THE AFFECT OF ENVIRONMENTAL WEB-DESIGN ON STUDENT
PERCEPTIONS OF SOCIAL PRESENCE IN ONLINE LEARNING COMMUNITIES

Thesis
Submitted to
The College of Arts and Sciences of the
UNIVERSITY OF DAYTON

In Partial Fulfillment of the Requirements for
The Degree of
Master of Arts in Communication

By
Christopher Michael Hovey
Dayton, Ohio
May 2014
THE AFFECT OF ENVIRONMENTAL WEB-DESIGN ON STUDENT

PERCEPTIONS OF SOCIAL PRESENCE IN ONLINE LEARNING COMMUNITIES

Name: Hovey, Christopher Michael

APPROVED BY:

Anna L. Langhorne, Ph.D.
Faculty Advisor
Director of Graduate Studies in Communication

Kyoungrae Oh, M.S.
Committee Member
Lecturer

Teresa L. Thompson, Ph.D.
Committee Member
Professor of Communication
ABSTRACT

THE AFFECT OF ENVIRONMENTAL WEB-DESIGN ON STUDENT PERCEPTIONS OF SOCIAL PRESENCE IN ONLINE LEARNING COMMUNITIES

Name: Hovey, Christopher Michael
University of Dayton
Advisor: Dr. Anna Langhorne

The purpose of this study was to identify the affect of environmental web-design on students’ perceptions of social presence and the development of community amongst small groups in an online course. The nature of online learning can be framed by many theoretical approaches, but two especially relevant theories have been utilized in this study: (1) Constructivism and (2) Social Presence Theory. Constructivism refers to the nature of human interaction and the emergence of shared meaning within groups (Delia, 1977). Social Presence Theory predicts how an individual perceives another during Computer Mediated Communications (CMC) (Short, Williams, & Christie, 1976). Social presence is an attribute of the medium based on the user’s perception of others’ personality, intention, and communication in CMC. The environmental web-design features used in a learning environment may affect user experiences and interpersonal interactions, ergo affecting social presence perceptions of the medium. High social presence facilitates group dynamics that develop and aid in creating a sense of personal belonging and community amongst group members. In the present study, it was
hypothesized that online college students utilizing individual identity presentations would have higher levels of perceived social presence than students in an online course utilizing group identity-presentations.

To test the hypothesis, a 25-item questionnaire was developed. Thirteen items were adapted from the Computer Mediated Communication Questionnaire by Tu (2002). Data were gathered via thirty-seven participants who were placed into one of two conditions: individual or group identity-presentations. First, participants introduced themselves, and then they completed a group activity before completing the questionnaire. The social presence scores were compared between the individual and group identity-presentation conditions using an independent samples t-test. Results had homogenous variance and yielded a p-value of .35 (t=.94, df=35); therefore, the null hypothesis was retained. Although results yielded no significance, there may have been mitigating factors such as participant attrition and the group activity design that contributed to the outcomes.

Suggestions for future research on social presence and student interaction in online learning include addressing platform learning curves, time required for relationship development in online courses, and engaging authentic activity design. It is further recommended that activities be pilot tested for authenticity before being utilized to test social presence perceptions.

Keywords: social presence, online learning community, constructivism, environmental web-design, e-learning, computer mediated communication
Dedicated to

Mom and Dad
ACKNOWLEDGEMENTS

I give my thanks to Dr. Anna Langhorne, my advisor, whose patience, guidance, and insight has helped bring me to where I am today. Her knowledge of the digital medium has been a guiding factor that inspired the work here and has driven my passion for education. Without her support I cannot imagine having completed this master’s thesis, for which I am eternally grateful.

I would also like to express my gratitude to everyone who has helped me along the way in this work. This includes Dr. Teresa Thompson, who initially encouraged me to pursue my masters and has continued to guide me over the last two years. Her feedback and efforts in preparing the text have been crucial in developing my writing and completing this project. Dr. Thompson’s personal drive and participation in not only my work, but also the work of many others, makes her a role model for collaboration and community building both in and out of the classroom. I would also like to thank Kyoungrae Oh, for his feedback on the data analysis and his enthusiasm in pursuing this topic further. His excitement about this material was rejuvenating and made me appreciate my own efforts in completing this project. Finally, I would like to thank Dr. Don Yoder, who listened and challenged me to think critically about the material. His support both personally and professionally has repeatedly made me question my ideas and refine my goals into more coherent and focused targets. All of their efforts, as well
as the support provided by my department Chair Dr. Jon Hess, the basic course
director Dr. Joseph Valenzano, and the department administrators Karen Gibson and
Cathy Waag have aided in acquiring participants, materials, and an open ear when I
needed it most.
# TABLE OF CONTENTS

ABSTRACT...........................................................................................................iii

DEDICATION........................................................................................................v

ACKNOWLEDGEMENTS.........................................................................................vi

LIST OF TABLES....................................................................................................ix

LIST OF FIGURES..................................................................................................x

LIST OF ABBREVIATIONS.....................................................................................xi

INTRODUCTION....................................................................................................1

METHOD.............................................................................................................28

RESULTS.............................................................................................................35

DISCUSSION.........................................................................................................41

REFERENCES.......................................................................................................46

APPENDIX...........................................................................................................51

A. Adapted CMC Questionnaire.................................................................51
LIST OF TABLES

1. Descriptive statistics comparing social presence and community items from rounds 1 and 2........................................37

2. Individual SP and community item comparison between conditions...............40
LIST OF FIGURES

1. Box plot comparing SP mean scores between conditions.................................39
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>Social presence</td>
</tr>
<tr>
<td>CMC</td>
<td>Computer-mediated Communication</td>
</tr>
<tr>
<td>OLC</td>
<td>Online Learning Community</td>
</tr>
<tr>
<td>CLT</td>
<td>Constructivism Learning Theory</td>
</tr>
<tr>
<td>CCT</td>
<td>Constructivism Communication Theory</td>
</tr>
<tr>
<td>SPT</td>
<td>Social Presence Theory</td>
</tr>
<tr>
<td>CVE</td>
<td>Collaborative Virtual Environment</td>
</tr>
<tr>
<td>OLE</td>
<td>Online Learning Environment</td>
</tr>
</tbody>
</table>
The purpose of this study is to explore the impact of environmental web-design features on social presence in online learning communities, as well as to determine which features transmit the most perceived social presence amongst members within a group. Social presence is an important component of online learning communities, because it helps students connect course material to their real-world experiences. This connection allows students to understand course concepts better by placing the material in a wider variety of situations and decontextualizes the information for broader usage than the class alone. According to Short, Williams, and Christie (1976), Social presence (SP) is defined as the degree to which others’ personality, intention, and meaning are available in Computer Mediated Communication (CMC). SP occurs when one user’s personality and nonverbal cues are accessible and considered by another user as he or she interprets messages. This interaction facilitates the development of shared meaning and allows for communities to emerge in various online settings. Design features in a web environment have the potential to transmit additional social information, which enhances the social context and interactivity that facilitates high-perceived social presence (Walther, 2011). The design feature in question for this study is identity presentations, which will be explored in greater detail later in the paper. The purpose of this study is to determine
whether or not environmental web-design features, such as customizable user profiles, affect perceived SP during student introductions. However, to better understand the impact and possible outcomes of web-design features on SP in online learning, a solid foundation in relevant theoretical approaches must first be established.

The nature of online learning can be framed by many theoretical approaches, but two theories seem especially relevant: (1) Constructivism and (2) Social presence Theory. Constructivism refers to the nature of human interaction and the emergence of shared meaning within groups (Delia, 1977). Social Presence Theory (SPT) describes one individual’s level of perception about another person when communicating through a mediated channel (Short, Williams, & Christie, 1976). Utilizing the conceptual framework of these two theories may provide insight into the relationship between web-design features, SP, and online learning.

The next section will examine Constructivism Communication Theory and its relationship to Constructivism Learning Theory. After Constructivism theories have been explored, a brief history of SP is presented, followed by a description of Online Learning Communities (OLCs); ergo, SP is placed in the context of OLCs. The final section will examine communication web-design features and course delivery methods as well as their impacts on SP.

**Constructivism**

According to Constructivism Communication Theory, knowledge is embedded in the communication experience of participants (Delia, 1977). Delia (1977) described personal meaning as an emergent phenomenon of interaction under contextual social rules, where participants actively co-create a shared meaning though the experience. The
social rules governing interaction change from one circumstance to another and people adapt to these changes. People are expected to behave differently in various circumstances, and they act out different roles depending on what those circumstances are. The shared meaning that participants create is impacted by their perception of others, as well as their own message adaption and efforts in role enactment. Perceiving the other is an important component of interaction in Constructivism, because it allows one to compose a message tailored specifically for the other. Delia (1977) describes the perception of others that is used to frame messages as a “fundamental process underlying interaction” (p.71). Perceptions of other’s motives, abilities, feelings, intentions, and attitudes are crucial in composing a message that achieves the sender’s desired intention. Within this framework, meaning is considered to be an emergent process, because individuals actively adjust their perceptions and reframe their messages to co-create shared meaning during interactions (Delia, 1977). Constructivism communication theory has been applied to a variety of situations. It is appropriate to examine Constructivism in the education context because it provides an explanation for how knowledge is generated and communicated during learning.

According to the Constructivism approach to education, knowledge is an emergent characteristic of social interaction amongst students (Stuetzer, Carley, Koehler, & Thiem, 2011). Students who work together in a group will share their perspectives and experiences as well as additional resources of personal interest. This shared experience leads to the emergence and acquisition of new knowledge within the group. In the Constructivism perspective, learning is achieved when social construction of knowledge occurs through exchanges of perspective and peer feedback within groups (Redfern &
Constructivism assists our understanding of online learning because the learning that occurs often does so through social interaction and the construction of knowledge (Redfern & Galway, 2002; Richardson & Swan, 2003; Stuetzer et al. 2011).

Constructivism Learning Theory (CLT) is consistent with Constructivism Communication Theory (CCT) in that participants actively assume roles, perceive the other, adjust messages, and co-construct meaning (Hickman, Neubert, & Reich, 2009). CLT, however, is concerned specifically with the educational environment. In this context, constructivism is more of an approach to education, where teachers push students to take a more active role in their learning. The constructivism approach to education posits enactment as a more effective learning mechanism than listening or reading (Hickman, Neubert, & Reich, 2009). When students are put into groups their roles become more interdependent, which results in the emergence of learning as part of the process of interaction and project completion (Hickman, Neubert, & Reich, 2009). In other words, students are more likely to learn while acting out real-world tasks in groups than they would studying the concepts alone. For example, students designing, programming, and building a robot would learn more about mechanical design and computer programming than students who only read about the subjects. CCT also posits that people act out different roles in different situations and CLT is concerned with one specific context, learning.

There are certain expectations of the actors and the roles they assume in learning under the CLT. Students should move from passive receivers of information to active participants who discover and unveil new information for themselves and their peers. Teachers also shift their role in the classroom from delivery of information to the support...
of student exploration and discovery (Hickman, Neubert, & Reich, 2009). Role expectations in the context of this research will be discussed later under SP.

The next three sections briefly describe the origin of SP theory and its connection to Constructivism, develop a context and description of online learning communities, and then explore SP within that context.

**Social Presence**

Social Presence Theory (SPT) is one of the earliest frameworks applied to CMC and was adapted by Short, Williams and Christie (1976) from teleconferencing research. According to SPT, different communicative mediums offer a variety of cues, which substitute verbal for nonverbal behaviors and enhance shared meaning in mediated communication (Walther, 2011). Nonverbal cues, such as eye contact, distance, and posture, convey attitudes and provide message context. Low cue availability in one communicative channel causes people to focus more heavily on the remaining channels (Short, Williams & Christie, 1976). For example, individuals conversing via text message might focus more heavily on word choice or emoticons in the absence of nonverbal cues to convey and interpret meaning. Short and colleagues (1976) described social presence as one user's perception of other users, and a “quality of the medium” (p.65), impacted by its ability to transmit varying forms of nonverbal communication. Similar to Constructivism, they also note that people act out roles in every situation, and these role expectations help message receivers place messages in context.

Social Presence Theory parallels constructivism in online learning environments in that the students’ awareness of others in the course is vital to the exchange of information that is needed to ascertain new knowledge. Students’ awareness of others
refers to the amount of personal context and nonverbal information available. Classroom
dialogue and idea exchange in online learning depends on meaningful interaction and is
central to a constructivist approach to education. Meaningful interaction, such as being
on topic and providing novel and useful information to others, may be enhanced by high-
perceived SP.

**Online Learning Communities**

Online learning can be referred to in many ways, including: e-learning, distance
learning, computer mediated learning, distance education, Computer Supported
Collaborative Learning (CSCL), and more. It is important to establish a specific
vocabulary and description of an online learning environment that will most benefit from
eliciting highly perceived SP amongst students.

The present study is an Online Learning Community (OLC) environment. Online
learning refers to the delivery of educational courses through the Internet. This kind of
learning is relatively new to the educational system and exists in many forms, from
simple email with digital textbooks to fully immersive virtual environments. It is used
increasingly by public schools, colleges, and universities (Parker, Lenhart & Moore,
2011). OLC refers specifically to e-learning in which students develop a sense of shared
experience with their classmates through the exchange of ideas, perspectives and
knowledge (Ryman, Burrell, Hardham, Richardson, & Ross, 2009). The term
“community” is important in framing online learning, because it implies the online class
is part of a social unit (Picciano, 2002). These communities of learners emerge when
social interaction is valued by students as part of their learning experience (Redfern &
Galway, 2002). Collaboration is a key element in developing a community online as it
creates interdependence amongst students that encourages them to invest time and effort in participation.

The online medium has much to offer in the way of collaborative learning, and the value has been noted by many researchers and institutions (Francescato et al, 2006; Herrington, Oliver & Reeves, 2003; Huang, 2002; Nguyen & Zhang, 2011; Olivier & Picciano, 2002; Pinkwart, 2011; Redfern & Galway, 2002; Stuetzer et al, 2011). For example, Deakin University in Australia requires every student to take at least one online course “to prepare students for lifelong learning by developing their skills in communication and collaboration” (Goold, Craig, & Coldwell 2008, p. 344). In order for these mediums to evolve with higher levels of functionality and for the communities involved to develop a set of best practices for implementing them, potential web-design features should be examined in greater detail. The present examination enables researchers to discern the function and purpose of various web-design features, and limit the consequences of trial and error at the classroom level.

The variety of communicative web-design features available on the Internet today presents researchers with the opportunity to identify which features, and at what levels, contribute the most to students’ perceived social presence. At the same time, it is important to understand the value for student learning, empowerment, self-reliance in completing tasks, and the task-efficacy of various web-design features. Some examples of web-design features include: Communication channels, identity presentations, course delivery methods, class space, and group spaces. The present research focuses on identity presentations, because introductions are a crucial moment in fostering mutual understanding and community, and is discussed in more detail in the final section of
The next section explores SP in the context of OLCs. Because SPT and CLT note the importance of role expectations in framing and interpreting messages, the role expectations of the actors in OLCs is also discussed.

**Social Presence in OLCs**

The SP capacity of a channel impacts learning, interpersonal relationship formation, and satisfaction in online learning environments (Cui, Lockee, & Meng, 2010; Picciano, 2002). Tu (2002) characterizes perceived SP in online environments as being composed of three concepts: (1) Social context, (2) online communication, and (3) interactivity. In this section, social presence is examined through two components: Perceived SP and Actual Participation. This is followed by an examination of the role expectations of OLC participants.

**Perceived Social Presence.** SP is the amount of interpersonal awareness and recognition among participants in CMC (Short, Williams, & Christie, 1976). It is an attribute of the medium being used, which varies by user and is impacted by many issues; these include available communicative channels or identity presentations (Cui et al., 2010). Availability of personality, intention, and meaning impacts SP perceptions, as they affect both the existence and nature of interaction between two or more classmates (Cui et al., 2010; Redfern & Galway, 2002). High SP facilitates group dynamics that develop and aide in creating a sense of personal belonging and community among group members (Picciano, 2002). The degree of access to other users’ intelligence, intentions, and impressions is an important factor in the transmission and understanding of personal meanings within groups (Cui et al., 2010). How well the online system allows users to
convey this level of personal meaning plays a part in perceived SP by enabling users to include their personality as part of the communication and provide social context. Access to others can be enhanced with peripheral awareness systems that allow activity and research (Bente, Rüggenberg, Krämer, & Eschenburg, 2008; Redfern & Galway, 2002). Richardson and Swan (2003) found a significant positive correlation to perceived SP and perceived learning. This connection demonstrates that high SP perceptions in an emerging online community contribute to student interaction and satisfaction.

Collaboration requires exchanges of information and interactivity between participants. SP was originally used to describe how the addition of video to teleconferencing enhanced distance communication by including nonverbal visibility (Short, Williams, & Christie, 1976). Subsequent advancements in communication technology have further enhanced or altered the nature of distance communication. An example would be 3D Collaborative Virtual Environments (CVEs), which refer to three-dimensional, digital environments that users can enter with a virtual representation of themselves, called an avatar. Collaboration and peripheral awareness are inherent in 3D environments, because others are physically visible as avatars interacting with each other and objects. CVEs are better at facilitating SP than video conferencing because they provide peripheral progress awareness and real-time data/project updates without intrusion on group members’ work (Redfern & Galway, 2002). Peripheral awareness refers to the visibility of other users’ activity. Avatars in 3D CVEs are virtual representations of users which are typically customizable in physical appearance and dress. Focus of attention can be seen through avatar posture and gaze (Redfern & Galway, 2002). Students constructing an object, display, or presentation in a 3D world
can work in parallel and coordinate their activity without interrupting others’ work (Redfern & Galway, 2002). Mansour and El-Said (2011) found that perceptions of social interaction were no different in a Second Life (3D platform) course than in a face-to-face one. Thus, CVEs may facilitate high levels of SP between group members via avatars.

Online 3D CVEs and 3D avatars pose a number of educational implementation issues. These programs require high-speed computer processors, graphics accelerators, and Internet connections to which many individuals do not have access at home or school. They also have steep learning curves for participants that have never used similar programs, which can hinder students’ performance and group attitude (Andreas, Tsiatsos, Terzidou, & Pomportsis, 2010). Furthermore, popular platforms such as Second Life are inhabited by users from around the world with many different intentions. Anyone logged into a public massive-user environment such as this risks the potential of encountering adult themes and uncensored language that parents would reasonably object to their children using. For these reasons this study focuses on forum-based course delivery instead of 3D CVEs.

**Actual Participation.** Student participation refers to all communication with their peers and teacher in the course setting; it is a necessary prerequisite for any social exchange of information. The exchange of information constructs new knowledge, which should increase achievement. In attempts to identify social construction of knowledge, many researchers (Goold et al., 2008; Herrington et al. 2002; Serby, 2001; Stuetzer et al, 2011) have examined participation and students’ perceived value of class resources, including peer contributions, finding that students value the inputs and additional resources provided by their classmates. Research by Richardson and Swan
(2003) highlights the importance of peer interaction as well; over half of the students found peer interaction, feedback and perspective to be the most beneficial component of their online courses. If participation is linked to achievement and satisfaction then it is also important to understand the factors that contribute to students’ level of participation.

Participation in online classes is affected by individual perceptions and behaviors. Students in online courses express concern over the necessity of self-motivation, uneven contribution levels, difficulty in coordination, and reliance on others. These issues are typically caused by lurkers and shirkers (Goold et al., 2008; Herrington et al., 2002; Serby, 2011; Stuetzer et al., 2011). The terms originate from social online communities, identifying participants who only show up to read what others have done and contribute little to no material themselves. Relying on the contributions of others to enhance one’s learning can be frustrating when those others do not participate (Stuetzer et al., 2011). These frustrations may inhibit students’ ability to complete a required task, because responsiveness and immediate feedback are characteristics of high-perceived SP. Because of student frustrations, the value of group interaction and participation are also of concern in designing online learning experiences.

Student participation in OLCs has been found to affect the construction of new group knowledge (Stuetzer et al., 2011). Stuetzer and colleagues (2011) conducted a detailed network analysis to identify communication roles across all online courses for one semester at Deakin University, Australia. Role switchers contributed to the Initiated Learning Network (ILN) by diffusing information and transferring knowledge amongst students (Stuetzer et al., 2011). The ILN refers to learning that occurs through peer exchange of information (Stuetzer et al., 2011). Analysis of the five network roles
indicated that while the majority of students contributed little and were active readers (Sightseers, 68%), most of the influence in the ILN actually came from the third largest group (Brokers, 12%) (Stuetzer et al., 2011). Brokers’ have a tendency to find and restate information in the forums for their classmates, distributing knowledge across broader contexts than the original locations (Stuetzer et al., 2011). Stuetzer et al. (2011) excluded complete non-contributors (shirkers) from the analysis, as their behavior contributed nothing to the formation of the ILN. These findings support the existence of socially constructed knowledge in OLCs. This also highlights the fact that the majority of students play little to no role in the process, which can frustrate their classmates.

Students are also frustrated by the time commitments of virtual classes (Goold et al., 2008), which may also affect participation. Nguyen and Zhang (2011) found similar student concerns and conducted a follow-up survey that revealed students spent significantly less time working on their online courses than their traditional ones. The reasons for this perceptual disparity were not investigated, but are an interesting phenomenon that could warrant research. It may be because their perceptions are warped by the fact that they conduct their personal work in the same setting as their classwork, whereas in a traditional course activities are divided up among different spaces.

**Role Expectations.** The roles of all individuals involved in online learning are different than they are in a traditional classroom. Teachers become more like facilitators and students become active transmitters of information. The intricacies of online interaction are difficult to quantify and emergent role descriptions vary depending on course delivery, online environment, and level of measurement (Hoadley, 2010). Collaboration is emergent in nature and prescribing roles may inhibit the development of
community so studying prescribed roles can be deceiving (Hoadley, 2010). Hoadley (2010) also notes that students may not enact assigned roles as expected in CSCL, and that course design and assessment can impact the nature of roles in groups. In contrast to these recommendations, Serby (2011) added anonymous peer work-quality evaluations and leadership role requirements to an online forum-based unit of a face-to-face class, successfully increasing participation. This study highlights the need for a teacher to facilitate learning, in this case by adding responsibility in the form of a leadership role to an OLC.

The role of instructors in online learning is different from the traditional classroom as well. A constructivist approach to education requires interaction between students and moves the teacher toward a facilitator role (Mansour & El-Said, 2011; Redfern & Galway, 2002). This scenario will shift the teacher to more of a moderator or a consultant, in which they become shapers’ of experience based on the environment. Faculty need to facilitate learning material, group coordination, work distribution, and goals to foster SP and maintain participation (Goold et al., 2008). The quality of the online learning experience can be more conducive to learning than the materials alone so teachers need to facilitate students’ interaction (Huang 2002; Redfern & Galway, 2002). Teachers should facilitate the classroom community by creating and maintaining a positive and safe environment, monitoring communication, publicly valuing contributions, and constructively steering mistakes and misbehaviors (Huang, 2002; Redfern & Galway, 2002). Teachers must take an active role to meet student expectations of an online course. When teachers establish their visibility, students have a model of interaction to guide their behavior in the OLC. By modeling and encouraging
interaction, teachers help students activate the SP potential of the course site.

Student roles in online learning move away from receiving and toward creating knowledge. The teacher as facilitator model moves students from a passive position in the classroom to an active one in which students self-manage learning (Huang, 2002). Dabbagh (2007) outlined the skills of success for online learners as a strong connection to coursework, fluent and diverse online capabilities, communication, collaboration, self-directed learning, and a desire to share. Utilizing these different skill sets puts the online learner in a diverse role to which many students are not accustomed in a traditional classroom setting (Dabbagh, 2007). In learner-centered activities, personal experiences are a valuable resource and a variety of perspectives can emerge from the students themselves (Huang, 2002). Personal experiences and student-contributed sources provide additional context and application of class material. Use of online resources and built-in search features by e-learners can develop individualized learning specific to each student’s interests (Huang, 2002). Using self-directed study can help make materials correspond to more real-world uses, but can also be erroneous, so students must evaluate the reliability and quality of peer contributions with guidance from their instructor (Huang, 2002). Self-directed study in online learning may also take students away from one another’s personal goals (Huang, 2002), and the instructor should help frame additional resources in the context of the course goals to maintain the ‘big picture’ and give social context (Mansour & El-Said, 2011; Redfern & Galway 2002).

As previously mentioned, communicative web-design features can impact perceived SP by enhancing social context and interactivity (Walther, 2011). The next section will explore web- and course-design features that affect SP including:
communication channels, class zones and collaboration, identity presentations and
demonstrations, and course delivery methods. In addition the following section also
explores their relationship to SP and previous research examining their impacts.

**Communication Web-Design Features**

The previous sections of this paper described the theoretical framework of
Constructivism and SPT and outlined their relationship with regard to OLCs. In this
section of the paper, environmental web-design features -- communication channels,
collaborative spaces, and identity presentations -- are investigated in further detail. How
they impact SP will also be discussed. A section on course delivery methods will follow
to describe the learning environments that depend on achieving SP to enhance learning.

**Communication Channels.** Relying solely on teacher-to-student communication
in online courses is not enough for students to become engaged with the material and can
lead to isolation, disengagement, and dropout (Cui et al., 2010; Francescato et al., 2006;
Redfern & Galway 2002). Communication should facilitate the flow of information
between student and teacher and between students. Integration of technology and social
context is important in distance learning in order to maintain humanity and prevent
isolation (Huang, 2002). To engage students with the material and one another, a
traditional classroom dialogue needs to be facilitated through new mediums. The
experiences of other classmates can be crucial in fostering a greater understanding and
usefulness of course information, and the differences in age and professional experience
of students can generate much knowledge transfer (Huang, 2002). Social Interaction
must exist in order for students to ask questions and for communities of learners to
emerge (Anderson, 2009). The insight gained through social interaction leads to the
acquisition of new knowledge (Anderson, 2009). Therefore, opportunities for sociability should be planned for and programmed into the online system (Redfern & Galway, 2002). This can be achieved by selecting the appropriate web-design features to meet course goals.

Traditional, one-way information delivery on the Web limits information exchange. Cui et al., (2010) claims that Web 2.0 features have enhanced online communication and the Web’s potential to increase SP beyond simple CMC. Web 2.0 refers to websites that offer visitors an interactive, social and participatory environment rather than limiting the experience to reading plain text and viewing images. Furthermore, multimodal communication has become the norm for interpersonal relationship formation (Walther, 2011). Over the last two decades, certain websites on the Internet have been built around the idea of portraying one’s personality through multi-media links, personal blogs, photographs, and community networks. Some of these sites are often referred to as ‘social networking’ platforms (e.g. Facebook), a term that may imply high SP perceptions are facilitated in the website. The effort that one puts into creating and maintaining one’s page, interacting with others, and disclosing personal events and opinions creates a sense of social presence between social networkers. Multimodal communication’s role in impacting interpersonal relationship formation applies to facilitating SP perceptions in online courses as well.

If SP is a perception, and multimodal communication has become the norm for interpersonal relationship formation (Walther, 2011), then utilizing multiple communication channels in a course may increase students’ perceived SP of the course site. Use of email, discussion boards, chat spaces, and collaborative environments create
more options for students to be involved in coursework. Email notifications of message board updates can enhance immediacy by linking students’ connection to the course with their more frequently used CMC outlets (Redfern & Galway, 2002). In a face-to-face classroom, teacher immediacy refers to nonverbal behaviors and personal disclosures that generate a perceived sense of closeness in teachers by their students (Titsworth, 2001). Teacher immediacy increases student motivation and learning (Titsworth, 2001).

Redfern & Galway’s (2002) suggestion of linking two channels, message boards and email, facilitates immediacy online by reaching out to students rather than requiring them to come on their own. Teachers who make use of multiple communication channels may be perceived as more immediate by their students. Different communicative channels offer a variety of enhancements to online communication.

Online written communication can be enhanced with the use of hyperlinks, text or images that function as a link to another website. Hyperlinking in written communication can be seen as a metaphor to the development of mental structures, where information branches out from student contributions to the original content (Anderson, 2009). Hyperlinking is a way for students to share “individual discovery and construction of knowledge” by providing source accessibility to their classmates (Anderson, 2009, p. 54). By using hyperlinks, students may summarize individual discoveries, while simultaneously presenting classmates with the source of knowledge and giving social context with the contribution. Other communicative channels offer additional cues as well, such as synchronous meetings.

In synchronous online learning, a number of communicative channels are available: text, audio, video, or any combination of the three. Bente et al., (2008) tested
the use of a shared workspace with the addition of a communication window in the corner of the interface, which featured text, audio, audio/video, or one of two different avatars. Aside from text based communication, there were no significant differences between social presence, interpersonal trust, and perceived communication effectiveness; this was attributed to the real-time nature of all the other communication forms (Bente et al., 2008). This highlights the importance of real-time communication in online collaboration. Based on these findings, Bente et al., (2008) asserted that SP in collaborative spaces is unlikely to be impacted by a communicative medium unless it were to be within a 3D virtual environment. In contrast to these findings, Jin (2009) found that within a 3D environment AI sales-avatars were rated more positively in expertise and information quality in a text-delivery condition rather than audio. This may have been due to the Non-Player Character (NPC) nature of the sales figure, an issue that warrants further research.

Communicative channels vary in their options depending on the medium, but in OLCs they should allow information to flow from any participant, not just the teacher. Allowing multi-directional and multimodal communication should enable high perceived SP amongst students. Collaborative group-spaces may also act as an additional form of nonverbal communication between group members.

**Class Zones and Collaboration.** The zones in which students work during an online class can be divided into three areas including class space, individual space and group space. The class space is where all students begin the course and consists of: instructor supplied resources, assignments, profiles, syllabi, lecture space, discussion boards, presentation space, announcements, and calendars. Individual space includes
personal document and project creation as well as any information gathered from outside of the class resources. The group spaces consist of team discussion boards and collaborative spaces. Chat rooms and discussion boards can exist in both class and group spaces depending on the level of access determined by the instructor or administrator.

Group spaces are an important zone to consider because that is where student interaction occurs around a central problem or project development. As interaction and collaboration are crucial to the construction of new knowledge, the zones in which students will share their individual discovery and apply their understandings are of significance to generating high-perceived SP. Group work frequently involves students working together on a shared project and providing a space for combined and coordinated contributions to said project is necessary.

Collaborative spaces are an important feature in group zones. Peripheral awareness of other’s progress or activity without interruption provides nonverbal feedback that can be crucial to efficient coordination (Redfern & Galway, 2000). Redfern & Galway (2000) recommends features such as “work artifact collaboration” and “What you see is what I see” (p. 205) in regards to 3D Virtual Learning Environments. These are virtual documents, models, or spaces that can be manipulated in real-time by multiple users at once, while providing visual cues as to the location and input of others. While Redfern & Galway was specifically concerned with 3D immersive environments, collaboration and peripheral awareness are not limited to this arena.

Online collaboration can be enhanced through ‘cloud-collaboration’ applications such as the free Google Drive. Cloud collaboration refers to Internet based platforms where multiple users can create and edit documents, presentations and spreadsheets.
together in real-time over great distance. Google Drive provides different color cursors on screen with a user key at the top of the page so everyone is aware of who is present and doing what, as well as a chat space alongside the document. Applications such as this address the issue of peripheral awareness of progress, while also providing a view of each student’s contributions. This is a level of interactivity that does not require direct communication and is an example of peripheral awareness design features.

It is reasonable to have concerns over whether or not these online spaces provide the level of interaction available in a traditional classroom. Francescato and colleagues (2006) conducted an experiment comparing collaborative learning through email and Yahoo Groups against a traditional classroom. Results of the study found no significant differences in students’ achievement and ability to collaborate on the assignments (Francescato et al., 2006). This example demonstrates the value of discussion board instruction in facilitating collaboration. However, the coordinated efforts of group members involve more than just project creation.

Collaboration can occur around research as well. Redfern & Galway (2002) suggests that Web access should be incorporated into CVEs to allow students to follow one-another to additional websites without interrupting or being left to wonder what their partner is doing. This type of feature can be incorporated into 3D virtual environments, an example of which can be seen in the platform SecondLife, where the browser is visible in the air in front of one’s avatar. Another example can be seen in the 2D platform Blackboard Collaborate, which allows classmates to ‘go live’ in synchronous lecture times and display websites and documents for others to examine. Student-to-student conversations require coordination online as well.
In 2D platforms, conversation is isolated to group members by limiting access to team-assigned discussion forums. Online forum discussions are coordinated by a “reply” feature that inserts and indents responses to comments directly below them. This way every student can give an initial response to a topic, then go back and respond to individual group-member responses and explore each idea in more detail. This type of forum-based discussion can facilitate a coherent and coordinated conversation even if students are contributing at different times, or asynchronously. Collaboration online can be difficult though, and issues concerning learning curves and prior knowledge of the environment may impact students sense of self-efficacy in task completion.

The level of students’ feelings regarding their ability to complete a group-task, or their task-efficacy, may also be increased by the environmental web-design features of which an instructor makes use. Examining the literature in online learning for efficacy related issues yields few results. Francescato and colleagues (2006) compared the growth of self-efficacy in regards to academic pursuit, socialization, and group problem-solving between an online course and a face-to-face course. Results of the inquiry suggest that students had the same growth of self-efficacy on all three dependent variables in both conditions. Studies testing whether or not design features facilitate a higher degree of task-efficacy were not found. However, task-efficacy may be enhanced by environmental web-design features such as collaborative systems. Students that are expected to play a larger role in their learning should feel that they are capable of doing so. If learning is expected to occur through collaboration, then the impact of design features on collaborative task-efficacy should be explored.

Constructivism learning is facilitated by group work, because student groups
prevent seclusion and non-participation of individuals (Svinicki & McKeachie, 2011). The web-design features that are made available in group spaces are an important consideration when students are expected to manage their own learning in teams. Providing collaborative spaces may enhance perceived SP and task-efficacy among group members.

**Identity Presentations and Demonstrations.** As social presence is a product of access to personality, intention, and meaning, the inclusion of Identity Presentations and Identity Demonstrations is another important design feature to examine in OLCs. An OLC can utilize Web 2.0 technology to enhance the variety of cues necessary to create high SP perceptions through personality projection and involvement in a community of inquiry (Cui et al., 2010; Walther, 2011). Identity presentations, such as user profiles and custom avatars, present the opportunity for students to tell a story about themselves that is persistent and available to others (Redfern & Galway, 2002). Custom avatars allow students to display their personality in tandem with their work; avatars may be 3D characters for use in CVEs or 2D images displayed alongside user contributions in forum-based discussions. Identity presentations give a face and personality to other users in the community. They provide message recipients with social context and increase the shared meaning generated from conversations (Redfern & Galway, 2002). However, identity presentations alone do not provide the contextual cues for others’ current activity, so productivity must be communicated through a different channel.

Identity Demonstrations come in the form of status indicators, allowing users to display what they are currently doing. Chat and massive multiplayer online-game users are familiar with ‘away’ or ‘busy’ labels that can appear alongside other online
community members. Online SP perceptions can be impacted by real-life actions such as grabbing a drink, using the restroom, or even leaving the course site to look up additional resources (Redfern & Galway 2002). Someone who leaves or goes idle to do research may be perceived as away or lurking by others even though they are focused on a class activity. The addition of an easy to enable/disable ‘away’ feature could also allow students to communicate their real-life activities in a non-invasive way. Identity demonstration features should alleviate the frustration of non-responsive individuals by communicating to others their whereabouts and current status.

Providing identity presentations and demonstrations can supply classmates and group members with current activity status and social context. Activity statuses can provide peripheral awareness and allow students to share information without interrupting their work. Social context can be important in framing or interpreting messages and increasing how knowable others are perceived to be. By giving a face and backstory to others, identity presentations may increase perceived SP. In face-to-face communication, the physical context can also impact the nature of interaction and the meaning those involved take away from the interaction. The virtual location of identity presentations online may impact perceptions in a similar fashion. For example, placing identity presentation in a group-space such as a message forum versus a personal space, such as a profile, may change the effort, meaning, or value that students put into their own identity demonstration or take away from others.

**Course Delivery Methods.** It is important to understand that not all online courses demand high perceived SP from the medium. However, when a teacher wishes to enhance student interaction for the purpose of learning, course delivery methods
should be adapted to those goals. Course delivery methods encompass how resources are
delivered, the interactive structure of the class, and any teaching strategies implemented
by the teacher. Resource delivery channels include the format of resources and
assignments, such as PowerPoint, video lecture, PDF, e-text or interactive Web 2.0. The
interactive structure refers to how the class is organized -- whether it is solo-lecture,
class-wide discussion, or small-group collaboration. Teaching strategies can vary
greatly, but online learning is regularly framed by the concept of authentic learning as a
way of engaging students with course material (Herrington et al., 2002; Huang, 2002;
Petraglia, 2009; Ryman et al., 2009). Authentic learning is defined as project oriented
instruction, with real-world applications that require interdisciplinary knowledge and
complex problem solving (Herrington et al., 2002). Although authentic learning can be
implemented individually, the focus of this investigation is on SP and collaborative
learning.

Engaging students in collaborative learning activities online requires more than
assigning them to do the coursework and answering their questions. Assignments must
generate a sense of authenticity and real-world value for students to truly engage in them
and take away the most from the learning experience (Herrington et al., 2002; Huang,
2002; Petraglia, 2009). To be authentic, the activities must have real-world relevance
both professionally and personally; be complex, ill-defined tasks; and require diversity of
resources and outcomes (Herrington et al., 2002; Huang, 2002; Petraglia, 2009).

Authenticity is a widely discussed topic in education and is a difficult concept to identify,
because of its demand to be flexible and meet individual student needs (Petraglia, 2009).
To be flexible, students should be encouraged to find outside sources and share them with
their groups. Finding outside sources can enable students to link personally relevant information to the course material. It will take much creativity and flexibility in any instructor’s creation, implementation, and maintenance of such a vague and fragile environment.

As Petraglia (2009) wrote, “Persuasion is at the core of authentication” (p. 179). Authenticity is an assessment made by participants (Herrington et al., 2002). Similar to being persuaded, labeling an activity as ‘authentic’ is a conscious decision made by people receiving a message (Petraglia, 2009). To persuade students that an activity has real-world relevance, a story, or a narrative, connecting the activity to a professionally applicable scenario can be utilized (Petraglia, 2009). Introducing activities through a narrative can enable people to relate tasks to their own experiences more easily than a list of facts because our minds already construct narratives out of our own experiences (Petraglia, 2009). Narratives engage people, and a quality narrative early in the course can make or break the experience for students (Herrington et al., 2002). OLC members must suspend disbelief in the same way moviegoers do to be persuaded into accepting the activity as authentic (Herrington et al., 2002). Introducing an activity with a narrative can establish context and encourage suspension of disbelief (Herrington et al., 2002). Initial student perceptions of an OLE are often skeptical of the quality of learning and use of their time; once disbelief has been suspended they begin to see the value (Herrington et al., 2002).

Online learning can isolate students from one another and the learning material. Using authentic learning activities can engage students with the material and provide real-world context. Working in groups to solve problems can increase interaction among
students. Online courses should use group-based, authentic learning activities to maintain attention and interaction. In this type of online learning environment, high perceived SP will enhance students' learning experience.

**Summary**

The constructivist-learning model is based around students working in groups, solving real-world tasks to create shared meaning. When students judge activities to have real-world application, they are viewed as authentic, and teachers can use narratives to connect class activities to real-world situations. Constructivist and authentic learning depend on SP for students to work together and create shared meaning while solving a problem.

The review of the literature has established SP is a perception or judgment made by users of CMC. Perceived SP is dependent on the environmental web-design, actual participation, and the role expectations of participants. Most of the literature examining SP in online learning has focused on comparing it against face-to-face learning to establish it does have the potential to transmit SP and is as effective for education as traditional classroom settings. However, little research has focused on comparing a variety of environmental web-design features against each other in one type of setting, such as forum-based learning vs. forum-based learning. Having reviewed the literature on SP in OLCs, this study is in a better position to address the web-design features that may enhance perceived SP. The web-design features of which an administrator makes use of will impact perceived SP, participation, and collaboration. This leads to the following hypothesis:
H: Students in an online course utilizing individual identity presentation spaces will have higher levels of perceived SP than students in an online course with group identity-presentations.
CHAPTER II:  

METHOD

Introduction

The purpose of this study is to investigate the effects of environmental web-design features on students’ perceived SP of the medium and community development among group members. SP is defined as the degree to which others’ personality, intention, and meaning are available in CMC (Short, Williams, & Christie, 1976). This study is concerned specifically with perceived SP among group members in an online learning community at the college level. The environmental web-design feature in question is identity presentations. According to Short, Williams, and Christie (1976), different communicative channels offer the potential to transmit additional communicative cues in conjunction with written or verbal communication, which give context and personalized meaning to messages. Context and personalized meaning convey a sense of identity that makes other users’ personality and intentions more accessible. Manipulating web-design features will allow the researcher to identify which feature, and at what level, SP is best facilitated. To test the effectiveness of design features, two conditions were implemented.

Identity presentations. In face-to-face communication, the physical context of interaction impacts the nature of communication between individuals and the meaning given to the interaction by participants. Environmental web-design features may also
affect the nature of interaction and the meanings assigned by individuals, by changing the virtual context in which communication occurs. The location of online identity presentations may change the context, value, and meaning given to the presentation by individuals. To test the hypothesis that students in an online course utilizing individual identity presentation spaces will have higher levels of perceived SP than students in an online course with group identity-presentations, participants will be divided into two groups.

The individual identity presentations will be user “profiles” that are incorporated into the Sakai 2.9 platform (the university courseware). Profiles on Sakai 2.9 allow students to link their school ID photo to their profile page, display personal information, and form “connections” with other users. “Connected” users on Sakai 2.9 are able to send private messages and post messages on their ‘wall’ which others in their “connections” can view. Users of Sakai can control their profile visibility, allowing access to all Sakai users at their institution or limiting “connections” only. Instructors wishing to create student groups have the ability to create “connections” for students, which can ease the burden of searching, requesting “connection,” and waiting for approval from their classmates. Students in the individual identity presentation condition will be directed to include their student ID photo, major, academic year, and “something interesting about themselves” on their profile page.

The group identity-presentations will be conducted through a threaded forum created specifically for introductions. Students will be directed to create a response in the forum giving the same information as the Sakai profiles, minus the inclusion of their student ID photo.
Both groups will be directed to share their name, major, academic year, academic interests, and “something interesting about themselves.” After creating their identity presentations, students in both conditions will be directed to respond to one another with the prompt, “When you have finished creating your (profile/introducing yourself), ask each of your group members something about themselves to get to know them better.” Students in the individual identity presentation condition will respond via the public ‘wall’ posts, while students in the group identity-presentation condition will ‘reply’ to one another’s initial post in the group forum.

The change in virtual context from personal- to group-space for conducting identity presentations may impact perceived SP due to engagement, privacy, and permanence of information. Having a individual identity presentation space may be perceived as more permanent than a class space, as students lose access to class forums once a course is completed. In the same way students may introduce themselves differently in a classroom versus a social setting, students may differ in how they present themselves in these two virtual contexts. In contrast to public introductions, small-group classroom introductions are a more formal and private environment. As a personal space, profiles may be more engaging to students as a place to present themselves. A profile is also potentially a public place that others can search for and view without the profile creators knowledge; however, Sakai profiles have privacy controls that are highly visible on the profile creation screen and can be used to limit accessibility by other students.

**Experiment**

The hypothesis was tested in an experiment, which took place on the Sakai 2.9 online platform at a mid-size Midwestern University in the United States. Two
conditions were implemented and compared using an independent samples t-test. Sakai is a web-platform for online learning that provides a variety of options for student interaction and course delivery. These options include, but are not limited to: discussion forums, email, profiles, slide-show presentations, calendars, and homework submission. The University hosts a website based on the Sakai software that allows instructors to selectively incorporate design features for use in their class.

All participants were first directed to participate in introductions with identical prompts in either a forum or through profile pages. They then completed the same group-based activity covering a non-major specific topic on the Google Drive collaborative space (see Appendix B). At the end of the session, all participants completed the adapted Computer-Mediated Communication Questionnaire (CMCQ) described in the forthcoming instrumentation section. Over half of the questionnaires were turned in within 45-minutes and the remainder were in within an hour of the start of the activity.

**Subjects**

Subjects were registered students at the university currently enrolled in one of the basic communication courses. Participant solicitation was conducted through the university email system as well as classroom visits and consisted of students from a variety of majors. Students were randomly distributed across groups using a random number generator. On the day of data collection, participating students received an email with a link to the beta Sakai website and instructions for logging into the ‘course’ page. There were a total of 37 participants consisting of 22 male and 15 female undergraduate students. Students were randomly assigned to groups of four and evenly distributed across conditions. Subjects logged onto the website from a variety of locations, including
-- four home and alone, 16 home with people around them, 13 in a computer lab, and four at the library.

**Instrumentation**

The dependent variable SP was measured through a self-report questionnaire adapted from the CMCQ developed specifically for online learning by Tu (2002). Tu developed the questionnaire in reaction to shortcomings of existing instruments to capture SP in online communication.

Short, Williams, and Christie (1976) originally developed a widely used four item semantic differential survey to measure SP (Tu, 2002). Tu (2002) highlighted the need for a more complex measure of SP in CMC due to the variety of user purposes, concerns, and topics present online. Tu also noted that semantic differentials can be inconsistent or misleading due to different meanings assigned to the key words by participants. Using declarative statements with a Likert-type scale leaves less room for interpretation than a single word. Tu (2002) developed the questionnaire by identifying CMC variables related to SP in existing literature, such as privacy, task, social-relationships and communication styles. The questionnaire was validated by experts in SP and online privacy against the related SP variables to ensure that the instrument measured its intended objectives. The original questionnaire measures participants’ perception of the Internet and its ability to transmit SP. For the purposes of this study, the items have been adapted to focus on communication amongst group members during participation in the study. The questionnaire for use in this study contains eleven SP items adapted from the original CMCQ (1-11 in Appendix A), with an additional two SP items relating to community (12-3 in Appendix A) for a total of 13 SP items. Community was included in
the SP items because literature identified the formation of group identity, or a community, as an outcome of high-perceived SP in online learning communities.

Additionally, two items related to task-efficacy, students’ feelings that they were capable of creating the final document, were created (items 14-5 in Appendix A). Participants were asked to rate each phase of the activity, identity presentations, discussion, and document creation for how well it enabled them to get to know their group members (items 17-9 in Appendix A). The additional questions allowed the researcher to determine the consistency of self-reported perceptions with any differences identified across experimental conditions. A validity control for any enhanced SP that may occur due to real-life familiarity between group members was also added to the questionnaire as one item asking, “How many of your group members were you at least regular acquaintances with?” A further control question was added in response to participant dropout in order to identify groups with less than four students in attendance.

Learning curves associated with Internet use may also hinder students’ perceptions of SP, so one table item was created for students to rate their proficiency of use with threaded discussion, Google Drive, and profile creation and management and was included.

Mansour and El-Said (2008) conducted a study exploring differences in perception of social interaction between genders; the results of the inquiry suggest that there are no differences in perceived social interaction between genders in CMC. For this reason gender was included in the questionnaire to explore confirmation of these results.

The last question asked for students’ physical location during participation in the study (item 25 in Appendix A). This question was included because environmental
distractions may hinder student involvement with their group. The final questionnaire consists of 25 items (See Appendix A).

**Data Analysis**

Data were analyzed using the Statistical Package for Social Sciences (SPSS). Analysis was conducted through an independent samples t-test across conditions to identify differences in SP based on participant responses to SP items on the questionnaire (1-13 in Appendix A). Items on the questionnaire rating proficiency of web-feature use were examined to see if computer use and knowledge had an impact on perceptions of SP.

Additionally, responses were examined for differences between genders. Any differences found relating to these demographics may indicate bias in the learning unit or questionnaire and were statistically controlled to limit Type I errors in results. Participant reports on their physical location of participation were included as a potential explanation for any low SP scores that may occur and were intended as possible controls if found to be of significant effect.
CHAPTER III:

RESULTS

Experiment

The experiment was conducted over two rounds of data collection. In the first round, only 22 out of 48 registered participants signed in to the online course for data collection. As a result of this, an unknown number of groups contained fewer than four members, and three participants later reported via email that none of their partners had arrived. The turnout of 22 students was also not enough to achieve statistical validity. In reaction to this circumstance, a second round was conducted. To control for this in the second round, a single item was added to the questionnaire to identify the number of participants in each group. During the second round of data collection 18 out of 39 registered participants signed in, but only 17 completed the questionnaire.

Data

The two rounds were compared for differences between parallel conditions to establish if combining the samples would affect the validity of data. Social presence and community items for participants in the individual identity-presentation condition were compared between rounds one and two using independent samples t-tests. Levene’s test indicated equality of variance: no items had a p-value lower than .05. Following this test, SP and community items for group identity-presentation conditions from rounds one and two were also compared using independent samples t-tests; the second test also demonstrated equality of variance and yielded p-values greater than .05 on all items.
Results of the two tests indicate no significant difference between rounds one and two. Therefore the two data sets were combined for a total of 37 participants. The results of the round comparison tests can be seen in Table 1.

The questionnaire was adapted from the CMCQ developed by Tu (2002). The original questionnaire was validated to ensure items measured their intended outcomes and it was necessary to validate the adapted questionnaire for inter-item reliability. The 11 SP items were compared for reliability using Cronbach’s alpha and yielded a value of .78, indicating a high level of internal consistency for SP measures. The individual item statistics revealed no item that would significantly increase the value of Cronbach’s Alpha.

The two community items were added to the questionnaire to measure the development of community amongst participants. These new items were not part of any previous research and the Pearson correlation coefficient was used to examine inter-item reliability. The two variables had an insignificant and weak positive correlation, r(35) = .24, p = .14. In light of the lack of reliability, it is reasonable to assume that these results indicate that the community measures were not an accurate measure of their intended outcomes.

**Social Presence Data**

The SP score was created using the mean of each participant’s eleven SP items from the questionnaire. The items related to community were not included because they were found to lack internal reliability.
Table 1. Descriptive statistics comparing social presence and community (CM) items from rounds 1 and 2.

<table>
<thead>
<tr>
<th>SP questionnaire item</th>
<th>df</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casual</td>
<td>17</td>
<td>0.06</td>
<td>.96</td>
</tr>
<tr>
<td>Impersonal</td>
<td>17</td>
<td>0.74</td>
<td>.47</td>
</tr>
<tr>
<td>Meaningful</td>
<td>16</td>
<td>0.87</td>
<td>.4</td>
</tr>
<tr>
<td>Stimulating</td>
<td>16</td>
<td>0.5</td>
<td>.63</td>
</tr>
<tr>
<td>Immediate</td>
<td>17</td>
<td>0.76</td>
<td>.46</td>
</tr>
<tr>
<td>Confidential</td>
<td>17</td>
<td>0.12</td>
<td>.91</td>
</tr>
<tr>
<td>Understand Meaning</td>
<td>17</td>
<td>0.84</td>
<td>.41</td>
</tr>
<tr>
<td>Self Expression</td>
<td>17</td>
<td>1.16</td>
<td>.26</td>
</tr>
<tr>
<td>Clear feelings</td>
<td>17</td>
<td>0.49</td>
<td>.63</td>
</tr>
<tr>
<td>Clear Goals</td>
<td>17</td>
<td>1.59</td>
<td>.13</td>
</tr>
<tr>
<td>Perceived Engagement</td>
<td>17</td>
<td>0.58</td>
<td>.57</td>
</tr>
<tr>
<td>Value input (CM)</td>
<td>17</td>
<td>1.15</td>
<td>.27</td>
</tr>
<tr>
<td>Value opinions (CM)</td>
<td>17</td>
<td>0.06</td>
<td>.96</td>
</tr>
<tr>
<td>SP items mean</td>
<td>15</td>
<td>0.95</td>
<td>.36</td>
</tr>
<tr>
<td>SP and CM items mean</td>
<td>17</td>
<td>1.23</td>
<td>.24</td>
</tr>
</tbody>
</table>
The mean SP scores were compared between the individual and group identity-presentation conditions using an independent samples t-test. According to Levene’s test, the variances were equal and no differences in SP were indicated (t = .94, df = 35, p = .35). The box-plot in figure 1 shows a visual representation of the relationship between the two conditions.

Following the t-test of SP mean scores, individual questionnaire items measuring SP and community were compared between conditions using independent samples t-tests, Table 2 shows the results of these tests. Results indicate that there were no significant differences between conditions for any SP items, community items, or control items.
Figure 1. Box plot comparing SP mean scores between conditions.
### Table 2. Individual SP and community (CM) item comparison between conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>df</th>
<th>t</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casual</td>
<td>38</td>
<td>.03</td>
<td>.98</td>
</tr>
<tr>
<td>Impersonal</td>
<td>38</td>
<td>1.27</td>
<td>.21</td>
</tr>
<tr>
<td>Meaningful</td>
<td>37</td>
<td>.54</td>
<td>.59</td>
</tr>
<tr>
<td>Stimulating</td>
<td>37</td>
<td>.02</td>
<td>.98</td>
</tr>
<tr>
<td>Immediate</td>
<td>38</td>
<td>.65</td>
<td>.52</td>
</tr>
<tr>
<td>Confidential</td>
<td>38</td>
<td>.19</td>
<td>.85</td>
</tr>
<tr>
<td>Understand Meaning</td>
<td>38</td>
<td>1.33</td>
<td>.19</td>
</tr>
<tr>
<td>Self Expression</td>
<td>38</td>
<td>.32</td>
<td>.75</td>
</tr>
<tr>
<td>Clear feelings</td>
<td>38</td>
<td>1.01</td>
<td>.32</td>
</tr>
<tr>
<td>Clear Goals</td>
<td>38</td>
<td>.95</td>
<td>.35</td>
</tr>
<tr>
<td>Perceived Engagement</td>
<td>35</td>
<td>.94</td>
<td>.35</td>
</tr>
<tr>
<td>Value input (CM)</td>
<td>38</td>
<td>.41</td>
<td>.69</td>
</tr>
<tr>
<td>Value opinions (CM)</td>
<td>37</td>
<td>.92</td>
<td>.37</td>
</tr>
</tbody>
</table>
CHAPTER IV
DISCUSSION

The hypothesis – that students in an online course utilizing individual identity presentation spaces will have higher levels of perceived SP than students in an online course utilizing group identity presentations – was not supported by any measures, and the null hypothesis is retained. However, this experiment is not conclusive regarding whether Identity Presentations are a contributing element of enhanced SP perceptions, or the development of community in online learning groups. There are a number of alternative explanations for the results. Limitations of this study, including participant attrition, activity duration, or experimental design may have contributed to the results.

Participant attrition is a likely explanation for the lack of significance in this experiment. First, the turnout of 37 participants is not enough for statistical significance. The goal was a minimum of 20 students per condition, meaning 40 participants were needed to obtain acceptable power. Having fewer than the required number means that even if significance had been found that the results would still be questionable in terms of generalizability.

Low turnout also likely impacted results because of experimental design and individual group populations. Groups of four students were randomly created and assigned before the day of data collection. A number of groups had fewer than four students due to missing participants. However, group numbers were only measured in the second round. In round two, three groups had all four members present, 13 groups
had only two or three participants, and one group had only one member present. During round one, three students emailed the researcher to report they had no partners, however identifying their questionnaires was not possible. These findings indicate that SP perceptions reported in the data are questionable.

Social presence is a perception of a communicative medium, based on a user’s interaction with other users. Without group members to interact with, participant ratings of the SP items may not be accurate or valid representations of interpersonal communication experiences in this web-environment. In the groups with only one participant each, the measures were invalid because the reported perceptions of social interaction were made without any interpersonal interaction. This means that SP measures taken from those individuals were likely speculative on their part, and possibly based on their previous experiences with online communication rather than the specific web-environment in which the experiment was conducted. Aside from participant dropout, the duration of the activity may have also caused problems in this experiment.

The entire experiment -- including student introductions, task, and questionnaire – was conducted in an hour or less. In contrast to this, Redfern & Galway (2002) recommend giving student groups at least a week or two to get to know one another at the onset of a course in order to facilitate stronger student interaction down the line. Though not a planned measure, over half of the questionnaires in both rounds were turned in within 45 minutes. Considering that the questionnaire had 25 items, this means that many participants likely spent less than 40 minutes interacting with one another, including the time to complete the activity. It is unlikely that students would have a chance to get to know one another’s personalities to the degree that would enable them to
use that knowledge for interpretation from a brief and scripted introduction. The short amount of time likely limited students’ comfort in using the online platform, as well.

Students also may not have become familiar or comfortable enough with the web-environment to engage in more informal communication and casual language. Aside from a profile picture, the main access to the thoughts and feelings of others that students had in this activity was through written communication. The mode and average scores on the ‘casual language,’ ‘apparent feelings,’ ‘understanding others,’ ‘self expression,’ and ‘meaningful language’ items from the questionnaire (items 1, 3, 7, 8, & 9 Appendix A) were all “Disagree.” This indicates students did not interact on a personal level. Casual language is needed to convey personality in written interpersonal interactions. Staying fully task-focused for the duration of interaction would have left little time for students to consider the attitudes of their partners. Furthermore, recurrent interactions may be required for environmental familiarity and community to arise. This was indicated by student reports on both community items, as the mean and mode of both were “Disagree” (items 12 & 13 in Appendix A). A suggestion for future research is to test the hypothesis during a full course rather than a one-time activity in order to allow students the time to become familiar with the environment and one another before attempting to complete a task.

Other elements of experimental design may also have been a contributing factor to the lack of significance. The mean and mode of the stimulating activity item (16 Appendix A) were “Disagree.” An engaging, or authentic, learning activity is an important element when your goal is to have students interact with one another. When implementing authentic, group based learning activities, students should find the activity
to have real-world relevance and provide a stimulating problem to solve. Students in this study did not find the activity stimulating, and this may have also contributed to the findings as well as the “Uncertain” average SP score. The experiment may not have been the problem, but rather the chosen variable of identity presentations may have limited differences between the two conditions.

The lack of significance in these findings may be attributed to something besides the limitations to the study. It is also possible that identity presentations are not a significant web-design feature impacting SP. Comparing use of profiles for interpersonal interaction against a group-space for interpersonal interaction over an entire semester may reveal a significant difference. A number of suggestions for future research on SP and environmental web-design can be taken from this experiment.

Longer-term use of the platform and repeated interaction may increase SP differences if students have a permanent group forum compared to coordinated activity and conversations through personal profiles. An experiment exploring differences between one-time identity presentations and some form of identity persistence, such as an avatar, may reveal more about the relationship between environmental web-design, identity, and SP perceptions. Identity can be conveyed on a more consistent basis by utilizing some form of avatar presented in tandem with user contributions, such as an image alongside their forum posts. Course delivery methods may also contribute to student engagement and SP perceptions.

Modeling the behaviors that are expected of students may increase their level of participation and encourage more casual interactions. An experiment in which the teacher participates in half of the group’s identity presentations may reveal more about
the role of the instructor in facilitating SP. Alternatively, the type of language used by
the teacher during introductions might also have an impact on the nature of student
interactions. Instructor role goes beyond introductions and could also be manipulated at
other points in a course.

The teacher can contribute to the judgment of authenticity made by students.
Instructor participation while introducing an activity might generate more interest. By
being present, asking questions, and answering questions a teacher may increase student
engagement with the activity. It is recommended that future work in this area should
pilot test the activity for engagement before utilizing it to test SP. In addition, the web-
design features being manipulated for online learning research, whether to explore SP,
community development, authenticity, or instructor role should always address or
facilitate learning goals or strategies.
REFERENCES


APPENDIX A

Carefully read each of the statements below and choose the option that best reflects your experience with the activity and your group members.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication with my group members was casual.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Communication with my group members was impersonal.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The language used by my group members was meaningful.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>The language used by my group members was stimulating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Communication between my group members was immediate.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
</tr>
<tr>
<td>6</td>
<td>Communication with my group members was not confidential enough to share personal information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>My group members’ meaning was easily understood.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>8</td>
<td>I was able to express what I wanted to my group members easily.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>My group members’ feelings were apparent to me in their communication.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>My group members’ goals were not clear to me.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
</tr>
<tr>
<td>11</td>
<td>My group members did not appear to be engaged in the activity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>My group’s final project represented everyone’s input.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
</tr>
<tr>
<td>13</td>
<td>My group members did not value everyone’s opinions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>I found it difficult to coordinate activity with my group members.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>I felt confident in creating the final document.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>I found the topic in this exercise stimulating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>The introductions helped me get to know my group members.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
</tr>
<tr>
<td>18</td>
<td>The forum discussion helped me get to know my group members.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Creating the final document helped me get to know my group members.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How many of your group members were you at least regular acquaintances with?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>How proficient are you with Internet use of:</td>
<td>Expert</td>
<td>Above Average</td>
<td>Average</td>
<td>Below Average</td>
<td>Novice</td>
</tr>
<tr>
<td>a. Threaded Discussion?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Google Drive?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Profile Creation and Management?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is your academic department?</td>
<td>utilized a drop down list</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is your gender?</td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is your current location?</td>
<td>Home and alone</td>
<td>Home with others</td>
<td>Computer lab</td>
<td>Library</td>
<td>Other</td>
</tr>
<tr>
<td>Besides yourself, how many members were in your group?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>