

A CRITICAL ANALYSIS OF TRANSACTIONAL DISTANCE THEORY

Paul Gorsky and Avner Caspi

The Open University of Israel

This investigation reviews published empirical studies that attempted to support or to validate transactional distance theory (Moore, 1993). It was found that either data only partially supported the theory or, that if they apparently did so, the studies lacked reliability, construct validity, or both. It was concluded that the basic propositions of transactional distance theory were neither supported nor validated by empirical research findings. Furthermore, it was found that the theory may be reduced to a single proposition (as the amount of dialogue increases, transactional distance decreases) and that this proposition may be construed as a tautology.

INTRODUCTION AND RATIONALE

Many attempts have been made to define distance education. Some view it as a unique discipline (Holmberg, 1986; Sparkes, 1983) while others view it within the bounds of traditional educational endeavor (Keegan, 1986). Over the past 20 years, parallel to developments in communication technologies, several theories have been proposed that seek to define an overall framework through which distance education may be viewed. Theoreticians such as Garrison (1989), Holmberg (1989), Keegan (1986), Moore (1993), Peters (1983), and Verduin and Clark (1991), have all made significant contributions to our understanding of distance education.

One attempt to define distance education and to articulate a theory about its underlying mechanisms was made by Michael Moore. The theory evolved from basic insights regarding independent learning and learner autonomy (Moore, 1972) into a multidimensional set of interrelated definitions, propositions and constructs known as the "Theory of Transactional Distance" (Moore, 1993). The process of theory development was driven initially by researchers who conducted theoretical studies (e.g., Garrison & Baynton, 1987; Garrison & Shale, 1987; Keegan, 1980). More recently, some empirical studies have been conducted in order to ascertain the construct validity of the theory (Bischoff, Bisconer, Kooker, & Woods, 1996; Bunker, Gayol, Nti, & Reidell, 1996;

• Paul Gorsky, The Open University of Israel, 108 Ravutski St., P. O. Box 808, Ra'anana, Israel 43137. Telephone: +972-9-778-1339. E-Mail: paulgo@open.ac.il

Chen, 2001a, 2001b; Chen & Willits, 1998; Saba & Shearer, 1994).

Moore (1993) defined distance education as "the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/or by time" (p. 22). This definition includes both synchronous and asynchronous delivery formats. Transactional distance theory is important conceptually, since it proposes that the essential *distance* in distance education is transactional, not spatial or temporal. Advances in communications technology, which made synchronous and asynchronous interaction readily available, enabled interaction to become a key factor in distance education systems. Prior to these advances, distance education was often studied in comparison to face-to-face or classroom instruction. The usefulness of such comparative studies has diminished as results generally indicated "no significant difference." By placing transaction at the core of distance education, Moore offered new insights into the mechanisms of distance education programs and pointed toward new and important research directions.

Today, transactional distance theory is important in practical terms for several reasons. First, many researchers view it as a basic analytical framework for understanding distance education systems. Garrison (2000) wrote that theories such as transactional distance theory are "invaluable in guiding the complex practice of a rational process such as teaching and learning at a distance" (p. 3). According to Jung (2001), "Transactional distance theory provides a useful conceptual framework for defining and understanding distance education in general and as a source of research hypotheses more specifically" (p. 527). Second, researchers often cite the need to reduce transactional distance. Murphy and Collins (1997) attempted to identify communication conventions in real-time, interactive instructional electronic chats (IECs) and to examine whether IEC users recognize a need to use these conventions to communicate clearly with others. They concluded that users

recognized a need to use a variety of communication conventions to reduce transactional distance in computer-mediated educational transactions. Third, the theory is assumed "true" and is taught at institutions of higher learning. For example, the importance of the theory is described on the Minnesota State University at Moorhead (2002) Website:

The purpose of the site is to gain a basic understanding of Transactional Distance Theory, or TDT. As today's generations and future generations move toward an educational process through means of technology, understanding TDT is vital for people to be effective in distance learning and teaching.

The initial purpose of this study was to appraise the current status of the theory vis-à-vis empirical findings made in the studies cited above. Special attention was paid to how researchers defined operationally the key constructs of the theory (structure, dialogue, learner autonomy and transactional distance). For each of the constructs, three questions were posed: How was it defined operationally? How was it measured? To what extent were measurements deemed valid and reliable?

Next, the global, dynamic aspects of the theory that emerged from the research data were studied by posing additional questions: Were learning outcomes measured? If so, how and to what extent? Did transactional distance appear to affect learning outcomes? Did the empirical data indeed support the theory in its present form?

The two questions about learning outcomes are especially relevant since a theory should be able to explain processes and predict events. If the theory of transactional distance is to be useful to distance education (and possibly to education in general), the variable transactional distance must correlate in a significant and meaningful way with learning outcomes.

Given the high face validity of the theory, expectations were to find a high-level goodness-of-fit between data and theory. It was found, however, that *either* data only partially supported the theory (Chen 2001a, 2001b;

Chen & Willits, 1998) or, that if they apparently did so (Bischoff et al., 1996; Bunker et al., 1996; Saba & Shearer, 1994) the studies lacked reliability and/or construct validity. In light of these unexpected findings, a review of the basic assumptions and mechanisms postulated in transactional distance theory was made. On close scrutiny, it was found that the theory, when operationalized, is transformed into what may be construed as a tautology wherein the key dependent variable (transactional distance), by necessity, becomes the inverse of the key independent variable (dialogue).

TRANSACTIONAL DISTANCE THEORY: A REVIEW OF THE THEORY'S BASIC TENETS

A detailed explanation of Moore's theory is not provided here. The unfamiliar reader should refer to other sources for deeper understanding, especially Moore (1993) and Moore & Kearsley (1996). Transactional distance theory assumes that the most profound impact on distance education is pedagogy and not the physical or temporal distance that separates instructor and learner. Moore (1993) defined the variable "transactional distance" as "a psychological and communications space to be crossed, a space of potential misunderstanding between the inputs of instructor and those of the learner" (p. 23).

The extent of transactional distance in a distance education program is a function of three key variables named "structure," "dialogue," and "learner autonomy." Moore's (1993) formal definitions follow:

A dialogue is purposeful, constructive and valued by each party. Each party in a dialogue is a respectful and active listener; each is a contributor, and builds on the contributions of the other party or parties.... The direction of a dialogue in an educational relationship is towards the improved understanding of the student (p. 24).

Structure expresses the rigidity or flexibility of the programme's educational objectives, teaching strategies, and evaluation methods. It describes the extent to which an educational programme can accommodate or be responsive to each learner's individual needs (p. 26).

Learner autonomy is the extent to which in the teaching/learning relationship, it is the learner rather than the teacher who determines the goals, the learning experiences, and the evaluation decisions of the learning programme (p. 31).

Relationships among these variables may be summarized as follows:

1. Dialogue and transactional distance are inversely proportional; as one increases, the other decreases. Specifically, Moore (1993) wrote "one of the major determinants of the extent to which transactional distance will be overcome is whether dialogue between learners and instructors is possible, and the extent to which it is achieved" (p. 26).
2. Increased program structure decreases the extent of dialogue, which in turn increases the extent of transactional distance. According to Moore: "When a program is highly structured and teacher-learner dialogue is non-existent the transactional distance between learners and teachers is high" (p. 27).
3. Transactional distance and learner autonomy are directly proportional. Moore (1993) wrote: "the greater the structure and the lower the dialogue in a programme the more autonomy the learner has to exercise" (p. 27).

TRANSACTIONAL DISTANCE THEORY: A REVIEW OF EMPIRICAL RESEARCH FINDINGS

Despite the considerable time span over which the theory has been evolving, to date, very few researchers have carried out empirical studies to test the validity of its key constructs and,

especially, the relationships among them. Six empirical studies were found and examined after a thorough literature review. The first three studies viewed dialogue only as a synchronous, in-class interaction. Although each of the studies supported the theory, their validity was extremely limited.

Three Studies that Support the Theory but Lack Construct Validity

At the University of Hawaii, Bischoff et al. (1993) surveyed 221 students' perceptions of structure, dialogue, and transactional distance in a distance education course mediated by interactive television. Data were generated by a 68-item questionnaire administered once during the course. Items on the questionnaire were measured by a 5-point Likert scale.

Bischoff et al. (1993) defined transactional distance as "the perceived interpersonal closeness between the teacher and student, among students, and between other students and the teacher, as perceived by the student respondents" (p. 5). Transactional distance was measured by students' responses to two items: the perceived "closeness/distance between you and the teacher" and the perceived "closeness/distance between other students at the site and the teacher" (p. 11).

Dialogue was defined operationally as "communication between teacher and student" (p. 11). It was measured by one item only: "number of times you communicated with the teacher" (p. 11). Structure was defined as "the degree of individualization of course content for the learner"; it was measured by "total number of students in the class," "seating arrangements," and "class activities" (p. 11). No attempt was made to relate any of the three constructs to learning outcomes.

In support of Moore's theory, results showed that "dialogue" and "transactional distance" were inversely proportional; that is, as dialogue increased, transactional distance decreased. However, these results lack construct validity for two reasons. First, dialogue was measured by one item only, the *amount* of

teacher-learner dialogue. This quantitative measure says nothing about the qualitative aspects of the variable dialogue. It does not, for example, address the issue of whether learner understanding was achieved. Second, in a similar manner, the operational definition of transactional distance used in the questionnaire (perceived "closeness" or "distance") differs completely from the theory's definition, which focuses on *understanding*, or lack of it, that emerges from teacher/learner dialogue.

Saba and Shearer (1994) studied 30 interactions between instructors and learners in a computer conferencing environment in order to verify key constructs of the theory, especially the relationship between dialogue and transactional distance. Each of the 30 participants worked *individually*, one-on-one, with the instructor. Students and instructors, working from different locations, could see each other via a video link and could talk to each other by telephone. Instructional transactions between instructor and learner were videotaped. Using a system dynamics model initially proposed by Saba (1988), they measured the variables in each system (verbal behaviors of instructor and learner) and graphed the results. Learning outcomes in the form of learner satisfaction were evaluated, but not specifically correlated with transactional distance.

Saba and Shearer (1994) defined dialogue operationally "as the extent of verbal interaction between the educator and the learner" (p. 42). It was measured by "discourse analysis," a technique that counts and categorizes each act of speech. They defined structure as "a measure of an educational program's responsiveness to learners' individual needs" (p. 42). It was measured by "the extent to which pace, sequence, feedback and content are organized" (p. 42). Transactional distance was defined as "a function of the variance in dialogue and structure as they relate to each other" (p. 42). It was measured as the ratio between the amount of dialogue and the extent of structure.

Results of Saba and Shearer's study showed that transactional distance varied in accor-

dance with dialogue and structure. As dialogue increased, transactional distance decreased; as structure increased, transactional distance increased. Two limitations in this study were noted. First, the architecture of the model, its underlying assumptions and structure, is problematic. Transactional distance was defined as a function of the variance in dialogue and structure as they relate to each other. This is a *derived* operational definition of the concept, not related directly to the theory's formal definition based on *learner understanding*. Graphs showed that rates of dialogue and structure, as defined for use in the model, change over time; however, it cannot be concluded that a gap in communication between instructor and learner has increased or decreased or that learner understanding of the subject matter has increased or decreased as a result of this variance. Second, the generality of the study is limited since only one kind of dialogue was analyzed: one-on-one synchronous interactions between instructor and learner. It appears, therefore, that the study's conclusions are not supported by the data.

Bunker et al. (1996) tried to measure the effect of changes in structure on dialogue in an international, multicultural distance education course taught via audio-conferencing. The research setting was a course that brought together a virtual class of approximately 100 students at nine different sites located in four countries. In this study, structure was defined in terms of one specific aspect of instructional design, the question-asking behavior of the instructor. Dialogue was measured by its frequency and duration. Transactional distance, learner autonomy, and learning outcomes were not assessed.

In support of transactional distance theory, the authors found that different types of question-asking behavior had a role in predicting and determining dialogue (learner participation). However, the authors themselves pointed out that these results lack meaningful reliability and validity. Of the four planned experimental procedures, one was cancelled and a second was biased (the instructor did not

act in accordance with experimental design). The instrument for measuring interaction was untested for reliability in audio-conferencing and the samples used were not uniform in duration. Furthermore, regarding construct validity, dialogue was measured in terms of its frequency and duration, not in terms of learner understanding as transactional distance theory prescribes. It may be concluded, therefore, that conclusions are not supported by data.

Three Studies that Found Only Limited Support for the Theory

The following three studies viewed dialogue not only as in-class and synchronous, but also as out-of-class, both synchronous and asynchronous. These studies found only limited support for Moore's version of transactional distance theory. Chen and Willits (1998) studied the experiences of 121 learners in a video conferencing environment. The study addressed the following research question: What are the determinants of perceived learning outcomes and transactional distance when simultaneously examining seven variables mediated through dialogue, structure, and learning autonomy? Operational definitions and measurement procedures follow.

Three types of dialogue were identified and defined: in-class discussion, out-of-class face-to-face interaction, and out-of-class electronic communication. Dialogue was measured in terms of frequency of occurrence. Two dimensions of structure were identified and defined: course "delivery-implementation," which included teaching methods, learning activities, and pace; and course "design-organization," which included attendance, objectives, choice of readings, requirements, deadlines, and grading. Structure was measured according to learners' perceptions along the dimension ranging from "extremely flexible" to "extremely rigid." Learner autonomy was defined as the ability to be self-directed, to work without guidance, and to develop a personal study plan. Learners rated themselves on a scale ranging from extremely

low autonomy to extremely high. Chen and Willits (1998) defined transactional distance as a "distance of understandings and perceptions" (p. 57) with teachers, on-site classmates, and remote site learners. It was measured by the students' own perceptions of this distance. Learning outcomes were defined as how much learners thought they had learned from the course.

Chen and Willits (1998) found only limited support for the theory's basic postulate that dialogue reduces transactional distance. They noted that the relation between dialogue and transactional distance depended on the type of dialogue involved and how transactional distance was measured. They found that "various kinds of dialogue affected different types of perceived transactional distance rather than jointly contributing to a lessening of all types of transactional distance in video-conferences" (p. 62). Except for dialogue, measured in terms of its frequency rather than learner understanding, the operational definitions used in this study were congruent with Moore's formal definitions. Unfortunately, learners' perceptions of transactional distance and learning outcomes were measured at only one point in time; furthermore, these perceptions were not compared with actual values.

Regarding learning outcomes, a variable not included in transactional distance theory, Chen and Willits (1998) noted that only two variables had significant direct effects on the level of learners' perceived learning outcomes. They found that the greater the perceived transactional distance between instructor and learner, the lower the perceived learning outcomes; and the greater the frequency of in-class discussion, the higher the perceived learning outcomes.

In two other studies, Chen (2001a, 2001b) measured the impact of individual and instructional variables on learners' perceived transactional distance in a World Wide Web learning environment. Seventy-one students participated in the study. Transactional distance was defined as a "distance of understandings and perceptions" (p. 462) between

learner-instructor, learner-learner, learner-subject matter and learner-interface. Questionnaires measured students' perceptions of transactional distance along a scale ranging from extremely close to extremely distant. The items were found to be reliable. Instructor-learner transactional distance was defined by three items: the degree to which learners understood the concepts and theories presented by the instructor and the degree to which they agreed with the comments and feedback posted by the instructor; the degree of instructor accessibility; and the overall quality of interaction between instructor and learner. Learner-learner transactional distance was defined by the degree that learners understand the ideas presented by other learners and agree with them, the degree of accessibility to learners and the overall quality of interaction among learners. Learner-content transactional distance was defined by the degree that learners understand the ideas presented in course materials, and that the materials, objectives, and requirements met their learning needs and expectations. Learner-interface transactional distance was defined by the degree of user friendliness as experienced by the learner.

Results of the studies showed that high levels of one type of transactional distance did not necessarily imply high levels of other types. Chen (2001a) concluded that alternative measures of transactional distance (i.e., objective measures and qualitative measures such as observation and interviews) will help expand our understanding of this phenomenon. Again, only limited support for transactional distance theory was noted.

Empirical Research Findings: Summary and Conclusions

It was found that the propositions of transactional distance theory have been neither supported nor validated by the empirical research carried out to do just that. This appeared to be so for two reasons. First,

TABLE 1
Summary of Operational Definitions

Research	Transactional Distance	Dialogue	Structure	Learner Autonomy	Learning Outcomes
Saba & Shearer (1994)	variance in dialogue and structure	number of communications; discourse analysis	organization of pace, sequence, feedback, content	—	Satisfaction
Bunker et al. (1996)	—	length & number of communications;	instructional design	—	—
Bischoff et al. (1998)	closeness/ distance	number of communications;	activities; seating; number of students	—	—
Chen & Willits (1998)	distance of understandings & perceptions	number of communications	Implementation organization	Independent; interdependent	extent of learning
Chen (2001a, 2001b)	distance of understand-ings & perceptions	—	learner support, extent of online asynchronous interaction	Independent; interdependent	extent of learning

Moore (1993) did not define any of the theory's constructs operationally. This led some researchers to use operational definitions that differed meaningfully from the formal ones, thereby severely compromising construct validity. By Moore's own definitions, dialogue is *not* the number of verbal interactions that occurred and transactional distance is *not* a perceived value of "closeness." Table 1 shows the different operational definitions used by researchers.

It is noteworthy that, except for Saba and Shearer (1994) and Bunker et al. (1996) who measured observed behavior, all other measurements were subjective, based on students' one-time perceptions obtained from one-time questionnaires. All authors recommended that future research include interview and observational data. Second, even when operational definitions were generally congruent with formal ones, only limited support for the theory was found. It was found that different dialogue types led to different *kinds* of transactional distance not accounted for by Moore. We felt, however, that the lack of support for transactional distance theory went deeper than issues of reliability and validity. A critique of the basic tenets of transactional distance theory as explicated by Moore (1993) follows.

A CRITIQUE OF THE BASIC TENETS OF TRANSACTIONAL DISTANCE THEORY

First, it will be shown that the theory may be reduced to a single functional relationship: as the amount of dialogue increases, transactional distance decreases; second, that this relationship may be construed as tautology, not theory.

Reducing Transactional Distance Theory

Moore (1993) wrote that the extent of transactional distance in an educational program is a function of three sets of independent variables—structure, dialogue, and learner autonomy—that interact to determine transactional distance, a dependent variable. However, the independent variables are, in fact, *hierarchical*. Moore (1993) wrote that "When a program is highly structured and teacher-learner dialogue is non-existent the transactional distance between learners and teachers is high. At the other extreme, there is low transactional distance in those teleconference programs that have much dialogue and little predetermined structure" (p. 27). In other words, "structure" is a variable that determines to some degree the

extent of "dialogue" which, in turn, determines the extent of "transactional distance."

In the same vein, regarding "learner autonomy," Moore (1993) wrote that when dialogue occurs, its extent and nature is determined by, among other factors, the personalities of teacher and *learner*. In other words, "learner autonomy" is a variable that also determines to some degree the extent of "dialogue" which, as noted above, determines the extent of "transactional distance."

Since structure and learner autonomy both determine to some degree the extent of dialogue, the theory, therefore, may be reduced to the functional relationship: "As the amount of dialogue increases, transactional distance decreases." Indeed, this relationship was investigated repeatedly in the studies cited above.

Tautology

Transactional distance theory is based on formal definitions only. Using our own set of operational definitions for the variables dialogue and transactional distance, derived from Moore's formal ones, we will show that the theory may be construed as the tautology: "As understanding increases, misunderstanding decreases".

On Dialogue and Understanding

Moore's (1993) formal definition of dialogue follows:

A dialogue is purposeful, constructive and valued by each party. Each party in a dialogue is a respectful and active listener; each is a contributor, and builds on the contributions of the other party or parties... The direction of a dialogue in an educational relationship is towards the improved understanding of the student. (p. 24)

Moore (1993) distinguished between interaction and dialogue. Dialogue is an interaction or series of interactions having the *positive*

qualities, cited above, that other interactions do not have. According to Moore, "there can be negative or neutral interactions" (p. 24), but dialogue, by definition, leads to improved student understanding. How then can we ascertain that a dialogue has occurred? If student understanding has been achieved or improved, say as a result of an instructor-student conversation, then dialogue between them occurred; if not, dialogue has not occurred and the conversation was merely interaction. Using this empirical procedure, the occurrence or non-occurrence of dialogue may be determined in retrospect, as a function of student understanding, achieved or not.

On Transactional Distance and Misunderstanding

Moore's (1993) definition of transactional distance is "a psychological and communications space to be crossed, a space of potential misunderstanding between the inputs of instructor and those of the learner" (p. 23). We suggest that transactional distance be measured as "student misunderstanding," quantified as a percentage. As such, the initial value of transactional distance (seen as the *potential* for misunderstanding facing *every* student in *any* distance education program, course, or transaction) is always 100%. That is, a student may subsequently learn nothing at all. To illustrate this point, the following initial conditions prior to some instructor-student conversation are assumed: *actual* student understanding = 0%; *potential* for student misunderstanding (transactional distance) = 100%.

If, at the end of the assumed conversation, actual student misunderstanding is still 100%, then the transactions were "interactions," lacking the "positive qualities" necessary to make them a "dialogue." Using this empirical procedure, the extent of transactional distance is equivalent to the extent of student misunderstanding, measured in retrospect as a percentage.

The Equivalency of Dialogue and Transactional Distance

We have suggested operational definitions for dialogue and transactional distance; the former is said to have occurred, or not, by analyzing student *understanding* while the extent of the latter is analyzed in terms of student *misunderstanding*. Since both variables are measured along the same bipolar dimension (understanding), transactional distance theory may be restated: "As the amount of dialogue (measured in terms of learner understanding) increases, transactional distance (measured in terms of learner misunderstanding) decreases" or as understanding increases, misunderstanding decreases. Any attempt to support or to validate the theory is meaningless, since a quantity and its inverse are being correlated.

DISCUSSION

Some conclusions about transactional distance theory and conjecture as to why the theory has existed for so long follow.

Some Conclusions about Transactional Distance Theory

It may be concluded that transactional distance theory was never a valid *scientific* theory. This is so, we believe, for three reasons: relations between variables were ambiguous; no operational definitions of any kind were proposed for any of the variables; and, ultimately the key variables, dialogue and transactional distance, are related inversely, given a certain, reasonable set of operational definitions.

What, then, is the usefulness of the concept "transactional distance"? As a historical milestone, it pointed out that the essential distance in distance education is transactional, not spatial or temporal. In practical terms, as a measurable dependent variable in a theory or model, the concept has little usefulness.

How and Why the Theory has Existed for So Long

Since Socrates, dialogue has generally been assigned a fundamental position in Western views of education. Historically, dialogue has been viewed from both philosophical and pedagogical approaches. Philosophical approaches to interpersonal instructional dialogue tend to emphasize either its epistemological advantages in the pursuit of knowledge and understanding (Socrates and Plato) or its moral and political foundations based on equality and mutual respect (Bruner, 1966; Buber, 1965; Dewey, 1916; Freire, 1972; Rogers, 1969). For example, regarding the moral aspects of educational dialogue, Martin Buber (1965) wrote "the basic movement of genuine dialogue, and thus of education itself, is a truly reciprocal conversation in which teacher and students are full partners" (p.184). According to Buber, the relationship between teacher and students is based on honesty, equality, openness and mutual respect. Genuine dialogue is not located *within* any one of the participants, but rather is found in their "betweenness," in what Buber calls the reality of the "interhuman" (p.184). Jerome Bruner and Carl Rogers also emphasized the importance and necessity of dialogue between teacher and student. Bruner (1966) wrote that instructor and student should engage in an active dialogue (i.e., Socratic learning). He contended that the task of the instructor is to translate information to be learned into a format appropriate to the learner's current state of understanding. Rogers (1969) discussed the centrality of the interpersonal relationship (dialogue) in the facilitation of learning alongside the need to provide freedom in educational environments. Clearly, Moore's definition of dialogue, cited above, rests firmly in this philosophical tradition of humanism.

Transactional distance theory was accepted philosophically and logically since its core proposition (as the amount of dialogue increases, transactional distance decreases) has high face validity and *seems* both obvious as

well as intuitively correct. Indeed, the philosophical impact of Moore's theory remains. Unfortunately, however, the movement from abstract, formal philosophical definitions to concrete, operational ones caused ambiguity, at best, and collapse of the theory, at worst.

The problem with philosophical approaches to dialogue is that they are highly idealized and prescriptive. They tell us how people *should* relate to each other and what outcomes *should* result from dialogue. They do not tell us, however, what real dialogues look like, sound like, and how they work, or fail to work, in real situated learning environments. Philosophical approaches are biased a priori toward an anti-empirical approach to the study of dialogue that, in fact, may explain the dearth of empirical research into transactional distance theory.

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