

## Revisiting Transactional Distance Theory in a Context of Web-Based High-School Distance Education

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### Abstract

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The purpose of this paper is to report on a study that considered Transactional Distance Theory (TDT) in a current technology context of web-based distance education (DE) in a high school environment. Data collection relied on semi-structured interviews conducted with 13 e-teachers and seven other personnel within an organization responsible for high-school distance education in Newfoundland and Labrador, Canada. Findings are presented in three categories labelled as follows: rapport and community-building; curriculum and teacher-centered tools as barriers; and the role of real-time interaction and engagement. We relate these categories respectively to the TDT concepts of dialogue, structure, and learner autonomy.

### Resumé

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Le but de cet article est de présenter une étude en lien avec la théorie de la distance transactionnelle (TDT) dans un contexte technologique actuel d'éducation à distance en ligne au secondaire. La collecte des données s'est faite à partir d'entrevues semi-dirigées conduite auprès de treize formateurs en ligne et de sept autres membres du personnel d'une organisation responsable de l'éducation à distance au secondaire à Terre-Neuve et au Labrador, au Canada. Les résultats sont présentés dans trois catégories : relation et construction de la communauté, curriculum et outils centrés sur l'enseignant comme barrières, et rôle des interactions en temps réel et l'engagement. Nous associons respectivement ces catégories aux concepts TDT de dialogue, de structure et d'autonomie de l'apprenant.

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### Introduction

Transactional Distance Theory (TDT) (Moore, 1972, 1980, 1990, 1993; Moore & Kearsley, 2005) remains, as Garrison (2000) observes, "one of the most appealing and well known theories of distance education" (p. 9). Moore and Kearsley (2005) called for further research on TD variables and their interconnections. Likewise, Chen and Willits (1999) noted the need for reconsideration of TDT in technology use contexts, such as videoconferencing, which allow for spontaneous communication. Others

have called for more specific investigations into how the elements of TDT operate in web-based learning environments (see Chen 2001a, 2001b; Jung, 2001; Stein, Wanstreet, Calvin, Overtoom, & Wheaton, 2005).

The purpose of this paper is to respond to calls for more inquiries into TDT and report on a study that provided an opportunity to consider TDT, not only in a more current technology context of web-based learning, but in a context of high-school distance education (DE). This paper discusses the study's findings in relation to TDT and its concepts of dialogue, structure, and learner autonomy. It addresses the following questions: What new insights into TDT might be gained by a focus on web-based distance education? What insights might be gained by focusing on distance education at the high-school as opposed to the post-secondary level?

We begin with an overview of TDT followed by a review of selected studies that have either validated the theory or expanded on its original concepts of dialogue, structure, and learner autonomy. We then present the context of the study and its methodology. We discuss the findings in relation to TDT and conclude with a brief overview of some future directions for inquiry.

### Theoretical Framework

Transactional distance refers to a separation or "...a psychological and communications space to be crossed, a space of potential misunderstanding between the inputs of instructor and those of the learner" (Moore, 1993, p. 22). It is a separation in the "universe of teacher-student relationships" (p. 22) that is pedagogical as opposed to geographic. This universe is "shaped around" the constructs of structure, interaction between teachers and learners, and the self-directedness of the learner. The extent of TD is determined by the "qualitative variables" (p. 23) of dialogue, structure, and learner autonomy.

Dialogue refers to "positive interactions," is "purposeful, constructive, and valued by each party," and involves "active listeners" as well as "contributors" in the interaction (Moore, 1993, p. 24). Structure refers to "the extent to which an education programme can accommodate or be responsive to each learner's individual needs" (p. 26). Learner autonomy or self-direction is the extent that the learner and not the teachers determine the goals, learning experiences and evaluation decisions. The specific determinants of dialogue and structure include educational philosophy and characteristics of teachers or designers; the personalities of teacher and learners; the subject matter; the interactive nature of the communications' media; and the constraints imposed by educational institutions.

Moore (1993) put forth a number of hypotheses related to TDT as follows: high dialogue and low structure result in low TD; low dialogue and high structure result in high TD; the greater the TD, the more autonomy the learner has to exercise; the more self-directed the learner, the less dialogue and structure needed. A change in any of the determinants will result in a change in the TD. This implies that the nature of the learner can have an important effect on TD. So, too, can the technologies. Moore (1993) hypothesized that dialogue could be increased and TD decreased by manipulating the communications' media and that highly interactive media can more likely bridge TD than recorded media as "these media permit more dialogue and require less structure" (p. 26). As an example, he referred to how teleconferencing technologies can support "multilateral relationships" and "dialogues between and among participants" (p. 37).

### Literature Review

Saba developed a model based on system dynamics to describe the relationships between dialogue and structure (see Saba, 1988; Saba & Shearer, 1994; Saba & Twitchell, 1988). Saba (1988) argued that integrated telecommunications systems enabled teachers to "vary the level of dialog and structure, and to provide a balance between the two variables" (p. 17). Saba and Shearer (1994) used the model to empirically verify the concepts of TD, structure, and dialogue in the context of a tele-lesson in which an instructor communicated one-on-one with graduate students. They found that "transactional distance varies by the rate of dialogue and structure" (p. 54). They also added the variables of learner and instructor control.

Bischoff, Bisconer, Kooker, and Woods (1996) measured dialogue, structure, and TD in a context of graduate, face-to-face and distance courses delivered through interactive television. To measure dialogue, the study used items such as the number of times students communicated with the teacher, seating arrangement, and total number of students in the class. The authors concluded that there is a need to study further the different aspects of dialogue, for example, by investigating the effects of different levels of dialogue and structure in groups of novice versus expert learners.

Chen and Willits (1999) investigated factors that constitute dialogue, structure, and learner autonomy from learners' perspective in a context of university videoconferencing courses. Structure contained two dimensions of course organization and course delivery. Learner autonomy consisted of two attributes of independence and interdependence. The authors found that the relationship between

dialogue and TD may vary depending on the type of dialogue (e.g., in-class discussion, out-of-class face-to-face interaction, out-of-class electronic interaction). Frequency of in-class dialogue was the factor that most affected learners' perceptions of their learning outcomes. Chen and Willits noted the need to investigate the conditions that promote each of the forms of dialogue, the relationship between course rigidity/flexibility and dialogue, and whether interdependency needs can be met in a videoconferencing setting.

In a context of a graduate course with students meeting face-to-face and online, Vrasidas and McIsaac's (1999) study found that "elements of structure such as required activities led to more interactions and increased dialogue among the participants" (p. 155). The authors concluded that, whereas in Moore's original conceptualization of TD, dialogue and TD can only be influenced by the interaction between the teacher and the learner, the increased learner-learner interaction allowed by new technologies can also influence TD.

In a case study of an asynchronous university course, Vandergrift (2002) expanded the variable of dialogue to include shared meaning-making. She emphasized "community dialogue," understood as "the engagement of an interpretive community in the process of shared meaning making" (Theoretical Frame section, ¶ 2), or "dialogue as conversation in an interpretive community rather than as teacher-student instruction" (Conclusion section, ¶ 2). Vandergrift elaborated on the notion of the teacher's intentional "restrained presence" as a means of promoting learner ownership of the online course and decreasing TD. She also distinguished between course structure and course infrastructure, which includes "everything in Moore's definition of structure plus a large body of additional content and contextual information designed for use by individual students exploring their own learning paths" (Theoretical Frame section, ¶ 2).

Offir, Lev, Lev, Barth, and Steinbok (2004) analyzed interaction in a videoconferencing learning environment to identify types of "compensatory strategies" used by teachers to reduce TD in both distance and face-to-face learning contexts. Their findings confirmed the relationship between instructors' effective dialogue patterns and the lessening of TD in that "teachers can detect and correct the potentially negative effects of transactional distance" (p. 115).

## Method

### *Description of the Case*

We used a case study (Yin, 1993) as a means to conduct our inquiry. The

case was high-school distance education in the province of Newfoundland and Labrador, Canada. The Centre for Distance Learning and Innovation (CDLI), created in the year 2000 (see Government of Newfoundland and Labrador, 2000), oversees and organizes DE in that province and served as the context for the study. When the study was conducted, the centre employed 27.5 e-teachers and offered in excess of 30 web-based high-school courses with over 1,500 course enrolments in approximately 100 schools across five provincial school districts, including a francophone district. In the academic year 2005-2006, enrolments ranged from fewer than ten to more than 130 students per course with multiple sections. The student-teacher ratio that year for elementary to secondary education in the province as a whole was 13.5 students per teacher (see Government of Newfoundland and Labrador, 2006, 2007).

The courses cover most subject areas, such as Social Studies, Language Arts, Mathematics, Physics, Chemistry, Biology, French, Music, Communications Technology, Art, and Career Development. CDLI also offers Guidance Counselling services as well as Advance Placement courses. Students enrolled in CDLI courses continue to attend traditional schools in their communities and take most of their courses face-to-face in these schools. Some students may only enrol in one course whereas others may enrol in as many as five or six online courses. Where necessary, mentoring teams (M-Teams) provide supervision and invigilation of laboratories and exams within schools. Technical support is provided through a 1-800 help line.

The e-teachers are located in different sites across the province of Newfoundland and Labrador. Some of them work in offices located within schools, while others work in school board, university, or community resource buildings. Course delivery relies on WebCT™ for the asynchronous component. Many courses offer as much as 60% of instruction synchronously using Elluminate Live™ (E-Live). The version of E-Live used at the time of the study supported tool features such as text-based Direct Messaging, half-duplex two-way audio, a White Board, Graphing Calculator, and application sharing. Half-duplex mean that only one person can speak at a time. More recent versions of E-Live support as many as four interlocutors at one time. The high bandwidth requirements of video mean that, most often, synchronous interactions must be voice- and text-based only, even though the software can support video interactions.

#### *Participants and Data Collection*

In response to an invitation, 20 individuals were recruited from CDLI for participation in the study. These included 13 e-teachers, the director,

former director, guidance counsellor, those responsible for program delivery, program development, communication and connectivity services, and a person responsible for teacher professional development within the province as a whole. The teacher participants represented a range both in grades taught, subject areas, and regions of the province. All teachers had experience teaching face-to-face. Some had previous experience with non-web-based forms of distance education.

Data collection techniques included 90 to 120-minute semi-structured interviews (Patton, 1990) with each of these individuals. Except for two interviews conducted in person, all others were conducted online using E-Live. Use of E-Live allowed e-teachers the opportunity to participate using a technology they were accustomed to and comfortable with. The technology also allowed them to make use of the whiteboard where necessary, to share learning resources with the interviewer. Interview questions for the e-teachers focused on background, goals, roles, experiences, beliefs, teaching approaches, constraints, and possibilities. Questions for the other personnel focused on the organization, its values, goals, constraints, and possibilities.

### *Data Analysis*

All interviews were recorded and subsequently transcribed. All transcriptions were then verified by another person. Finally, interview transcripts were sent to each participant for member checking and validation (Lincoln & Guba, 1985). The interview transcriptions resulted in approximately 300 double-spaced pages. To facilitate coding the data, we first imported it into MAXqda2TM qualitative analysis software. For analysis, we used the unit of meaning or what Henri (1992) termed the thematic unit and what Aviv (2001) explains is “a statement or a continuous set of statements, which convey one identifiable idea” (p. 59).

We relied on open and axial coding (Strauss & Corbin, 1998) to identify concepts and categories of concepts. To make sense of our findings in general and of the categories in particular, we then looked to the foundational literature on distance education, specifically TDT. In our reporting, we aim to preserve and convey the character, tone or 'flavour' of the interviewees and therefore use where possible their actual words.

## Findings

### *The Need for Rapport and Community-Building*

In the context of teaching and learning in distance education at the high-school level in Newfoundland and Labrador, dialogue and interaction between e-teachers and learners, and between learners themselves, takes

place primarily during the synchronous sessions using E-Live. This interaction is voice- and text-based, which means that, unlike the typical traditional classroom, teachers and students do not see each other. E-teachers described how, due to the lack of visual cues, students could experience “fear” and “anxiety” when interacting with others. The e-teachers compensate for this constraint with “conscious,” “deliberate” effort and rapport making and “nurturing.” One individual referred to “deliberate rapport building” as a necessity but also as a challenge. In this regard, when making the transition in his first-year teaching online, he experienced feelings of loneliness when “the students were out there but [he] didn't really know them.”

E-teachers compensate for the lack of physical presence with strategies that include keeping photographs of and information about students on the wall of the e-teacher's office, and systematically keeping track of students' preferences and of extra-curricular events in which they are involved. Other strategies include asking students more questions than in a face-to-face classroom to help them “get rid of some of the inhibitions they have about using the microphone.”

In an online environment, “opening up” to students by sharing personal information or communicating with them outside instructional time is also essential. As one e-teacher commented, “the more contact time ... with the kids, the better off they are.” Another individual referred to the importance of “establish[ing] social presence, to get a feeling of comfort in communication between teacher and students, among students and among teachers, teacher and students as a collective group.”

Strategies to compensate for lack of physical proximity also include reliance on technologies that students are “more familiar with” and “eager to use,” such as Direct Messaging, which can be used as a “social vehicle” between students. Asynchronous text-based communication in the form of e-mails provides an effective means to make personal contact with students and to provide students with prompt responses, “constant feedback” and “immediate attention.” Blogs or journals as well as text-based discussion forums also provide an opportunity for student-to-student sharing both during and outside of instructional time.

The preoccupation with dialogue and interaction goes beyond providing opportunities for communication between e-teachers and learners. One manager described “the first and foremost task” of an e-teacher as building of community. Synchronous teaching that builds community does not involve lecturing to students, but requires sharing, “input from all around” as well as a “response” or “reaction” to teacher initiation. The capacity for community building depends largely on what one individual described as e-teacher personal qualities such as being able to “understand oneself and others.” The effective e-teacher is

someone who values community, can create it, and can actively “plan for” community building. The role of the teacher is to “really get to know” students and “meet them socially” so that the students and the teacher “get a feel” for each other, and “make a connection over the distance.”

This emphasis on community moves beyond interactions between e-teachers and learners and includes the relationships, interdependence, and shared values and goals between the teachers themselves. Interviewees referred to “collaborating,” “cooperating,” “communicating back and forth,” “working together,” “helping one another,” and “sharing best practices.” E-teachers’ “ability to mentor one another” is highly valued and encouraged. New e-teachers experience what one individual described as the “collegiality of the group,” its “close-knit” quality, and the “bonding” between people.

#### *Curriculum and Teacher-Centered Tools as Barriers*

Despite the potential to promote dialogue through effective use of synchronous and asynchronous communication, this potential cannot always be realized because of constraints related to structure. The structure in this case comes from the curriculum. In many courses, especially those with a common final, public (provincial-wide) exam, the curriculum may not leave room for open dialogue or for flexibility and may instead focus teachers’ efforts on content delivery. One individual referred to the curriculum as being “inflicted upon” teachers, resulting in a situation where they are “trying to cover as much content in as short a period of time as possible.”

The lack of flexibility and of open dialogue may also result from the Learning Management System used. The Learning Management System is “not the most conducive environment” to learning and “imposes a very strong, rigid environment in which [teachers] structure things.” Synchronous communication using E-Live can be used as a teacher-centered, one-way system of communication that “constrains, manages, and structures” the learning experience. The use of the synchronous learning technology can be a “very dangerous temptation” for the e-teacher “because it allows [the e-teacher] to control quite a bit.” E-Live “isn’t a tool that encourages the student to have autonomy.” It is “a very controlled, very controlling environment” because it “enables teacher-centered instruction quite readily.”

#### *The Role of Real-Time Interaction and Engagement*

In order to succeed in the asynchronous classes, high school students need to be “motivated,” “self-directed,” “able to work independently,” and demonstrate a “willingness to communicate” and to “ask for help.” They also need to be “organized” and have “good time management



skills." However, at this level they often lack these skills. As a solution, one e-teacher described monitoring students' work in the asynchronous period by tracking their access in WebCT to see if "students are utilizing those pieces of work for review and then to help them learn material."

Learners in this context of DE are spatially independent, which means that e-teachers do not have "the ability to really see what students are doing." E-teachers compensate for this lack of face-to-face contact with learners by temporal contact in the form of synchronous classes. These classes are necessary for e-teachers to provide direction to and engage with learners. As one e-teacher noted, "direction is definitely something that students need at the high school level" because they often may not have the skills, the work ethic, the motivation, or the ability to work independently.

Although "some students would flourish in an environment where there is no dialogue with a teacher, others would not" because they need "prompting" and "external motivation." That is why "the real-time interaction as opposed to time-shifted interaction is quite valuable." It allows the e-teachers to "ask [students] questions, to test their understanding or to test their ability or just to get their opinion" and to provide "instant feedback."

The e-teacher's role in a context of synchronous communication in "engag[ing] every student" through "questioning" and "prodding" to test their knowledge of the material. The students' role is to "be engaged in the instruction" and "focused on the task at hand." In contrast, asynchronous learning, as one interviewee commented, "hasn't become the large vehicle that ... would engage kids in independent learning opportunities."

## Discussion

Moore's definition of TD emphasizes the potential misunderstanding between the teacher and student. In the context of DE at the high-school level using web-based asynchronous and synchronous technologies, TD is more than a breakdown in understanding between the teacher and students. It is a potential for lack of community, not only between teachers and the students, but between teachers themselves, who are also separated physically from each other. Participants emphasized the need for rapport-building, social presence, nurturing, collaboration, sharing, and self-understanding. These preoccupations move well beyond the TDT's determinants of dialogue and interaction.

Findings related to the curriculum and teacher-centered tools illustrate how structure can make it harder for teachers to meet students' needs particularly in a context of distance education. The curriculum relied on in this context of distance education does not have any particular or

special accommodations (for example in terms of time) built into it to reflect the fact that teachers and students are physically separated. Although the teachers recognize the importance of rapport building and meeting individual needs of students, the curriculum may inhibit teachers' efforts in this area. In this context of web-based distance education at the high-school level, the curriculum can increase TD.

TDT argues that highly interactive media can permit more dialogue and require less structure. Although compared to recorded media, E-Live potentially supports more interaction, as we saw in this case, the media did not have this result. Whether the lack of flexibility and of open dialogue and "rigid environment" was more a function of teacher behaviours or the technology itself is not clear since the study did not focus specifically on this aspect. This finding does, however, point to a need for further inquiry into how these types of tools relate to TD. If, indeed, they do structure the environment in a way that does not meet students' needs, then a different type of interactive tool may be required. Alternatively, teachers may benefit from training aimed at helping them use the tools in a way that decreases TD. Our findings, therefore, do not support TDT's hypothesis that more interactive media support more dialogue.

TDT argues that the more self-directed the learner, the less dialogue and structure needed. Similarly, the greater the lack of self-directedness amongst students described in this case, the greater the need for temporal contact in the form of synchronous classes. Although it is not uncommon for post-secondary courses to favour asynchronous interactions solely, this case suggests that secondary students require real-time interactions with their teachers. For schools or organizations planning to offer distance courses to students at the secondary level, consideration will need to be given to the ratio of asynchronous to synchronous instruction. Our study suggests that the less self-directed the learner, the more synchronous interactions are needed.

The challenges highlighted by participants related to engaging students in asynchronous contexts point to a need to inquire further into how these forms of learning might be most effectively designed for these types of learners. Likewise, if synchronous interactions are privileged or increased in order to better meet the needs of less self-directed learners, then these environments and interactions within them should be consciously designed to ensure needs are indeed met. The need for this design would appear to be particularly important if, as participants suggest, the synchronous communication using E-Live can be teacher-centered.

## Conclusions

Compared to the studies reviewed in an earlier section of this paper, the present study provides a unique opportunity to appreciate how TDT might be conceptualized at a level other than the post-secondary. In addition, we attempt to systematically relate our concepts and constructs to those of Moore's (1993) TDT as well as to its propositions, determinants, and hypotheses. Our findings relate most specifically to those of Saba and Shearer (1994) who emphasized the variables of learner and instructor control, and to Chen and Willits' (1999) notions of independence and interdependence.

The learner-learner interaction allowed by new technologies and highlighted in Vrasidas and McIsaac's (1999) study could be included as one concept of the broader construct of the learning community associated with TD in our study. Vandergrift's (2002) emphasis on "shared meaning-making", "community dialogue," and "restrained presence" are the concepts most similar to those reflected in our findings.

This particular context of web-based, DE at the high-school level is limited to one case in which to consider the concepts, propositions, and hypotheses related to TDT. Its limitations prevent generalization to broader or universal contexts of web-based DE at the high-school level. Nonetheless, our study illustrates how TDT can serve as a lens through which to interpret empirical findings. Likewise, we might also consider how this one case can serve as a means of shedding light on the theory itself.

Hypotheses suggested by our findings and which might be investigated in subsequent studies of web-based DE at the high-school level include the following:

- an increase in deliberate strategies to promote rapport, collaboration, and engagement decreases TD;
- as synchronous classes decrease, TD increases;
- as goals and activities increase in centeredness around curriculum content, TD increases;
- asynchronous and synchronous environments designed for student engagement decrease TD.

While we have had many opportunities for both theoretical and empirical consideration of DE in post-secondary contexts, such has not been the case at the secondary level. Just as Moore argues that DE is but a subset of education in general, so, too, is secondary-school DE but a subset of DE. Further theoretical and empirical consideration of teaching and learning at this level might shed light on DE in general and TDT in particular. Since this study was conducted in only one case of distance

education in one province, it would no doubt be of interest and value to see if our own findings might be replicated in other contexts.

### Acknowledgements

The study reported on in this paper was funded by the Social Sciences and Humanities Research Council of Canada. We would like to thank the teachers, managers, and staff of the Centre for Distance Learning and Innovation for their participation in and assistance with our research.

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