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Video lecture format, student technological efficacy, and social presence in online courses

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ABSTRACT

Online platforms are frequently used as an alternative environment for individuals to meet and engage in a variety of activities, like attending courses online. We examined the effect of adding social presence cues in online video lectures and technological efficacy on college students' perceived learning, class social presence, and perception that the videos aided learning. Participants rated their technological efficacy and completed an online class with video lectures that either included the video (image) of the instructor or not. The interaction between technological efficacy and video manipulation predicted lower ratings of perceived learning, social presence, and video usefulness, particularly for students with lower technological efficacy. A mediated-moderation analysis showed that, the interaction between person (efficacy) and media (instructor image in video vs. no image) predicted greater perceived learning through the mediators of perceived usefulness of videos, class interactivity, and felt comfort in the class.
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1. Introduction

The internet has become a popular alternative platform for interacting with others and disseminating information. As a result, online courses are frequently being used as instructional mediums, especially within higher education. Over 5.6 million college students took at least one course online in the fall 2009 semester, and furthermore, research predicts that almost 90% of college students will take at least one class online during their college career (Allen & Seaman, 2010). Although the vast majority of university classes are still taught in traditional, 'face to face' settings, mediated learning environments are swiftly growing towards being accepted as a normal part of the American college experience.

The applications of online instruction presently extend across all academic disciplines, any level of curriculum, and a wide variety of student populations. For example, past research (Allen et al., 2004; Donavant, 2009) has demonstrated that students engaging in internet courses extend from youth in high school through college age, as well as into adulthood (e.g., police officers, military, and businesses). Similar to traditional 'face to face' courses, media-based courses utilize a multitude of teaching techniques in attempt to best meet the needs of students. Instructional methods vary by medium, resulting in a wide range of approaches such as email and bulletin board postings to utilizing supplemental interactive video lessons (Katz, 2002). Although there is a large amount of enthusiasm and interest in promoting mediated learning, the creation of alternative environments directly paralleling 'face to face' learning experiences, has yet to be accomplished, resulting in a need to examine these new methods of teaching. Taken together, the widespread use and diversity of online instruction has led to a flood of research concerning the similarities and differences between online and face-to-face instruction.

The vast majority of research concerning online instruction revolves around the notion that there may be different experiences and outcomes between online and face-to-face learning environments. Whether or not these learning platforms indeed affect online learners differently is still under debate and past research findings diverge on a number of topics. For example, one proponent of online instruction published a seminal book that reviewed the research regarding traditional vs. mediated learning platforms and determined there was no significant difference between the two modes of instruction (Russell, 1999). On the other hand, researchers have noted some caveats of this conclusion. They suggest that self-selection, may account for the lack of significant results (Coates, Humphreys, Kane, & Vachris, 2004). In addition to inconsistencies between previous findings, past related research also contains a number of methodological concerns (e.g., lack of random assignment), further warranting caution regarding the interpretation of studies exploring online education (Institute for Higher Education Policy, 1999).

Although there are a number of concerns regarding past research on online learning, exploratory efforts have successfully identified a number of positive and negative aspects of using the internet as an educational platform. With respect to the typically

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busy and overwhelming lifestyle of a large number of students, the most commonly cited reason for students to prefer online instruction is the overall convenience (Bennett, 2002; Donavant, 2009; Perreault, Waldman, Alexander, & Zhao, 2008). For example, time and money is saved when students do not have to commute to a university to participate in a face-to-face class (Brinkman, Rae, & Dwivedi, 2007). Some negative aspects of using these methods of instruction are that online classes typically have a larger dropout rate than traditional courses (McLaren, 2004), and many students report having feelings of isolation, or limited 'social presence' (Gunawardena & McIsaac, 2004), while taking online courses (Bennett, 2002; Donavant, 2009). Even with increasing internet speeds affording instructors the opportunity to offer video based instruction (Dykman & Davis, 2008), which compared to other forms of media (e.g., text-based communication) is posited to communicate greater felt social presence (Gunawardena & McIsaac, 2004), reports of perceiving isolation persists. Irrespective of past research concerns and the benefits and costs of online instruction, the trend toward online education is continually expanding, resulting in the pressing need for further empirical investigation of this educational platform and its implications for learners.

Following the emergence of social presence theory (Short, Williams, & Christie, 1976), the majority of related research primarily focused on exploring the nature and implications of online media and communities, and in particular, online educational settings. Social presence theory suggests that different media (e.g., face-to-face, telephone, text) convey differing degrees of social cues that lead interacts to feel more or less psychologically present with one another (Tu & McIsaac, 2002). A number of dimensions of social presence have been proposed including intimacy, immediacy (Short et al., 1976), social context (e.g., informal or formal conversation), online communication (e.g., ease of expression), interactivity (Tu, 2000), group interactivity, comfort, influence of others (Lin, 2004), privacy (Tu, 2002), affective interaction, cohesion with other interactant (Rourke, Anderson, Garrison, & Archer, 1999), emotional expression, and group cohesion (Garrison, Anderson, & Archer, 2000). Although the literature is filled with ambiguity among defining terms and conceptualization of the components of social presence (Biocca, Burgoon, Harms, & Stoner, 2001), a common theme is evident. Social presence is related to the subjective perception of feeling psychologically connected with others while engaging in social interactions through various mediums.

Many social presence theorists and researchers have expanded the original theoretical framework to account for the complex and dynamic nature of this phenomenon (Biocca et al., 2001; Gunawardena & Zittle, 1997; Kehrwald, 2008; Richardson & Swan, 2003; Tu & McIsaac, 2002). Originally, social presence theory focused on the degree to which users perceive and feel as though interactions within mediated settings are indeed interactions among real people. However, it has been suggested that consideration of other factors, such as the user's technological competence (e.g., computer skills) and the user's individual perceptions of their experiences (e.g., perceived interactivity), also provide important insight into understanding the experience of social presence. As suggested by Lewin (1946), dynamic interactionism is encapsulated in the simple formulation—behavior (B) is a function (F) of the person (P) and his environment (E), $B = F(P, E)$. In effect, perceived social presence is an outcome of the dynamic interaction between the person (e.g., past experience, efficacy to use the media, mood, motivation, preference, culture) and the environment (i.e., the communication medium).

The ability to utilize mediated interfaces to successfully interact within different mediums and personal perceptions of mediated activities are two important factors which influence the potential for perceiving social presence. Tu and McIsaac (2002) suggest that individual's technological skills and past experiences with media platforms greatly affect the degree of social presence users may perceive. For example, an individual's lack of experience with a communication medium may affect their perception of the media's social presence affordances at any given point in time. With practice, the same individual may learn to properly use the components of the media or develop new strategies to adapt and better interact with others in the environment, which may reduce extraneous factors related to lack of experience. As a result, the degrees of social presence afforded by the media will likely evolve as technological skills are obtained. Similarly, the perception of interactivity has been identified as another key dimension related to social presence (Tu, 2000). According to past research on online learning environments and social presence, an individual's perception of student–teacher and student–student interactivity throughout online courses, consistently predicts the amount of satisfaction they will have with the class (see Fulford & Zhang, 1993; Lowenthal, 2009). Furthermore, perceiving oneself to be 'present' in an online course is related to students' perceived learning and satisfaction with the instructor (Richardson & Swan, 2003). Together, technological efficacy and subjective perceptions of mediated experiences, provide insight into the extent to which media users perceive social presence. Thus, it seems desirable to identify how to manipulate social presence among users in mediated settings and further explore the nature and implications of this dynamic interaction between students and online class environments.

According to social presence theory, the use of supplemental methods, like adding video instruction, should induce some degree of social presence through non-verbal cues (e.g., eye gaze, facial expressions, smiling) which are otherwise absent in telephone or text based instruction. However, promoting social presence is not limited to enhancing instructional methods alone. Individuals who engage in taking online classes, regardless of specific instructional techniques, have commonly demonstrated the ability to overcome the limitations of the communication medium, and they too provide different types of cues (e.g., using emoticons in email) which facilitate social presence (Gunawardena & Zittle, 1997). Combined, these findings suggest that social presence is grounded upon a number of personal and social factors, and not merely on something inherently built into the communication medium itself (Gunawardena & Zittle, 1997).

The dynamic nature of social presence can lead to difficulties in examining this construct. Past research has demonstrated that mediums which have a few social presence cues may increase group cohesion and adherence to group norms when compared to face-to-face interactions (Lea & Spears, 1991; Reicher, Spears, & Postmes, 1995). Similarly, others have shown that adding cues may inhibit social presence, suggesting that there are limitations to using social presence cues in online classes. In two studies, Homer, Plass, and Blake (2008) examined the effect of adding additional social presence cues (i.e., non-verbal signals) to a video lecture on participants' cognitive load, perception of social presence, and learning. In Experiment 1, participants were randomly assigned to view a talk that contained the lecture slides and voice of the presenter (no image of the presenter) or the same video with the video image of the presenter included. Participants then rated their perceived social presence, cognitive load, and completed an exam on the material presented in the video. Contrary to social presence theory, no significant differences were observed between the video conditions (no image vs. image) on perceived social presence. Additionally, no differences in exam scores were found, however participants in the video with the presenter's image rated their degree of difficulty and effort with the video (i.e., cognitive load) significantly higher than participants in the no image condition.

In Experiment 2, a measure of visual learning preference interacted with the video manipulation to predict cognitive load.

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