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The impact of transactional distance dialogic interactions on student learning outcomes in online and blended environments

Kayode C.V. Ekwunife-Orakwue*, Tian-Lih Teng [1]

The Department of Technology and Society, The College of Engineering and Applied Studies (CEAS), Stony Brook University, SUNY, United States

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ABSTRACT

This study measured how student interactions (as captured by Transactional Distance dialogue (Moore, 1993)) in online and blended learning environments impacted student learning outcomes, as measured by student satisfaction and student grades. Dialogue was measured as student interactions with other students (student–student interaction), the technologies used (student–technology interaction), the instructors (student–teacher interaction), and the course contents (student–content interaction). In addition, moderating effects of media and modality of interactions and individual differences on student learning outcomes were also measured. Data was obtained from 342 online and blended students between 2010 and 2013. Findings indicate that student–content interaction had a larger effect on student learning outcomes than other forms of dialogue. Implications for educational policies that require teacher-presence (student–teacher) and student–student interactions in distance learning environments are also discussed.

1. Introduction

Theories of learning show that interactions between, and among students and teachers, play a role in determining student learning outcomes. However, studies that are based on these theories often fail to account for the mechanisms by which these interactions are influenced by the media of interaction; and miss the opportunity to identify and isolate the myriads of interactions that distinguishes a traditional face-to-face (F2F) learning environment from an Online Learning Environment (OLE). Studies that do, often limit their analysis to interactions between students and teachers as in a traditional face-to-face learning environment (TF2FLE); even though social ecologists clearly depict OLEs and TF2FLEs as two distinct learning environments. Moreover, attitudes of individuals are known to be shaped by the way they perceive the object of interaction. Inadvertently, the environment an individual is situated influences the type of behaviour exhibited or portrayed; and specifically the attitude expressed by that individual. Social psychologists refer to this attitudinal change as perceived distance. Distance learning theories, most notably, Transactional Distance Theory (Moore, 1993) have been posited to explain the mechanisms by which perceived distance operates in OLEs, but none have adequately identified the constructs to measure the factors involved, much less predict a causal pathway for the mechanism of occurrence.

Regular, frequent, and direct face-to-face contact with instructors have always been the hall mark of traditional educational settings (Bacow, Bowen, Gutherie, Lack, & Long, 2012). However, the rapid penetration of educational technologies (Radford, 2011) (such as Learning Management Systems (LMS), streaming lecture videos, and web conferencing software) that provide similar, though mediated, educational transactions in traditional and virtual classrooms, is challenging this core assumption (Garrison, Anderson, & Archer, 2001; Sener & Shattuck, 2006). It is crucial now, more than ever, to understand the mediated human–technology interactions, "the perceptual illusion of non-mediation that media users experience" (Lombard & Ditton, 1997), and how the learner's sense of educator's presence, and their dialogic relationship (Munro, 1998) impacts students' affective and cognitive learning outcomes (Anderson & Walberg, 1974; Walberg, 1974). In light of the proliferation of these educational technologies, more research studies are needed (Black, Ferdig, & DiPietro, 2008; U.S. Department of Education, 2010; Barbour & Reeves, 2009) to address the low retention, ; Aragon and Johnson,

* Corresponding author. Tel.: +1 6314030615; fax: +1 6316322704.
E-mail addresses: kayode.adebowale@stonybrook.edu, kayodecv.ekwunifeorakwue@gmail.com (K.C.V. Ekwunife-Orakwue), ted.teng@stonybrook.edu (T.-L. Teng).
[1] Tel.: +1 6316328962; fax: +1 6316322704.

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2008; Gibson, Ice, & Mitchell, 2012; Rhee-Weise, 2013 high attrition, and high failure rates of online students compared to face-to-face (F2F) settings (Allen & Seaman, 2009, 2013; Bernard & Amundsen, 1989; Bernard, Abrami et al., 2004; Cyrs, 1997; Dille & Mezack, 1991; Jordan, 2013; King, 2002).

Contemporary distance education is often difficult to define by the mode of educational delivery via information and communication technology (ICT), or the physical separation between learners and instructors, due to the rapid evolutions in education technologies. Researchers, institutions of higher education, and policy makers often struggle to find an operational definition for online learning environments. To avoid such conceptual confusions, Allen and Seaman (2010) (Table 1) developed a framework for categorizing courses based on modes of educational delivery.

1.1. Theoretical framework

1.1.1. Transactional distance theory

Moore (1993) termed perceived distance that arises as a result of attitudinal changes to an object of interaction as transactional distance (TD); and defined it as a psychological and communications space (in which there exists "potential misunderstanding between the inputs of instructor and those of the learner") created by the separation of learners and instructors.[2] This space of potential misunderstandings produces special patterns of learner and teacher behaviours called universe of teacher–learner relationships that affect teaching and learning. From the perspective of TD, distance education is operationalized as a pedagogical concept that describes this universe of teacher–learner relationships that exists when learners and instructors are separated by space and/or by time (Moore, 1993, p. 22). TD as a continuous variable, is a function of three clusters of constructs that determine the degree of transactional distance namely: structure (S), dialogue (D), and learner autonomy (LA). Transactional Distance increases when there is more structure, less dialogue, or greater learner autonomy (Moore, 1989; Moore & Kearsley, 1996, 2005).

Some studies expose the gap with previous research on TD. Hauser, Paul, and Bradley (2012) pointed to the inability to generate a consensus around valid and reliable objective measures of S, D, LA, and TD. The lack of construct validity and consistent measurements is also a problem with research studies on TD (Gorsky & Caspi, 2005). This gap, which Moore recognized as the "infilling of the theoretical spaces" (Moore, 1990, p. 14), is due in part, to the lack of clarity on the interrelationships among structure, dialogue, and autonomy, and whether these constructs are clusters, variables, or dimensions of TD (Garrison, 2000). Hence, the need for a visual model, such as Saba and Twitchell (1988) system dynamics model, for understanding the structural relationships between these constructs. In this study, we only focus on the construct dialogue since it is the least controversial, and because of its overlap with other perceived distance theories such as transactional presence (Shin, 2002; Shin, 2003), and [online] social presence ([3]Garrison, Anderson, & Archer, 2000; Gunawardena, 1995; Mehrabian, 1969; Short, Williams, & Christie, 1976; Tu & McIsaac, 2002).

1.2. Positing hypotheses of dialogue based on TD theory and other theories of perceived distance

Moore operationalized dialogue as positive interactions between learners and teachers, and between other party or parties [i.e., stakeholders involved with the course or educational program], towards the direction of improving student understanding. Moore states the criteria for a dialogue with positive interactions as "purposeful, constructive, and valued by each party;" thus a synergistic relationship between the parties involved. Though Moore emphasized the need to understand the interactions of different factors, especially the behaviours of teachers and learners, he did not provide clear interpretations on how the research field can measure this qualitative construct, thus inviting criticisms on the validity and reliability of the different measurements been used to quantify dialogue, either based on TD (Garrison, 2000; Gorsky & Caspi, 2005) or other theories. Nevertheless, a robust theory should be open to various ways of measuring the same construct that ultimately yields the same answer (Weick, 1989).

Though Moore clearly defined dialogue as positive interactions between parties, such as learner and instructor (L–I) and learner–learner (L–L) interactions, some studies have argued for the inclusion of other types of interactions that influence OLEs such as: student–institution interaction (Shin, 2002); learner–content interaction (Garrison et al., 2001; Rourke, Anderson, Garrison, & Archer, 1999); and success measures (Menchaca & Bekele, 2008). There is consensus in the field of distance education on the role of dialogue, measured by L–I interaction (Hannon et al., 2002; Shea, Swan, Fredericksen, & Pickett, 2002; Swan, Shea, Fredericksen, Pickett, & Pelz, 2000) in increasing student affective outcomes such as student satisfaction and perceived learning, but not on student grades. However, studies on student–content (or L–C) interaction, and student–student (or L–L) interaction have yet to find any substantial effect; and some of the findings are often haphazard, inconclusive, and lack construct validity. In this study, we focus on only four forms of interactions as a measurement of dialogue—Learner–Instructor (L–I), Learner–Content (L–C), Learner–Learner (L–L), and[4] Learner–Technology (L–T) interactions or computer self-efficacy (Stratchota, 2003). These four forms of dialogue are operationalized as follows:

L–I interaction: dialogue between the learner and instructor towards increasing the learner's understanding.
L–L interaction: dialogue between students or learners towards increasing student understanding.
L–C interaction: dialogue between the learner and the course contents, that is, access and interaction with the contents of the course, towards increasing student understanding.
L–T interaction: learner's experience, skill level, and ability at interacting with the technology used in the course towards increasing the learner's understanding.

[2] In this study we prefer the term instructors and learners as substitutes for teachers and students respectively, to make salient that these labels do not suffice to describe today's transactions in online learning environments.

[3] Social presence was one of the three elements (cognitive and social presence being the other two elements) of a Community of Inquiry model that was postulated to contribute to presence.

[4] L–T interaction was adopted from Cassidy and Eachus (2002) instrument for measuring computer self-efficacy.