Measuring Ecoshock and Affective Learning: A Comparison of Student Responses to Online and Face-to-Face Learning Ecologies

David L. San Jose and Tom Kelleher

School of Communications
University of Hawaii
Honolulu, HI 96822 USA
tkell@hawaii.edu

Abstract

A 12-item ecoshock index was developed and tested to measure differences in university students' responses to online and face-to-face learning ecologies. The index yielded promising internal reliability scores in pilot testing and experimental conditions. Construct validity was supported with evidence from within-subjects experimental comparisons (N = 49) showing that ecoshock was significantly higher in online conditions than face-to-face conditions as predicted. Also as predicted, ecoshock correlated negatively with an 8-item index of affective learning, which was found to be greater in face-to-face conditions than online conditions. Implications for instruction and student learning outcomes are discussed.

Keywords: Culture shock, transition shock, lifelong learning, communication education

Introduction

Students new to online learning activities experience similar challenges as those who travel physically to different cultures. When people step outside of the comfort of their own culture or familiar learning environment, they feel vulnerable because they lack a shield from the threat of the unknown (Barna, 1983). The stress from the strangeness and unfamiliarity of new technologies affects a person's confidence and motivation to complete a task. According to Fontaine (2000) *ecoshock* directly affects a person's quality of experience, performance, and motivation. Ecoshock is the physiological and psychological reaction to a new, diverse, or changed ecology (Fontaine, 2000). The extension of the concept of ecoshock to new technologies in higher education is the focus of this study. The purpose is to create an ecoshock index and test its utility in measuring the presence of ecoshock in an online learning environment. This study also explores the relationship between ecoshock and affective learning.

Culture Shock

The root of ecoshock may be traced back to Kalervo Oberg's *culture shock*. Oberg (1954) stated that symptoms of culture shock included feelings of helplessness, anger, paranoia, fear of being taken advantage of and cheated, frustration, and refusal to engage with the host culture. "Individuals differ greatly in the degree in which culture shock affects them" (1954, p. 2). Oberg (1954) also stated that some people just cannot live in a foreign country, whereas other people can adjust by simply experiencing it themselves or seeing others go through the process.

When someone experiences a different culture than his or her own, "he or she is like a fish out of water" (Oberg, 1954, p. 1). The reason people feel anxious is because their familiar cues, or the ecology that they are accustomed to, have been removed. Oberg (1954) posited that culture shock produces two outcomes as individuals experience the frustration and anxiety of a new and changed ecology: 1) the individual rejects the environment that caused the discomfort, and 2) he or she regresses back to a familiar environment such as his or her home environment.

Transition Shock

One of the difficulties in understanding culture shock is the tendency to treat it as an exotic ailment, with origins rooted in faraway places (Bennett, 1977). Bennett took a different perspective on culture shock with what she called *transition shock*. She wrote that, "culture shock bears a remarkable resemblance to tensions and anxieties we face whenever change threatens the stability of our lives" (1977, p. 45). In transition shock, however, the symptoms are not only felt during travels to 'strange cultures' but also are experienced when there are changes in normal lives. According to Bennett (1977), transitional experiences such as a change of lifestyle, the loss of a familiar frame of reference in an intercultural encounter, or a change of values with rapid social innovation all will manifest some sort of shock or stress.

Transition shock is defined as, "a state of loss and disorientation precipitated by a change in one's familiar environment which requires adjustment" (Bennett, 1977, p. 46). In transition shock, the stress and shock experienced is due to the loss of familiarity and normalcy. A person's normal way of life is threatened and coping skills are needed to alleviate the stress. She also added that when adaptive process fails to meet the need of the changed ecology, we find ourselves overwhelmed by the stimuli (Bennett, 1977).

The symptoms of transition shock are similar to Oberg's culture shock but Bennett added that in transition shock communicative behavior becomes problematic. According to Bennett, when we are anxious, lonely, and disoriented our communication skills disintegrate: "Isolation and tension are exacerbated, producing blockage and defensive communication" (1977, p. 46). This is a dilemma because adaptive and coping skills may not be developed if sojourners are not willing to interact in their new ecology.

In an online learning ecology, transition shock is also highly problematic as students may experience stress and shock due to the new and changed learning ecology. Students in an online learning ecology who experience transition shock may be unwilling to ask for help or support and, similarly to their sojourner counterparts, sink themselves into isolation.

In a meta-analysis of online learning studies, Menchaca and Bekele (2008) found that students' satisfaction in online learning environments is directly related to achievement and negatively related to dropout rates. Engagement, participation, and the willingness to experience online learning environments are necessary adaptive components for students to be successful in online courses. When students remain isolated and shy away from assistance, adaptive skills and information and communication technology (ICT) experience are not cultivated. Transition shock is a problem in both physical and virtual environments, and thus, intervention strategies are needed to alleviate the effects of transition shock.

Transitional Experience

In Adler's (1975) examination of the *transitional experience,* he stated that, "Although culture shock is most often associated with negative consequences, it can be an important aspect of cultural learning, self-development, and personal growth" (p. 14). Adler expressed that even though stress and anxiety interfere with adaptation to the new and changed ecology, the sensations of stress, anxiety and frustration are key factors in the development of adaptive behavior. "Transitional experiences can be the source of higher levels of personal development" (Adler, 1975, p. 14).

In Adler's transitional experience, the individual is not necessarily hindered by the stress and shock of the new and changed ecology, but challenges are part of the acclimation process. According to Adler, "the more one is capable of experiencing new and different dimensions of human diversity, the more one learns of oneself" (1975, p. 22).

Ecoshock

Fontaine, in his examination of 'strange lands,' or travels to different ecologies, called the stress and shock that is felt *ecoshock*. According to Fontaine (2006), people who encounter new ecologies as part of job assignments typically experience complex physiological reactions that seriously impact their success. He noted that while the stress or shock reaction from a new and changed ecology commonly

has been called 'culture shock,' changes in ecology are more than just cultural. Ecoshock also includes changes in psychological, physical, technical, and biological environments (Fontaine, 2000). The ecoshock concept encompasses the difficulties and challenges in both physical and virtual travel. Individuals who are looking to use emerging communication technologies suffer similar difficulties and challenges as those who travel physically to different cultures.

The concept of ecoshock in this study was necessary in order to encapsulate the challenges students encounter as they venture into virtual learning. In this study, the concept of ecoshock assists in identifying the stress and the shock students experience due to the differences between traditional FTF and online learning ecologies.

Symptoms of ecoshock may include:

> Poor perceptual-motor coordination and short-term illness; anxiety or nervousness, often with no specific identifiable source; depression manifested in boredom, fatigue, wishing to sleep all the time, withdrawal from others, or the inability to get interested in anything; irritability and other mood changes, often over matters that otherwise might appear minor; fears of being taken advantage of, cheated, or discriminated against; feelings of vulnerability to disease, accidents, crimes, and failure; lowered effectiveness of thought processes particularly in judgment and decision making; and breakdowns in old social relationships and difficulty in establishing and maintaining new ones. (Fontaine, 2000, p. 637)

In online learning, the ecology changes from what students are accustomed to, and "the appropriateness of… normal or habitual ways of doing tasks becomes problematic" (Fontaine, 2002, p. 122). When faced with an unfamiliar ecology, even the most mundane task has an adverse effect on a person's psyche. Naturally, people adapt differently depending on their previous experiences or success. Students who do not have prior experience with online learning ecologies may experience more stress that is associated with the new and changed ecology. However, as Adler suggested in describing transitional experiences, students must continue with online courses and be willing to experience the challenges of the new ecologies in order to gain the coping skills necessary to be successful.

Students who are participating in an online learning ecology may experience some form of ecoshock regardless if they have prior experience or not. The key is that they are aware that they will experience ecoshock and understand that by keeping an open mind, increased awareness, and willingness to participate, they can alleviate the symptoms.

The ability to use ecoshock to overcome the sensation of anxiety and fatigue is an imperative skill to develop to achieve success when encountered by a new and changed ecology. As Adler (1975) stated, "the transitional experience is a journey into the self" (p. 22). Being aware of the stress and shock experienced during a transitional phase and using heightened awareness to develop skills to overcome challenges will not only help in accomplishing task objectives but also will help students discover themselves.

Affective Learning

Affective learning refers to one of the three domains identified by Bloom (1956) in his taxonomy of learning. Bloom identified, *cognitive*, *affective*, and *psychomotor* as the three domains of educational objectives. Cognitive is described by Bloom as, "the recall or recognition of knowledge and the development of intellectual abilities and skills" (p. 7). Affective is described as, "objectives which describe changes in interest, attitudes, and values, and the development of appreciations and adequate adjustment" (p. 7). Lastly, psychomotor are the motor-skills or behavioral skills that constitute the relationship between cognitive process and the physical movement in education (Bloom, 1956).

Historically, a number of studies have attempted to analyze the affective learning domain. The definition of affective learning also has changed since Bloom's original description. Affective learning has been defined as the "attitudes and feelings that students have about themselves" (Stancato & Hamachek, 2001, p. 78). Scott and Wheeless (1975) defined it as, "an increasing internalization of positive attitudes toward the content or subject matter" (p. 81). Bean (as cited in Stancato & Hamachek, 2001) defined it as the feelings, attitudes and behavior of the learner. For the purpose of this study, the researchers

utilized Scott and Wheeless' affective learning definition of "internalization of positive attitudes toward content or subject matter".

According to Moneta and Kokkonen-Moneta (2007) research in the field of online education has not completely investigated students' emotional process or affective learning. Moneta and Kokkonen-Moneta (2007) examined how the affective learning domain would manifest itself in an online and face-to-face lecture in an introductory computing course. Moneta and Kokkonen-Moneta (2007) operationalized affective learning and divided it into three different facets: *intrinsic engagement*, *external engagement*, and *negative affect*. Intrinsic engagement comprised students' positive affect, perceived challenges, and perceived skills (Moneta & Kokkonen-Moneta, 2007). External engagement was based on students' performance expectations, goals, and self-efficacy (Moneta & Kokkonen-Moneta, 2007). Negative affect was defined as the disruption of students' progress, described by the researchers as, "a third independent dimension of affective learning" (Moneta & Kokkonen-Moneta, 2007, p. 55).

Moneta and Kokkonen-Moneta's (2007) study not only identified dimensions of affective learning but it also provided a link to the current ecoshock study. The researchers stated that the, "pattern of mean values suggested that negative affect was higher in the online courses" (p. 67).

Rationale

The first step in dealing productively with ecoshock is properly identifying it. This study culls key dimensions of ecoshock and affective learning from prior literature in the development of several questionnaire items. The ecoshock items are then tested for internal consistency and construct validity. Evidence of construct validity is sought via the testing of three hypotheses:

> *Hypothesis 1:* Students participating in an online learning ecology will report higher ecoshock than when they are participating in a familiar face-to-face (FTF) learning ecology.
>
> *Hypothesis 2:* Students participating in a familiar FTF learning ecology will report higher affective learning than when they are participating in an online learning ecology.
>
> *Hypothesis 3:* There is a negative relationship between ecoshock and affective learning.

Methods

Participants

Eighty students enrolled in a large introductory communication course were asked to participate during the spring 2009 semester at a large state university. The course was designed as a hybrid course in which attendance and participation in both in-class and online activities was required.

Students were assigned to one of two groups (A or B) with a near-random procedure. The researchers used the last digit of the students' school identification number to assign the students to groups. Students with an even-ending school identification number were assigned to group A (n = 37) while students with an odd or a zero-ending identification number were assigned to group B (n = 43). Group B consisted of students with odd and zero-ending school identification numbers to better balance the number of students assigned to each condition. Of the 80, 53 students submitted and completed both FTF and online surveys, which were voluntary.

Procedure

During the first week of the two-week study, students in Group A participated in the FTF learning ecology while group B participated in the online learning ecology. The assignment was reversed during the second week. In both FTF and online learning classroom ecologies, surveys consisting of the ecoshock index and affective learning index were administered.

In the FTF learning ecology, the professor of the course lectured on the topics of "conceptualizing communication" and "requisite variety" while the online learning ecology presented a module on "cultural dimensions." The FTF condition included required reading, in-class discussions, PowerPoint slides, a quiz, and the voluntary survey with the informed consent statement. The online condition included an asynchronous module with required reading, self-guided PowerPoint slides, suggested video resources,

online discussion questions, an online quiz, and the voluntary survey with an informed consent statement. The same professor and teaching assistant were responsible for the material presented both conditions. In the FTF learning ecology, the survey instrument was administered during class in a paper form. Students in the online learning ecology were presented with an electronic version when they accessed the learning module.

Ecoshock Index

To create an index for ecoshock, the first author developed a list of candidate items from the literature to measure feelings of frustration, fatigue, clumsiness, anxiety, paranoia, depression, irritability, and rigid thinking that are likely to interfere with adjustment and performance in an online learning ecology (Oberg, 1954; Adler, 1975; Bennett, 1977; Fontaine, 2000). The Depression Anxiety and Stress Scales (DASS) created by Lovibond and Lovibond (1995) also were used in the initial development of the ecoshock index item list. Lovibond and Lovibond's (1995) DASS items were included for the measurement of "depression, anxiety, and stress as relatively varying states and not necessarily an enduring trait" (Lovibond & Lovibond, 1995, p. 337).

The ecoshock survey items were set up with five-point Likert-type items with the response options ranging from 1 ("strongly disagree") to 5 ("strongly agree"). A pilot test of 46 candidate ecoshock survey items was conducted with a group of different students in a prior section of the same course with the same instructor and teaching assistant in fall 2008 (N=59). Using exploratory factor analysis (principal components rotation) and face validity checks, the ecoshock index was reduced to the following 12 items for the main study:

- I felt unmotivated.
- I felt unsatisfied.
- I felt uninspired.
- It was difficult for me to calm down.
- I feared that I would be "thrown" by some trivial but unfamiliar task.
- I found it difficult to tolerate interruptions.
- I was intolerant of anything that kept me from getting on with what I was doing.
- I found myself getting agitated.
- I found myself being troubled with this class.
- I felt that I was in a bad mood.
- I found myself feeling helpless.
- I found it difficult to adjust to the class.

These 12 items resulted in a Cronbach's Alpha of .93 in the pilot study, indicating a high degree of internal consistency. In the FTF and online conditions in the main study, the 12-items yielded Alphas of 0.93 and 0.92, respectively.

Affective Learning

Index items were developed from Scott and Wheeless' (1975) Affective Learning scale and Beatty and Payne's (1985) Student Motivation Scale. Scott and Wheeless (1975) reported a range from a low of .86 to a high of 0.96 on Cronbach's Alpha reliability tests, whereas Beatty and Payne (1985) reported Cronbach's Alphas of 0.93 and 0.96. The two pre-existing lists of items were combined to create a single index to measure students' "internalization of positive attitudes toward the content or subject matter"

(Scott & Wheeless, 1975, p. 81) while acknowledging that affect may be "a temporary condition in which individuals direct high levels of concentration and attention toward the competent completion of a task" (Beatty & Payne, 1985, p. 343). The affective learning index yielded a Cronbach's Alpha of $\alpha = 0.93$ in the pilot study and Alphas of 0.89 and 0.91 in the FTF and online conditions, respectively, in the main study. Affective learning items included:

- I enjoyed the lesson plan.
- I was enthusiastic with the lesson plan.
- I thought the content of the lesson plan was good.
- I thought the content of the lesson plan was positive.
- I thought the content of the lesson plan was fair.
- I found the class exciting.
- I found the class stimulating.
- I found the class engaging.

Results

Hypothesis 1

A paired sample t-test was used to test Hypothesis 1. While in the online learning ecology, students reported significantly higher ecoshock scores ($\overline{x} = 2.32$, SD = 0.67) than when they were in the FTF learning ecology ($\overline{x} = 1.92$, SD = 0.60), (t (48) = - 4.188, one-tailed $p < .001$). Thus, the first hypothesis was supported. Statistics for hypothesis tests are based on all cases with valid data for all variables in the procedure.

Hypothesis 2

A paired-sample t-test also supported the second hypothesis. While participating in a FTF learning ecology, students reported significantly higher affective learning scores ($\overline{x} = 3.97$, SD = 0.52) than when they were in the online learning ecology ($\overline{x} = 3.42$, SD = 0.63), (t (51) = 6.345, one-tailed $p < .001$).

Hypothesis 3

An analysis using Pearson's correlation coefficient indicated a strong negative correlation between ecoshock and affective learning across all conditions ($r = - .659$, one-tailed $p < .001$). The third hypothesis was supported.

The survey also included a question regarding students' prior experience with online learning ecologies. Of the 64 students who filled out the online survey, 42 (65.6%) stated that they had no prior experience with online courses other than the course they were taking.

Discussion

As predicted, the newly developed measure of ecoshock correlated negatively with affective learning and indicated that students experienced greater ecoshock in an online learning ecology than in a comparable but more familiar FTF ecology. Results also were consistent with Oberg's culture shock and Bennett's transition shock concepts as students reported higher ecoshock in the online learning ecology compared to when they were in the FTF learning ecology. The higher ecoshock levels in the online learning ecology are likely due to the loss of familiar signs and symbols of the traditional FTF learning environment and the stress from the changed ecology.

Fontaine (2002) identified three challenges in his studies of journeys to strange lands: 1) coping with our physical and psychological reaction to online ecology, 2) developing and implementing strategies to complete the task essential for living and working in an online ecology, and 3) finding ways to "maintain the motivation to continue, in spite of inevitable frustration, fatigue, ecoshock, and often poorer that desired task performance" (Fontaine, 2002, p. 122). Empirically measuring the presence of ecoshock and identifying the negative correlation between ecoshock and affective learning constitute important first steps in the continued effort to develop ways to increase learning outcomes in online learning ecologies.

Limitations and Directions for Future Research

The sample of participants in this study was selected through a convenience sampling process that relied on students who were registered in an introductory communication course at a single university in a single semester. Broad conclusions from data from this group must be tested by replication with other groups in other contexts. The within-subjects statistical comparisons, however, do help offset compromises in external reliability with interesting findings about how students were affected internally by the conditions designed for this experiment.

The differences between the content of the learning modules presented in the FTF and online learning ecologies are possible confounding factors that should be considered. Although the researchers observed carefully and followed up informally with students, no evidence was observed to suggest that the course content in different conditions was a significant factor. The observed differences between conditions seem much more likely the result of the sociological, physical and technological differences that theoretically would cause differences in ecoshock. Nonetheless, future researchers should consider controlling for content in the evaluation of the ecoshock index.

The findings of this study suggest at least two key directions for future research. First, it is important to identify specific causes of ecoshock in online courses and design interventions to deal with the symptoms of ecoshock. One possible way to defend against the negative outcomes of stress in an online course is for instructors to initially set up more manageable learning modules, allowing time for acclimation, and a fairly simple quiz to help build students' efficacy. Observing students' ecoshock levels individually in a longitudinal manner will help ascertain teaching techniques to serve this goal.

Second, seeking the optimum balance between levels of ecoshock and coping skills will help instructors establish what Adler has referred to as the "tension posed by the transitional experience" that produces "the potential for authentic growth and development" (1975, p. 14). Developing and creating activities that improve student learning outcomes in online classes and modules will be beneficial to both students and instructors. Students' dissatisfaction in online learning is likely due to how online courses upset ways of learning to which students are accustomed. Identifying effects such as ecoshock in such situations will help instructors mitigate negative effects, and perhaps even integrate the challenges into lessons for student growth.

In the context of this brief study, ecoshock was predicted to have a negative effect on affective learning, but in the greater context of lifelong learning, the mild challenge to affective learning these students reported may mature into better self-understanding and ability to cope with future online learning experiences. In the broader picture, the relationship between ecoshock and affective learning may be less linear than presented here. In the long view, a bit of well-managed ecoshock may have an ultimately positive impact on learning.

References

Adler, P.S. (1975). The transitional experience: An alternative view of culture shock. *Journal of Humanistic Psychology, 15* (4), 13-23.

Barna, L.M. (1983). The stress factor in intercultural relations. In D. Landis & R.W. Brislin (Eds.). *Handbook of intercultural training, Vol. II.* New York: Pergamon.

Beatty, M. J. (1994). Student motivation scale. In R.B. Rubin, P. Palmgreen, & H.E. Snyder (Eds.), *Communication research measures: A sourcebook.* (pp. 343-346). New York: Guilford Press.

Bennett, J. (1977). Transition shock: Putting culture shock in perspective. *International & Intercultural Communication Annual, 4*, 45-52.

Bloom, B. S. (1956). *Taxonomy of educational objectives*. Handbook I: Cognitive Domain. New York: David McKay

Fontaine, G. (2000). Skills for successful international assignments to, from, and within Asia and the pacific: Implications for preparation, support, and training. *Management Decision, 35*, 635-647.

Fontaine, G. (2002). Teams in teleland: working effectively in geographically dispersed teams in the Asia pacific. *Team Performance Management: An International Journal, 8*, 122-133.

Fontaine, G. (2006). *Successfully meeting the three challenges of all international assignments*. Honolulu, HI: University of Hawai'i. Retrieved May 14, 2009, from http://www.ebookmall.com/ebook/225098-ebook.htm

Lovibond, S. H., & Lovibond, P. F. (1995). Manual for the depression anxiety and stress scales. *Behaviour Research and Therapy, 33*, 335-342.

Menchaca, M.P., & Bekele, T.A. (2008). Learner and instructor identified success factors in distance education. *Distance Education, 29*, 231-252.

Moneta, G. B., & Kekkonen-Moneta, S. S. (2007). Affective learning in online multimedia and lecture versions of an introductory computing course. *Educational Psychology, 27*, 51-74.

Oberg, K. (1954). Culture shock. *Presentation to the Women's Club of Rio de Janeiro*, Brazil, August 3, 1-9.

Scott, M. D., & Wheeless, L. R. (1975). Communication apprehension, student attitudes, and levels of satisfaction. *Western Journal of Speech Communication, 41*, 188-198.

Stancato, F. A., & Hamachek, A. L. (1990). The interactive nature and reciprocal effects of cognitive and affective learning. *Education*, 111, 77-81.

Manuscript received 14 May 2009; revision received 3 Aug 2009.