

# Learning and Designing in a Virtual Place

## *Investigating the Role of Place in a Virtual Design Studio*

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**Abstract.** *This paper reports on a study of the role of place in a virtual learning environment for digital media design. Using an immersive 3D Virtual World based on Active Worlds, we have created a virtual learning place for students in a Website Design course. The virtual learning place has two distinct parts: a classroom-like place surrounded by student galleries. Students can navigate and communicate (synchronous chat) within the environment in the form of an avatar (virtual person). We recorded the conversations and activities of the students in discussions held in the virtual learning place and applied a communication coding scheme to analyse their discussions. In this paper we interpret the results of our analysis to characterise the effects of a sense of place on the students learning experience in a virtual learning environment.*

**Keywords.** Virtual Learning Environments, Place, Virtual Design Studios.

## **Introduction**

Places provide “a focus where we experience the meaningful events of our existence” (Norburg-Schulz, 1971). When discussing the essence of place Relph (1976) said “Places are the contexts or backgrounds for intentionally defined objects or groups of objects or events, or they can be objects of intention in their own right”. These statements are by no means a universal definition of place, but seek to illustrate the significance of place in relation to human action and intention.

3D virtual worlds provide a basis for creating a new kind of place that, similar to place as described above, provides context for human action and intention. The theory underlying these assumptions and the translation from theory into a specification for a virtual learning environment has been explored by Kalay et al (2004). We have explored the role of place in virtual learning environments (Clark and Maher, 2003) and have studied designers collaborating in 3D virtual worlds (Rosenman et al 2005).

This paper presents our approach to developing an understanding of the role of place and evidence of its effect on the conversations of design students in a virtual learning environment. We show how we identified the characteristics of place and specifically how it provides a context for identity and presence for supporting collaborative and constructivist student centred learning.

Traditional learning has focussed on the distribution of learning materials such as texts and course notes, the presentation of lectures, followed by assignments and examinations. While many of these approaches have been transferred to virtual environments, the development of places for learning is not as well developed. Examples of places as learning environments are: Diversity University, Tappedin, and Virtual Campus. Many of these environments focus on the development of rooms and tools for communicating while learning. They do not yet facilitate the learner-centred approach that allows the learner to communicate and share external representations of their knowledge.

Since the early 1990's institutions of higher education have experienced a paradigm shift from the traditional classroom/studio/laboratory based approach to learning and implemented blended e-learning in the form of virtual learning environments and virtual design studios. Virtual learning environments in the beginning were based on MUD's and MOO's evolving with technology into 2D learning management systems such as Web-CT and Blackboard. These technologies have provided a common location for course materials and information, and have provided forums for communication. It is arguable whether the web-based technologies have recreated the context that is available in places like the physical classroom or studio.

Advances in virtual technology have now made it possible to develop online interactive 3D immersive virtual worlds where individuals are able to engage in an experiential environment. Using an immersive 3D Virtual World based on Active Worlds, we have created a virtual learning place for students in a Website Design course. Kolb's experiential learning theory (Kolb, 1984) states that learning is a process whereby knowledge is created through the transformation of experience. Studies into the process of learning, such as those of Jean Piaget (Piaget, 1977), have led to the conclusion that people do learn from their experiences, and particularly from their mistakes. The development of place as the core of a virtual learning environment can provide the context for experiences in which we engage with others through presence and identity as well as have common access to shared information and various communication forums.

Canter (1997) in studying the concept of place identified three interrelated elements: activities, physical attributes and conception, that when combined could be used to identify the nature of places. "Architecture, above all its other virtues and accomplishments is the art of making places. Places differ from mere 'spaces' in that they embody social and cultural values, in addition to spatial configurations. It is the concept of 'place', not space, that connects architecture to its context, and makes it responsive to given needs." (Kalay and Marx, 2001)

A critical aspect of any design curriculum is the studio. The design studio is a place for students and design teachers to come together in a learning context or place. We have since extended this notion of place and established a Virtual Learning Environment (VLE). Developing a VLE or virtual place for the design studio means that learning is not bounded by the limitations of physical studio space, as we have seen possible by making studio information available on the internet, without losing the shared contextual experience we have in a physical studio.

Using architectural principles and theories of place based on Relph and Canter, a virtual learning environment was designed, developed and implemented for a web site design course at the Faculty of Architecture, The University of Sydney, Australia. This virtual learning environment was used to study the affects of a sense of place on the learning experiences of design students. The virtual learning environment contains two distinct aspects: a structured place for accessing shared information, surrounded by student galleries for sharing the designs under development by the students. Students navigate and communicate (via synchronous chat) within the environment in the form of an avatar (virtual person). Students can construct their knowledge and learning experience using embedded contextual learning resources and tutorials contained in the virtual learning environment. The student galleries provide a place for a visual representation of students' own design work submitted for peer review and collaborative feedback.

What makes this system unique is that we provide a learner-centred virtual learning environment that provides a sense of place and encourages constructivism and

collaboration. In our study, we focus on characterizing the conversations to demonstrate that the virtual place allows the students to express their identity and presence: critical components of a shared experience in a place.

Our reflections on the VLE suggest that the studio gallery acts as a focal point for students – where they can engage in discussion and collaborative activities with their peers while viewing each others' website designs. The key feature that distinguishes this from a traditional chat room is that the students share a common visualization of the designs that constitute their own work. The use of the virtual world intrinsically supports the collaborative and conversational approach to learning since students are able to immediately see who else is in the studio/galleries and can converse with them using a talking by typing approach.

To study the effect of a sense of place we analyze the discussions that take place in the virtual learning place using a coding scheme. The coding scheme categorizes the content of the discussion into place communication and learning communication categories. The coded discussions provide insight into the way in which a virtual learning place influences the learning experience. We augment the discussions by using screen shots of the student's activities in the virtual learning place to cross-examine and visualize the learning experience with the students' conversations.

This paper presents examples of our analysis of the effects of a sense of place on the students' learning experience in the virtual learning environment. This research will help to inform our understanding of the paradigm shift from physical places to virtual places for designing and learning.

### **Characteristics of a Virtual Learning Place**

Design teaching emphasises the experience of designing as a major component of education. We build on this by emphasising the importance of learning as an experience. The development of place as the core of a virtual learning environment can provide the basis for a shared or collaborative learning experience.

#### *The Course*

DESC9123 Web Site Design is a course in the Faculty of Architecture, University of Sydney. The course is run during summer school as an intensive six week course or during first and second semester as a thirteen week course. The web site design course teaches students skills and techniques in creating web pages, develops their understanding of the concepts and semantics of the World Wide Web, and gives them experience in designing, developing and implementing a web site.

#### *Pedagogy*

The pedagogy used is based on constructivist learning theories, which encourages design students with the opportunity to express their creativity, enable construction of knowledge, while the lecturer facilitates on-going mentorship. Providing a learner-centered virtual learning environment allows students to experience the process of designing in a situated context, engage in practical learning activities, enable representation of their practice, engage in peer critique and collaboration, and form a learning community.

#### *The Environment*

In previous years, web site design was taught using WebCT as the technology to create the virtual learning environment. What it lacks is the ability for students to engage each other and the lecturer in a place environment that is integrated with the

prescribed learning materials and the construction of their identity and designs. In our research a 3D Virtual World was used to underpin the technology.

Virtual worlds, such as Active Worlds (<http://www.activeworlds.com>), are networked environments that allow the opportunity to create a sense of place and a sense of presence of others in the place. Active Worlds provides various tools for communication and collaboration. Students represented by an avatar explore, navigate and gather information in the virtual world by walking, flying or teleporting. Students change the shape, colour and texture of their world by adding new objects or modifying existing ones. In the virtual learning place students communicate by "talking by typing" and utilize expression of emotion in the form of facial and bodily gestures through the use of the avatar. They can also change their virtual persona (different types and genders of avatar are available to choose from) to suit their mood or tone. Selecting a virtual world as the technology for a virtual learning environment provides the basis for a place.

### **Communication Coding Scheme**

In order to analyse communication in the virtual design studio we adapted a coding scheme developed for studies of computer-mediated communication and cognitive studies of designers by Gabriel (2000) for analysing design communication.

Our communication coding scheme consists of five major classifications. Control, Technology and Social are based on those used by Gabriel (2000). Learning and Place are used to study the effects of a sense of place on the learning experience of students. The categories for place drew on an understanding of place as creating the context for human intention and action. This was translated into identity, presence, location, ownership, citizenship, exploration, and gestures based on our observation of the possible actions and the conversations in the virtual world.

### **Study of a Virtual Learning Place**

For this research we used the summer school session for January - February 2002, which had a small group of 8 students. As the course is an internet-based course, it is always available for access. Students can connect using the Active Worlds client/browser either in the school computer labs or from their homes.

#### *Timing*

Weekly lecture/discussions are held for one hour twice daily in the virtual learning place. Each discussion is devoted to a particular theme, are a compulsory component of the course and the only time when students can receive formal feedback from the lecturer and their peers. We collected data from the conversations that occurred during the weekly lecture in the virtual learning place.

#### *Gathering Data*

The process of gathering conversations in the virtual learning place used the client software which has a number of features, including a facility to log the chat as a text file. The log files identify the time logging commences, participants' names and the chat text. For this research there was one log file per lecture with a total of 12 log files. We used these log files as the source of our research data. During the lectures we also took time stamped screen grabs of the students activities at various key moments. These were used as a cross reference against the conversations that took place.

### *Multiple Coders*

Two independent coders were used to code the conversations in the log files. Once coding was completed an arbitration process took place to identify discrepancies and unify the two coders coding. After arbitration a final coded transcript was produced. All quantitative measures and qualitative observations were gathered using this final coded transcript.

### **Analysis of Communication in the Virtual Learning Place**

In this section we present our approach to the analysis of communication for the web site design course. We employed both qualitative and quantitative methods to analyse the coded communication. We describe through quantitative measures and qualitative observations the effects of a sense of place on the conversations and the key elements that identify a virtual learning place.

### *Major communication categories*

The statistics in Table 1 shows the mean and total number of coded utterances for each of the five major categories. These measurements help to identify the dominant categories of communication and provide an overall statistical perspective on the communication that occurred in the virtual learning environment.

*Table 1 Mean and total number of coded utterances for major communication categories*

Communication categories	MEAN	TOTAL
Control	5.8	70
Technology	3.8	46
Social	8.1	97
Learning	168.7	2024
Place	88.3	1059

Figure 1 shows that the learning and teaching experiences in the virtual learning environment are characterised by a high proportion of learning and place communication with respect to the other communication categories. With 32% of the coded communication in the virtual studio relating to issues that concern place. The dominant category, learning communication, shows 62% of all communication in the virtual studio involves the concept of learning. Combining these two highest rating categories results in 94% of student's conversations involve issues that relate to Place and Learning in the virtual studio. The other categories, Control communication, Social communication and Technology communication all displayed very low percentages of utterances.

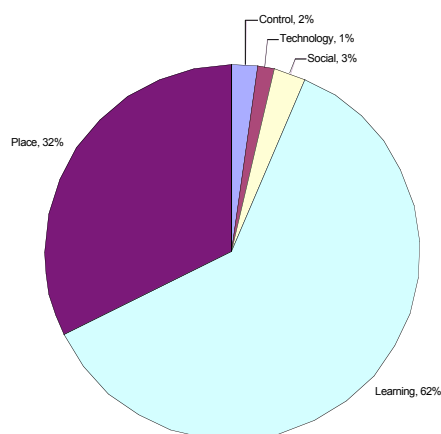


Figure 1 Percentage of coded communication for major categories.

The dominance of learning and place communication characterizes the student's engagement in these two key areas. To investigate the effects of a sense of place we focused on these two major communication categories.

The results for the other three categories: control, social and technology were comparative to findings by Gabriel (2000) in the study of computer-mediated collaborative design. Social communication was kept to a minimum and when it occurred was often straight to the point. Technical problems with the use and interaction in the virtual learning place were minimal resulting in very little communication in this category. Control communication was at a minimum as the nature of text based communication enabled participants to state what they wanted with no interruptions or floor holding.

#### *Analysis of Place Communication*

Place communication is characterized by three dominant categories, as can be seen in Figure 2, Identity 39%, Presence 34% and Location 14%.

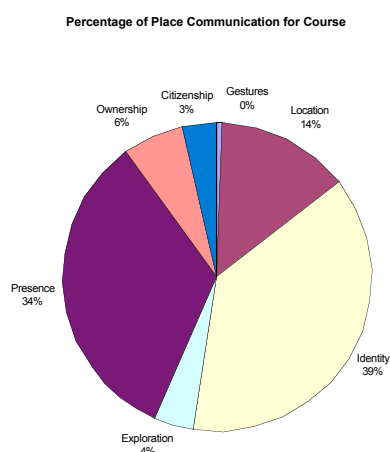


Figure 2 Percentage of Place Communication

The other four categories show low scores in comparison: Ownership (6%), Exploration (4%), Citizenship 3% and Gestures 0%. These statistics do not indicate if there is any relationship with the other low scoring categories, or if there is a synergistic relationship between any of the categories.

A key feature of a 3D virtual learning environment as opposed to text-based MUD's and two dimensional virtual learning environments such as Blackboard and LambdaMoo is the ability for lecturer/students to visualise the presence of other students. The ability to visualise others creates an awareness of new students entering or "Lurkers" who enter the virtual learning environment, but don't contribute. Students are able to see who is in the virtual learning environment and where they are located. After becoming a citizen students have the ability to personalise or individualise the type of identity they represent in the virtual learning environment. They have the capability to choose their own character from a preset selection of customised avatars each with its own set of gestures and features. A contact list can be created by the lecturer/student to easily contact and identify other students in the virtual learning environment. When a student enters the virtual learning environment their name on the contact list indicates their presence, as shown in Figure 3.

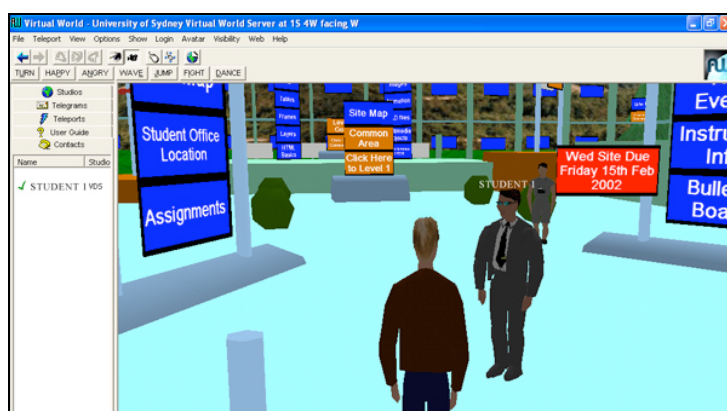


Figure 3 A Sense of presence through citizenship.

Discussions on identity are a significant part of virtual places and contribute to establishing collaboration. The visualization of other students and the use of the contact list can be used to clarify the identity of a student in the virtual learning environment. An excerpt from a conversation is shown below as a typical discussion about identity. Although the conversation is simple, it shows the informality of the discussions and the way in which the lecturer leads the student in creating an identity through citizenship.

- Lecturer: Student 1 are you a citizen? If not can you log in again as a citizen.  
Thanks
- Lecturer: I have you as a contact on my list.
- Student-1: oh. Hang on.
- Student-1: Ok Student-1 now
- Lecturer: There you are on my list great.

At the beginning of every session students acknowledge their presence by greeting each other as they would on entering a physical room. This becomes a ritual that both

indicates the start of a discussion and acknowledges the names and presence of the participants.

- U1. Lecturer: Hi Student 1
- U2. Student 1: Hi Lecturer
- U3. Student 2: Hi there Lecturer
- U4. Lecturer: Hi Student 2
- U5. Student 1: Are we the only ones here?
- U6. Student 2: Yep

By acknowledging their presence and identity students are taking steps towards building a learning community. The dynamics of place communication for one session, shown in Figure 4, is a timeline of the session and shows the number of utterances for each of the seven categories of place. The empty spots during the conversation are where utterances occur in another major category such as learning communication. The cluster on the *identity* category from utterances (U) 1-6 represents the greeting protocol at the start of the session.

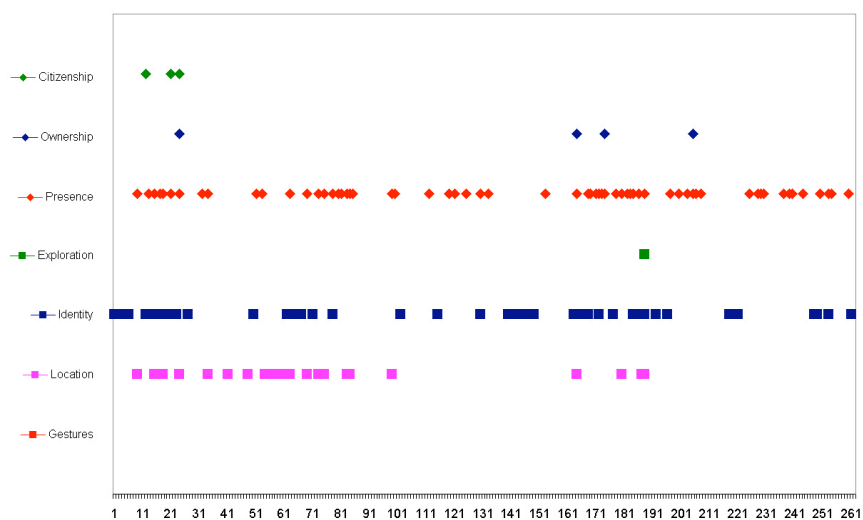


Figure 4 Dynamics of place communication for one session

## Findings of Research

Our analysis of the conversations using a communication coding scheme highlights that a sense of place can be achieved in a virtual learning environment and that identity and presence place major roles in establishing the context for learning in a place. Our research has identified that visualisation of avatars in the virtual learning place supports the lecturer in the management of learning. We have found that discussions about the location of the students' avatars with respect to the learning material in the virtual learning place can be a way of focussing attention and providing a context for the discussion. We found contextual discussions about a location in the virtual learning place supports students in constructing their knowledge by collaborating with their peers and lecturer.

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