to immersion.

Other instruments follow a comparable development process. The list below details the dimensions of presence as proposed in a sample of this strand of empirical work published over the last decade.

Witmer and Singer, [17, 18]	Involvement
	Adaptation/immersion
	Sensory fidelity
	Interface quality
Schubert Friedmann, F. and Regenbrecht, [19]	Spatial presence (in relation to one's own body)
	Involvement
	Realness
Usoh, Catena, Arman and Slater [20]	The sense of 'being there'
	The sense of reality
	The impression of having visited a place
RJP [21]	Quality/realism
	Reality judgment
	Presence
	Interaction/navigation
	Emotional engagement
	Emotional indifference
SVUP [22]	Quality evaluations
	Attitudes
	Presence
	Realism
ITC-SOPI [23]	Physical space
	Engagement
	Naturalness
	Negative effects
MEC-SPQ [24]	Attention allocation
	Spatial situation model
	Spatial presence
	Higher cognitive involvement
	Suspension of disbelief

We should also mention the conceptualisation of presence in Lombard and Ditton's early review paper [25], which takes in a broad spread of then extant empirical work. Aspects of presence identified therein, as summarised by [26], comprise: 'social richness'; 'realism', 'transportation' and 'immersion' (involved, absorbed, engaged [and] engrossed).

From the above list, the main dimensions of presence may be aggregated as involvement/engagement, reality/naturalness and sense of physical space/place, supplemented by interface quality and negative effects, which seem to be contributory factors rather than dimensions in themselves. Since we will return to involvement and engagement later in our discussion it is worth taking a little extra time to examine how these terms have been employed.

As we have seen, involvement or engagement is cited as a dimension of presence in most empirically based models. However, there is considerable variation in how these terms are used. For Lombard and Ditton (*ibid*), involvement and engagement are both properties of immersion, while Lessiter Freeman, Keogh and Davidoff [23] for example, treat involvement as an aspect of engagement. Involvement was one of the original dimensions addressed by the initial item set for the ITC-SOPI instrument, but the four axes identified after factor analysis substitute 'engagement', defined as "a tendency to feel psychologically involved and to enjoy the content" and also as "a user's involvement and interest in the content of the displayed environment and their general enjoyment of the media experience". Similarly, Slater's [27] discussion of presence terminology treats involvement as near-synonymous with both interest and emotional engagement, arguing that involvement is a content factor, and thus "at a different logical level" from presence, while Nunez [28], in his gloss on Slater's point states that "presence would be the sense that one is physically in a concert hall, and this would be independent of *engagement* with the content" (our emphasis). Both Nunez and Slater, together with [21] and [23] among others suggest an emotional aspect to engagement. Lastly, for some authors, there is an element of intentionality. Witmer, Jerome and Singer [18] for example define involvement as "a psychological state experienced as a consequence of focusing one's mental energy and attention on a coherent set of stimuli or meaningfully related activities or events" (p.298), while the MEC model includes 'suspension of disbelief' ([24]), also identified by [25] as a user factor in immersion.

Space precludes a complete review of the treatment of involvement and engagement in empirical presence studies, but we might take a selection of papers presented at Presence 2007 as a representative illustration of current usage in the context of spatial (rather than social) presence. As will be seen, while such usage remains heterogeneous, engagement and involvement continue to be used near-synonymously. The emphasis throughout the extracts is ours.

Involvement and engagement are treated as having bodily connotations: "…physical distance between one's body and events occurring in a mediated environment may modulate one's *involvement* in that experience. Close is arousing, intimate, *engaging*…" (p.35) [29] and "body centred interaction, the *engagement* of the full body through interaction… is one possible key to presence." (p.110) [30.]

As requiring volition, intentionality, or control, "…a relationship may exist between forms of listening and perceived presence – we would hypothesise that sense-making betokens a greater degree of intentionality, *engagement* and hence, conceivably presence" (p.48) [5] While Jones (p.120) [31] notes "One function that would appear integral to the act of mental simulation is what has commonly been referred to in the literature on fiction, film, and presence as the "suspension of disbelief." Because *engaging* in a narrative requires some effort, willingness and motivation on the part of the individual that initial step toward receptivity to the narrative requires explanation."

In their discussion of engagement (p.250) [32] observe, "*Engagement*, a major factor in virtual heritage success, is related to three aspects …, the possibility of free exploration and control…". And "*Engagement*, a major factor in virtual heritage success, is related to three aspects: the most important, a social and emotional connection ..." Finally, (p.363) [33] write "We suggest that this result suggests that emotional effects may improve the *involvement* and hence may improve presence."

Involvement is also closely connected to immersion and attention, as (p.187) [34] observe, "One way to see presence refers to the degree of *involvement* and immersion into a stimulus… In a highly immersive state people's attention is focused on the source of immersion and there is little attention outside the stimuli. Keeping this in mind, we wanted to study whether eye-movements could be used as an indicator of attention/game *involvement* ...".

A further example of the apparent inter-changeability of involvement and engagement is found in Bracken and Pettey, (p.283) [35] who say, "Immersion was measured by asking participants to respond to five statements … Examples of items include: "How *involving* was the video?", and "How *engaging* was the story?"

5. Further developing our understanding of *In*

Using these epistemological insights together with Heidegger's own observations we now develop our understanding of involvement. Our analysis of involvement has revealed that involvement can either be voluntary or involuntary (subject to directly attention or not). We define choosing to be involved as being engaged. We develop this in figure 2. Engagement must, by definition, take a predicate. Thus I am currently writing this sentence (and you are reading it) reflecting our involvement in presence research and our engagement intellectually in this discussion. Our involvement in this work is an a priori necessary condition.

Having already recognised that involvement can be either voluntary or involuntary and having defined voluntary involvement as engagement we can now proceed to explore the

nature of engagement. As we have seen from section 4 the predicates of engagement include the corporeal, emotional, intellectual, and the social. So we can be engaged physically

male and are typically aged 17-18 years and are native English speakers. These free form accounts were transcribed and Atlas/ti was used to facilitate a qualitative analysis of these
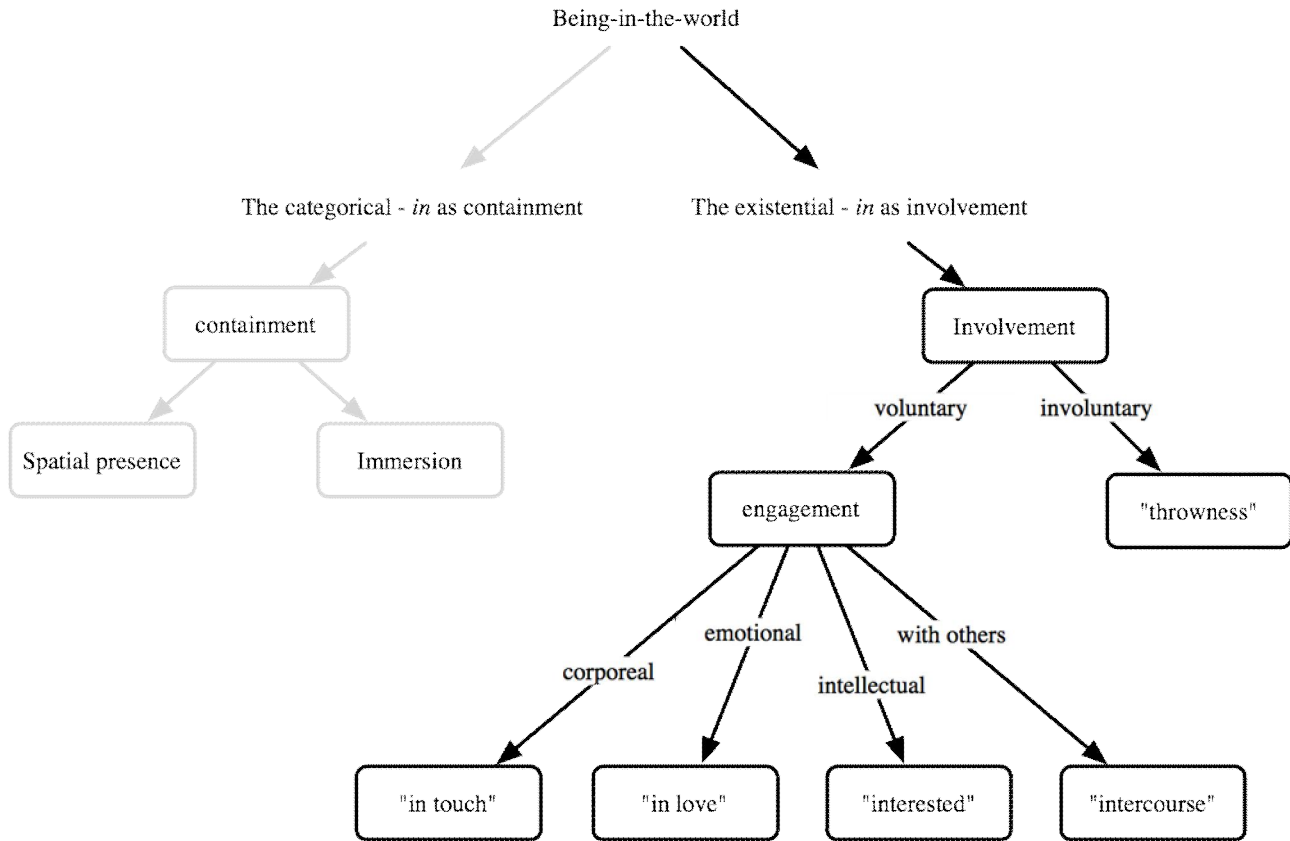

Figure 2 Developing the concept of involvement

("in touch"); engaged emotionally ("in love"); engaged intellectually ("interested") and engaged with others ("intercourse").

We now turn to our simple empirical study.

6. Why do people play games?

We asked students in the School of Computing at Napier University while they were attending their first year tutorials to write a free form description of why they played computer games (game playing being a legitimate area of research for presence). Of the 100 students solicited, 87 responded. None was paid. Permission to use these data for the purposes of publication was obtained. The responses ranged from a sentence or two to three paragraphs. We assured the participants in this study that we would neither record or report any personal details, save to say that most of the students were

data. In all, this analysis comprised four steps: a) the reading and re-reading of the accounts; b) the identification of recurrent themes in these accounts; c) an initial consolidation of related themes; d) final consolidation and creation of a theory to account for the data. Having read and re-read the accounts the following 10 recurrent themes were identified.

Achievement	Lawlessness
Competition	Relaxation
Enjoyment	Socialising
Escapism	Timelessness
Involvement	Transportation

Each of these themes is illustrated below with a number of quotations from the accounts. The suffix P14 and so forth should be read as participant 14.

The headings are not presented in any particular order – other than alphabetical. As will be seen, the quotations

frequently evidence more than one theme. The results are in no way unexpected and indeed echo the much earlier work of [36, p. 64-65) who wrote, "Video games allow the viewers to engage actively in the scenarios presented . . . [Adolescents] are temporarily transported from life's problems by their playing, they experience a sense of personal involvement in the action when they work the controls, and they perceive the video games as not only a source of companionship, but possibly as a substitute for it".

6.1. The codes

6.1.1. Achievement The theme of achievement was mention be many of the respondents (23 mentioned either 'achievement' or 'challenge').

P3: "Progressing and seeing results";
P8: "The satisfaction of finally completing it, especially if you have been working hard on it";
P5:"I also enjoy the challenge, [as] it stimulates my brain";
P16: "Achieving a task set by someone else";
P21: "Achieving the goal. It makes the effort put into the game worth while";
P27: "Achieving something, either progressively or at the end."
P28: "It also provides a challenge to get better at something";
P29: "I like the challenge of the most difficult level settings and the records of all the medals I have collected on the level selecting screen".
P72: "Completing it as it is achieving something";

6.1.2. Competition While game playing is often portrayed as a solitary pursuit, competition is a recurrent theme.

P25: "the competition between you and your friends in 2 player games makes it more exiting and competitive."
P24: "not everyone can be that good at a game and it's every gamers duty to rub everyone else's nose in the fact that you are better than them";
P29: "The games we play provide a competitive environment"
P35: "I enjoy playing the game online with a friend as it makes it more competitive and adds a new challenge to the game"
P52: "Playing with friends because I enjoy the game more and it gets us all competitive when playing sports games or *shoot-em-ups*"
P56: "Beating your friends at football games".

6.1.3. Enjoyment Unsurprisingly, a number of those surveyed described their enjoyment of computer games (e.g. 26 people used the word 'fun', 4 made reference to 'laugh' and a further 26 mentioned 'enjoy').

P14: "having a good time"
P19: "It's good fun and often makes me laugh."
P80: "I enjoy spending time trying to complete the missions"
P71: "I enjoy the challenge it brings"
P20: "They are time filling. Often provide hours of fun."
P64: "The multi-player option. I enjoy this part of a game the most as you can have a good laugh with your friends "

6.1.4. Escapism Many participants also made reference to 'escape' or 'escaping' either (from?) themselves or their situation.

P74: "It [playing the game] allows you to escape from modern day life."
P47: "I can become someone/something that I am not"
P85: "See [playing a game] as a way of escaping the world"
P39: "I enjoy this because I think everyone needs to escape sometime and for me this is ideal.
P74: "It is fun and enjoyable and an escape from reality."
P81: "It's fun. It allows you to escape from modern day life and kill things."

6.1.5. Involvement Game players explicitly describe themselves as being involved in what they are doing. Though engaged might be an equally good description of this.

P6: "Being able to forget about everything else around you because you become so involved and enjoying it."
P25: "Most games have a storyline that you can follow and get involved in."
P26: "[I] get so involved that I don't pay attention to what's going on around me."
P36: "[I] get right into it, and usually get carried away"
P39: "Depending on the game type I can find myself quite involved in the story line and feel very inside the game."
P68: "No matter what life is like for the few hours you are playing you get involved and forget about your worries."

6.1.6. Lawlessness The desire to kill and destroy (mentioned by 19 participants) appeared frequently in the data set:

P29: "Doing something which would otherwise be impossible."
P70: "Destroying things, I would probably get in to trouble if I did it for real."
P24: "I like nailing people in the head with an AWP"

P43: "Kill ugly people and break the law"

P10: "Committing crimes because I can't do it in real life.

P1: "It's very satisfying to blow up the enemy after they have pissed me off"

P74: "Playing with friends as you get to kill them in a game & not real life."

P68: "When you kill other players you see the blood splurging from arterial gashes"

P41: "I can shoot and kill people and get away with it, go through red lights and shoot the police"

P66: "Murder and driving on the wrong side of the road ... backwards in a car that I had stolen"

P51: "The game isn't a symbol of real life, I can do things in games that I cannot do in the real world."

P10: "Shooting guns and people, committing crimes because I can't do it in real life"

6.1.7. Relaxation Nineteen participants also said they played computer games because it relaxed them.

P66: "I find playing these games releases some tension"

P86: "[I] switch off and relax"

P44: "It makes you relax and sets your mind at ease."

P14: "Feel relaxed and having a good time on my own."

P27; "Feel more relaxed, forget about problems"

P12: "It helps me relax and forget about things that have been on my mind."

P48: "It helps me to relax and forget about my troubles for a time."

P85: "Find it relaxing and see as a way of escaping the world."

P20: "It is relaxing & fun. You can play with other users around the world etc."

P86: "Switch off and relax."

P5: "It helps me to relax and forget my problems I might have for a short time. I also enjoy the challenge, it stimulates my brain."

6.1.8. Socialising Contrary to the image of the solitary gamer, many of the participants made reference to the role of games in making and interacting with fellow gamers.

P28: "It allows me to interact and have fun with friends over the internet"

P49: "Completing it because you can then brag to your friends that you have completed it before them."

P50: "I play MMORPG's (Massively Multi-player Online Role Playing Games) and the enjoyment is getting to meet new people with the same interests as me."

P57: "I enjoy the challenge and always try and better my score, Beating my mates is always good as well. Getting the chance to do things in a game that I don't do in real life is always an added bonus."

6.1.9. Timelessness Many participants remarked on the loss of the sense of time whilst playing.

P8: "Usually get stuck into it and ignore my surroundings and begin not to hear anything around me except the game I am playing"

P24: "I usually loose (sic) all track of time and what's going on around me"

P57: "Forget about what is going on around me, time is no longer a factor and even food isn't needed … three days with no sleep is nothing when I'm in a game."

P75: "Makes me forget where I am and immerses my mind in another universe."

P24: "I play until my contact lenses dry out and stick to my eyes … then put on glasses and start again"

6.1.10. Transportation Descriptions of computer games transporting players into a different world and reality were frequently reported. These were identified by phrases such as 'taking me away'.

P4: "It's very cool, can do things that I can't do in real life, you're free to anything in the game, takes you away from this world."

P6: "Being able to forget about everything else around you."

P49: "[They] takes me away from the hardships of everyday life.

P82: "Visiting places [similar to] fairy tales"

P61: "It takes my mind away from the bad things going on in the world"

P48: "I like the interaction with other people in the internet through another world"

P3: "It takes attention away from other things and in a way takes you to a fantasy world."

P38: "The feeling of being in a virtual world where anything is possible. This is because it lets you leave your worries or problems behind and let you get the full experience of the game."

6.2. Making sense of this – triangulation in action

In making sense of these codes the next step would typically be to consolidate them and then group them in a meaningful arrangement. However these interpretative approaches are open to numerous criticisms relating to their rigour, subjective-ness and so forth. This is where triangulation comes into its own.

Figure 3 illustrates the use of the *in* ontology to triangulate the findings of this study. What we can see is that the codes arrived at from the qualitative analysis more typically favour the existential aspects of *in* rather than then spatial. So the group of codes encapsulating lawlessness, socialising, achievement, relaxation, enjoyment and so forth which are examples of engagement (i.e. engagement with others;

engagement with an intellectual goal; engagement with an affective state "being excited" or "being afraid").

In contrast to these states of existential *in*-ness there are a small number of experiences which reflect the categorical states of being within the games environment. People reported being transported to another place and escaping this world for somewhere else.

It should be recalled that the purpose of triangulation is not to mimic or reproduce the findings of this empirical study so we cannot expect the match between the two to be exact. Instead they ought to be complementary which is clearly the case here.

Discussion

We began by noting that despite the variety of approach to understanding, delineating and otherwise exploring the nature of presence they can all be reasonably described as being epistemological in character.

We also noted that presence research is necessarily very challenging given its subject matter. The experience of presence is private, personal and frequently remarkably elusive. Given these premises it is not without some justification that triangulation should be called upon to help clarify, confirm,

challenge or lend substance to this epistemological body of work.

The use of triangulation is not without its own issues and as we have already noted there is the question of confirmation bias. Conformation bias is not merely a consequence of doing bad science it is fundamentally unhelpful. A single counter-exploration we must avoid falling into the trap of using it to justify bad or lazy science.

Triangulation is the instrumental use of an alternative method to help cast light on existing findings. In this case it is example can turn theory on its head whether this is a single black swan or a thought experiment involving a cannon-ball and a feather. So while undoubtedly triangulation has potentially considerable merit, utility, and invites further the pragmatic use of philosophical thought. However, this is not and cannot be the sole use of philosophy in this kind of research and we must not lose sight of the contribution it can make in its own right but for now … .
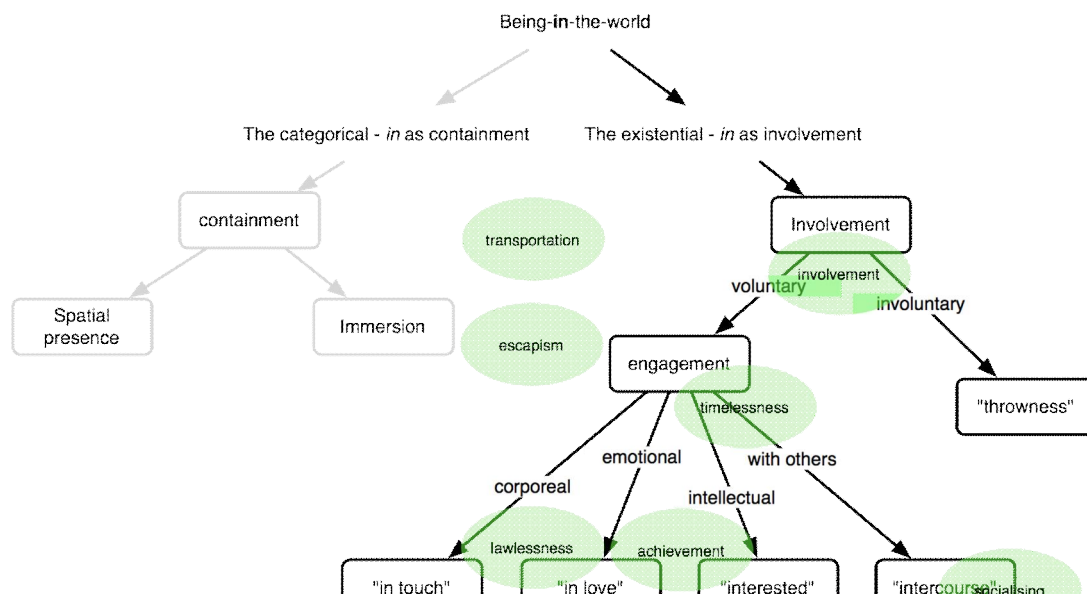
Acknowledgements

Figure 3 Triangulating the ontological and the epistemological

Figure 3: Triangulating the ontological and the epistemological

References

[1] M.J. Schuemie, P. Van Der Straaten, M. Krijn, C.A.P.G. Van Der Mast. Research on Presence in Virtual Reality: A Survey. *CyberPsychology & Behaviour*, 4, 183-201. 2001.

[2] P. Zahorik, R.L. Jenison. Presence as Being-in-the-World. *Presence: Teleoperators and Virtual Environments*, 7, 78-89. 1998.

[3] T. Sheridan. Descartes, Heidegger, Gibson, and God: Toward an Eclectic Ontology of Presence. *Presence: Teleoperators and virtual environments*, 8, 551-559. 1999.

[4] G. Mantovani. Building a Bridge between Different Scientific Communities: On Sheridan's Eclectic Ontology of Presence. *Presence: Teleoperators and Virtual Environments*, 10, 537-543. 2001.

[5] P. Turner, S. Turner, I. McGregor. Listening, Corporeality and Presence. In: *Proceedings of the 10th International Workshop on Presence*, 43-50. Barcelona. 2007,

[6] B. Flyvbjerg. *Making Social Science Matter*. Cambridge: CUP. 2001.

[7] L. Cohen, L. Manion. *Research Methods In Education*. London: Croom Helm. 1986.

[8] H. Altrichter, P. Posch, B. Somekh. *Teachers Investigate Their Work; An Introduction To The Methods Of Action Research*. London: Routledge. 1996.

[9] N. Denzin. *Sociological Methods: A Sourcebook*. NY: McGraw Hill. 1978.

[10] A. Bryman. *Quantity and Quality in Social Research*. London: Unwin Hyman. 1988.

[11] ISPR site URL: - ispr.info

[12] M. Davis. Theoretical Foundations for Experiential Systems Design. In: *Proceedings. ETP'03*, 45-52. June. 2003.

[13] T. B. Sheriden. Response to "Building a Bridge between Different Scientific Communities: On Sheridan's Eclectic Ontology of Presence". *Presence: Teleoperators and Virtual Environments*, 10, 544 -545. 2001.

[14] F. Biocca. Inserting the Presence of Mind into a Philosophy of Presence: A Response to Sheridan and Mantovani and Riva. *Presence: Teleoperators and Virtual Environments*, 10, 546-556. 2001.

[15] R. Lauria. In Answer to a Quasi-Ontological Argument: On Sheridan's "Toward an Eclectic Ontology of Presence" and Mantovani and Riva's "Building a Bridge between Different Scientific Communities". *Presence: Teleoperators and Virtual Environments*, 10, 557-563. 2001.

[16] M. Heidegger. *Being and Time*. New York: Harper Collins. 1927/1962.

[17] B. G. Witmer, M.J. Singer. Measuring Presence In Virtual Environments: A Presence Questionnaire. *Presence: Teleoperators and Virtual Environments*, 7, 225-240. 1998.

[18] B. G. Witmer, C. J. Jerome, M. J. Singer. The factor structure of the presence questionnaire. *Presence: Teleoperators and Virtual Environments*, 14, 298-312. 2005.

[19] T.W. Schubert, F. Friedmann, H. T. Regenbrecht. Decomposing the sense of presence: Factor analytic insights. In: *Proceedings of the. 2nd International Workshop on Presence*. Colchester. 1999. URL: http://www.temple.edu/ispr/prev_conferences/proceedings/98-99-2000/1999/Schubert.pdf

[20] M. Usoh, E. Catena, S. Arman, M. Slater. Using presence questionnaires in reality. *Presence: Teleoperators and Virtual Environments*, 9, 497-503. 2000.

[21] R. M. Baños, C. Botella, M. Alcañiz, V. Liaño. Immersion and Emotion: Their Impact on the Sense of Presence 2004. *Cyberpsychology & Behaviour*, 7, 734 -741. 2004.

[22] P. Larsson, D. Västfjäll, M. Kleiner. The actor-observer effect in virtual reality presentations. *CyberPsychology and Behavior*, 4, 239-246. 2001.

[23] J. Lessiter, J. Freeman, E. Keogh, J. Davidoff. A cross-media presence questionnaire: The ITC-Sense of Presence Inventory. *Presence: Teleoperators & Virtual Environments*, 10, 282-298. 2001.

[24] W. Wirth, T. Hartmann, S. Böcking, P. Vorderer, C. Klimmt, H. Schramm, T. Saari, J. Laarni, N. Ravaja, F. R. Gouveia, F. Biocca, A. Sacau, L. Jäncke, T. Baumgartner, P. Jäncke. A Process Model of the Formation of Spatial Presence Experiences. *Media Psychology*, 9, 493-925. 2007.

[25] M. Lombard, T. Ditton, At the heart of it all: The concept of presence. *Journal of Computer Mediated Communication*, 3. 1997. URL: jcmc.indiana.edu/vol3/issue2/lombard.html

[26] M. Lombard, M. Jones. Presence and Sexuality. In: *Proceedings of the 7th International Workshop on Presence*, 28-35.Valencia. 2004.

[27] M. Slater. A note on presence terminology. *Presence-Connect*, 3. 2003. URL: presence.cs.ucl.ac.uk/presenceconnect/articles/Jan2003/melslaterJan27200391557.html

[28] D. Nunez. Effects of Non-Diegetic Information on Presence: A Content Manipulation Experiment. In: *Proceedings of the. 10th International Workshop on Presence*, 19-26. Barcelona. 2007.

[29] A. Tajadura-Jiménez, A. Väljamäe, N. Kitagawa, H-N. Ho. Whole-Body Vibration Influences Sound Localization in the Median Plane. In: *Proceedings of the 10th International Workshop on Presence*, 35-42. Barcelona. 2007.

[30] M. Slater, H. Ehrsson, O. Blanke. Body Ownership and Representation–Towards a Theory of Presence? In: *Proceedings of the 10th International Workshop on Presence*, 109-114. Barcelona. 2007.

[31] M. Jones. Presence as External Versus Internal Experience: How Form, User, Style, and Content Factors Produce Presence from the Inside. In: *Proceedings of the 10th International Workshop on Presence*, 115-126. Barcelona. 2007.

[32] L.P. Tost, E.M. Champion. A Critical Examination of Presence Applied to Cultural Heritage In: *Proceedings of the 10th International Workshop on Presence*, 245-256. Barcelona. 2007.

[33] E. Ofek, M. Reiner. A subjective touch to presence: Haptic performance, emotions and subjective significance. In: *Proceedings of the.10th International Workshop on Presence*, 361-363. Barcelona. 2007.

[34] K. Kallinen, M. Salminen, N. Ravaja, R. Kedzior, M. Sääksjärvi. Presence and Emotion in Computer Game Players during 1st Person vs. 3rd Person Playing View: Evidence from Self-Report, Eye-Tracking, and Facial Muscle Activity Data, In: *Proceedings of the 10th International Workshop on Presence*, 187-190. Barcelona. 2007.

[35] C.C. Bracken, G. Pettey. It is REALLY a Smaller (and Smaller) World: Presence and Small Screens. In: *Proceedings of the 10th International Workshop on Presence*, 283-290. Barcelona. 2007.

[36] E. Provenzo. *Video Kids: Making Sense of Nintendo*. Cambridge, MA: Harvard University Press. 1991.