DISTANCE EDUCATION IN THE U.S.: A PARADOX

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ABSTRACT

Over the last several years distance education (DE) class offerings at U.S. universities and colleges have been increasing at a rate of approximately 10% or more per year. While the effectiveness of DE classes vis-à-vis that of face-to-face (F2F) classes has been sufficiently documented, there are few studies that compare student evaluations of the two class delivery systems. Therefore, we sought to answer the question, is there a significant difference between student evaluations of the Teaching Methods and Styles (TM&S) of DE and F2F classes as measured on a student completed class and instructor survey, examined through the lens of Moore's Transactional Distance Theory (TDT) constructs of student autonomy, dialogue and structure. Moore maintains that Transactional Distance (TD) is a psychological and pedagogical separation of student and instructor, as well as a geographical one. The twenty TM&S questions included in the survey data for 765 classes offered from September 6, 2011 to December 19, 2013 were collected and analyzed for classes identified as SOC 101 Introduction to Sociology through SOC 340 Applied Research in the Behavioral Sciences that are offered by the College of Social and Behavioral Sciences at a Mid-Atlantic Open University. A t-test analysis of variance was conducted and analyzed. The results of the study indicate that 16 of the 20 TM&S questions returned statistically significant results, 3 of 4 for student autonomy, 8 of 10 for dialogue and 5 of 6 for structure. Three of the TDT construct dialogue/interaction questions and two of the TDT construct structure questions returned medium effect size magnitudes. Three of the TM&S questions associated with the TDT construct autonomy returned statistically significant results with low effect size magnitudes. Based on the results of the study, we have concluded that psychological and pedagogical separation, or TD between student and instructor is reduced when the DE course structure encourages and requires increased dialogue and interaction.

Keywords: Distance education, distance education paradox, transactional distance and transactional distance theory

INTRODUCTION

In a study conducted by Babson Research for the Sloan Consortium, Allen and Seaman (2013) reported that over the last 10 years of research Chief Academic Officers (CAOs) report a less than overwhelming claim for the validity and legitimacy on DE by their respective faculty. As Table 1 below indicates, only about 30% of those CAOs indicated their faculty's agreement that DE is valid and legitimate. The rest disagree or are neutral on the question suggesting that a large percentage of faculty have yet to make up their minds with respect to the validity and legitimacy of DE. It may be that many of that group have not been exposed to DE classes and are reluctant to make a judgment. Such numbers have led one to assume that faculty members are having difficulty adapting to and accepting DE. If, as is discussed below, students are already uncomfortable with DE and are quick to drop a DE class when they discover the reality of DE classes and faculty members are uncomfortable with DE classes, a problem for the successful growth of DE exists. Yet, in spite of these issues, the number of students enrolled in DE classes increased in 2011 and 2012, albeit at a slower rate than previous years. The Sloan Consortium study estimates that the 2012's growth rate for DE enrollments of "9.3 percent is the lowest recorded in this report series" (Allen & Seaman, 2013, p. 4).

Table: 1
Faculty Assessment of Legitimacy of Online Education: (Allen & Seaman, 2013, p. 29)

	Fall 2002	Fall 2004	Fall 2005	Fall 2006	Fall 2007	Fall 2009	Fall 2011	Fall 2012
Agree	27.6%	30.4%	27.6%	32.9%	33.5%	30.9%	32.0%	30.2%
Neutral	59.3%	57.8%	56.1%	51.9%	51.9%	51.8%	56.5%	57.2%
Disagree	7.4%	10.3%	14.7%	11.0%	14.6%	17.3%	11.4%	12.6%

Student dissatisfaction with DE classes, as evidenced by the widening attrition gap between DE classes and traditional F2F classes is becoming an even bigger problem as DE class offerings increase (Patrick, 2009). Moreover, in the most recent Babson Survey Research Study (Allen & Seaman, 2014), over 40% of CAOs report that it is more difficult to retain DE students for 2013 and that percentage has increased significantly since 2004 (see Figure 1).
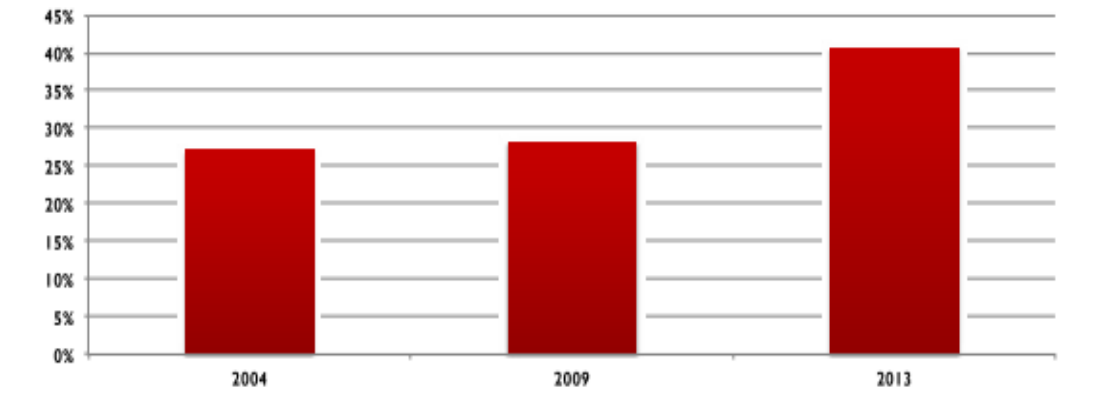
Figure: 1
Retaining Students is a Greater Problem for Online Courses than it is for Face-To-Face Courses (Allen & Seaman, 2014, p. 18).

Given the incredible development of DE classes throughout the U.S. and the very weak retention numbers cited by Chief Academic Officers, a paradox exists. While there are a number of studies that compare DE classes to F2F classes with similar disappointing results (see Bernard et al., 2004), the current study examined the difference based on students' survey ratings of the teaching methods and styles (TM&S) for both DE and F2F classes.

MOORE'S TRANSACTIONAL DISTANCE THEORY

In the early 1970's, Michael G. Moore (1997, 2010) focused on a revised explanation of DE. His revision holds that DE is not only a geographical separation but a psychological and pedagogical separation as well. The theory is known as Transactional Distance Theory (TDT). It is based on Dewey's concept of transactional education (See Dewey & Bently, 1949). They viewed knowledge and its acquisition as occurring in a natural system in which each member of that system is dependent on other members. Therefore, no one stands alone in his or her acquisition of knowledge.

TDT maintains that the greater the transactional (psychological) distance, the less effective the online class. Consequently, Moore's purpose has been to reduce the psychological or transactional distance of DE courses. Moore considered three constructs necessary for TDT. They are student autonomy, dialogue/interaction and course structure. He has hypothesized that "as dialogue increases, transactional distance decreases [and] as structure increases, transactional distance increases" (Moore, 2010, p. 19). Moreover, the need for student autonomy "increases as transactional distance increases" (p. 21). In the end, dialogue appears to be the key variable, as the degree of transactional distance is ultimately dependent upon the level of dialogue, which causes some to consider TDT a tautology and not a viable theory (Gorsky & Caspi, 2005b).

Like others (Connolly et al., 2007; Dron et al., 2004; Fulford & Zhang, 1993; Holmberg, 2003; Lear, Isernhagen, LaCost, & King, 2009; Salmon & Shephard, 2004; Tsui & Ki, 1996), Gorsky et al. (2004), we have concluded that dialogue is important to student satisfaction (see also Gorsky & Caspi, 2005a). Moreover, they also discovered, as did others (Connolly et al., 2007; Salmon & Shephard, 2004) the importance of the tutor in motivating students to participate in dialogue. Finally, they came to the realization, as did Dron et al. (2004) that in spite of the importance that theorists like Moore (1993) attached to dialogue, the reality is that very often dialogue has been neglected in DE classes.

THE CONCEPTUAL FRAMEWORK

The study considered the TM&S as reported on the student survey through the lens of Moore's Transactional Distance Theory (TDT) (1973, 1997, 2010, 2012). There are 20 IDEA TM&S variables. Each variable was categorized under one of the constructs of Moore's TDT (Autonomy, Dialogue & Structure).

The study categorized the 20 TM&S variables from each IDEA survey and Moore's constructs in the following way.

AUTONOMY: Moore (2012) defined autonomous students as those capable of taking charge of their learning. Table 2 categorizes Moore's TDT construct with 4 survey TM&S variables.

Table: 2
IDEA TM&S Categorized with Moore's TDT Construct Autonomy

Moore's TDT Constructs	Survey Teaching Methods & Styles
AUTONOMY	Stimulated students to intellectual effort beyond that required by most other courses (IDEA Survey item #8)
	Encouraged students to use multiple resources (IDEA Survey item #9)
	Inspired students to set and achieve goals which really challenged them (IDEA Survey item #15)
	Gave projects, tests or assignments that require original or creative thought (IDEA Survey item #19)

DIALOGUE: Moore described dialogue as a certain kind of interaction between students and instructors that relies on words and images. Table 3 Categorizes Moore's TDT construct of Dialogue with 10 survey TM&S variables.

Table: 3
Survey TM&S Categorized with Moore's TDT Construct Dialogue

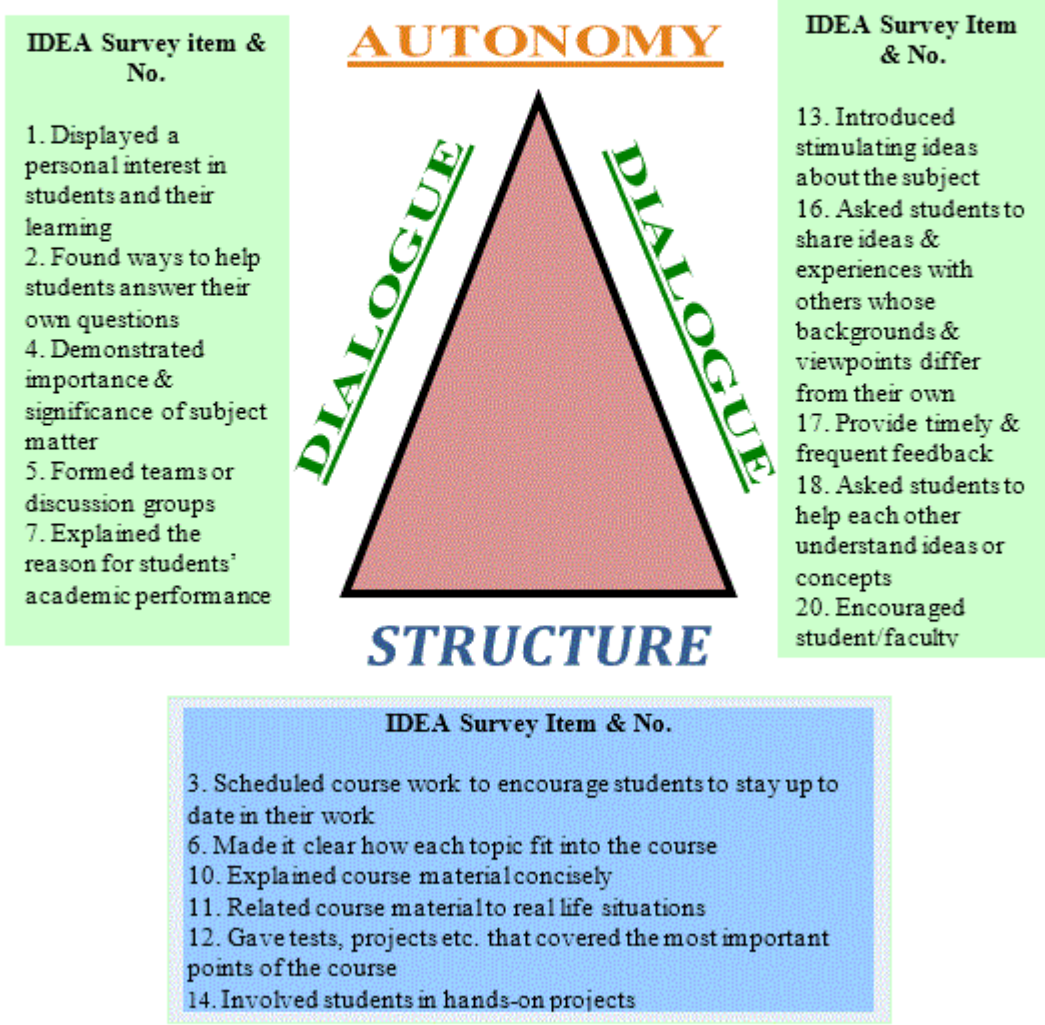| Moore's TDT Constructs	Survey Teaching Methods & Styles
	Displayed a personal interest in students and their learning (IDEA Survey #1)
	Found ways to help students answer their own questions (IDEA Survey #2)
	Demonstrated the importance and significance of the subject matter (IDEA Survey #4)
	Formed teams or discussion groups to facilitate learning (IDEA Survey #5)
DIALOGUE	Explained the reasons for criticisms of students' academic performance (IDEA Survey #7)
	Introduced stimulating ideas about the subject matter (IDEA Survey #13)
	Asked students to share ideas and experiences with others whose backgrounds and viewpoints differ from their own (IDEA Survey #16)
	Provided timely and frequent feedback on tests, reports, projects, etc. to help students improve (IDEA Survey #17)
	Asked students to help each other understand ideas or concepts (IDEA Survey #18)
	Encouraged student - faculty interaction outside of class (IDEA Survey #20)

Finally, STRUCTURE: Moore (2012, p. 5) has defined structure as "that which expresses the rigidity or flexibility of the course's educational objectives, teaching strategies, and evaluation methods. Table 4 Categorizes Moore's TDT construct Structure with 6 IDEA TM&S variables.

Table: 4
Survey TM&S Categorized with Moore's TDT Construct Structure

Moore's TDT Constructs	Survey Teaching Methods & Styles
	Scheduled course work (class activities, tests, projects) in ways which encouraged students to stay up–to-date in their work (IDEA Survey #3)
	Made it clear how each topic fit into the course (IDEA Survey #6)
	Explained course material clearly and concisely (IDEA Survey #10)
STRUCTURE	Related course material to real life situations (IDEA Survey #11)
	Gave tests, projects, etc. that covered the most important points of the course (IDEA Survey #12)
	Involved students in "hands on" projects such as research, case studies, or "real life" activities (IDEA Survey #14)

IDEA Survey Item & No.

8. Stimulated students to intellectual effort
9. Encouraged students to use multiple resources.
15. Inspired students to set & achieve goals
19. Gave projects, tests, or assignments that required original or creative thought ideas

IDEA Survey item & No.

1. Displayed a personal interest in students and their learning
2. Found ways to help students answer their own questions
4. Demonstrated importance & significance of subject matter
5. Formed teams or discussion groups
7. Explained the reason for students' academic performance

AUTONOMY

DIALOGUE DIALOGUE

STRUCTURE

IDEA Survey Item & No.

13. Introduced stimulating ideas about the subject
16. Asked students to share ideas & experiences with others whose backgrounds & viewpoints differ from their own
17. Provide timely & frequent feedback
18. Asked students to help each other understand ideas or concepts
20. Encouraged student/faculty

IDEA Survey Item & No.

3. Scheduled course work to encourage students to stay up to date in their work
6. Made it clear how each topic fit into the course
10. Explained course material concisely
11. Related course material to real life situations
12. Gave tests, projects etc. that covered the most important points of the course
14. Involved students in hands-on projects

IDEA TEACHING METHODS & STYLES

Figure: 2
The Conceptual Framework

METHODOLOGY AND DATA COLLECTION

An independent samples t-tests was used for the purpose of examining whether a statistically significant difference exists between the TM&S of DE and F2F student ratings at an Open University in the Mid-Atlantic region of the U.S. with respect to student surveys through the lens of Moore's TDT (see Figure 2) (IDEA, 2013; Moore, 2012). Twenty null hypotheses were stated to correlate with the 20 TM&S questions listed on the student survey for a range of classes beginning with SOC 101 Introduction to Sociology and ending with SOC 340 Applied Research in the Behavioral Sciences offered from September 6, 2011 through December 19, 2013. Student ratings for 765 classes (488 F2F and 277) were evaluated.

The sampling approach was a comprehensive one that included an analysis of all of the completed surveys for the stated courses and dates. This was an Ex Post Facto design (Campbell & Stanley, 1963) as the data was collected prior to this study. The data for each class was separated into DE and F2F categories.

The Instrument

The data for this study was drawn from a commercially available survey instrument that has been used at the study site for twenty-five years. It is a student-centered survey that is designed to obtain the student's evaluation of both the course he or she has just completed and the instructor responsible for teaching the course (IDEA, 2013). Student evaluations of instructor performance, including this particular instrument, have been shown to be both valid and reliable (Benton & Cashin, 2012; Renaud & Murray, 2005; Theall & Franklin, 2001). There are no identifying factors to any student contained on the instrument. Therefore, all student information was kept confidential and anonymous.

Content Validity

Descriptions of the TDT constructs of autonomy, dialogue and structure and the categorization of the TM&S variables considered consistent with the TDT constructs were sent to a TDT expert, the Senior Survey Research Officer and the Chair of the Behavior Science Department at the study site for their comments for the purpose of testing content validity. The TDT expert did not respond. The senior researcher and the Chair both responded in the affirmative.

Significance and Effect Size

The independent samples t-test was run using IBM SPSS v. 21. P values at the .05 level of significance and effect size magnitudes for each of the 20 survey variables are reported. The effect size magnitude calculations were based on a Cohen's *d* statistic of low, medium and high effect size (Field, 2013; Hinkle et al, 2003).

The mean scores for 15 courses offered in 765 classes (277 DE & 488 F2F) of IDEA surveys were analyzed from Fall 2011 to Fall 2013 inclusive. Of the 277 DE classes evaluated, there were 2216 responses for an average of 8 responses per class. Of the 488 F2F classes evaluated, there were 4880 responses for an average of 10 responses per class. A total of 7184 responses were examined in the study. Of the 20 null hypotheses from the IDEA TM&S surveys, 16 had statistically significant results.

The analyses of the results for hypotheses categorized under the TDT construct autonomy (Table 5) indicate that three of the four (HØ$_8$, HØ$_{15}$ & HØ$_{19}$) yielded statistically significant results. Those three hypotheses were rejected. All three hypotheses returned Cohen's *d* magnitudes of less than .30 indicating small effects. Taking this information into account, there is likelihood that the effect of the particular variable is not substantive. HØ$_9$ with a p-value greater than .05 was accepted.

Table: 5
Independent Samples t-Test Results for TDT Construct Autonomy

IDEA Item #	Equal Var	Levene's Test for Equality of Variances			t-test for Equality of Means				95% Confidence Interval	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
#8	Y	.221	.638	-2.997	763	.003	-.1079	.0360	-.1785	-.0372
	N			-3.020	586.340	.003	-.1079	.0357	-.1781	-.0377
#9	Y	2.631	.105	-1.457	763	.145	-.0464	.0319	-.1090	.0161
	N			-1.496	619.027	.135	-.0464	.0311	-.1074	.0145
#15	Y	.639	.424	-2.080	763	.038	-.0772	.0371	-.1502	-.0043
	N			-2.116	603.903	.035	-.0772	.0365	-.1489	-.0056
#19	Y	.584	.445	-2.164	763	.031	-.0656	.0303	-.1251	-.0061
	N			-2.215	614.072	.027	-.0656	.0296	-.1238	-.0074

The analyses of the results for hypotheses categorized under the TDT construct dialogue (Table 6) indicate that eight of the ten (HØ$_1$, HØ$_2$, HØ$_4$, HØ$_5$, HØ$_{13}$, HØ$_{17}$, HØ$_{18}$ & HØ$_{20}$) yielded statistically significant results. Those eight hypotheses were rejected. Three of the eight statistically significant hypotheses retuned medium effect sizes (HØ$_1$ / *d* = .55, HØ$_2$ /*d* = .52, & HØ$_4$ / *d* = .45) indicating a more substantive effect. The remaining five hypotheses returned small effect sizes.

Table: 6
Independent Samples t-test for the TDT Construct *Dialogue*.

IDEA ITEM #	EQUAL VAR ASSUM	Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff	Std. Error Dif	Lower	Upper
#1	Y	8.705		-7.471	763	.000	-.2431	.0325	-.3070	-.1792
	N		.003	-7.135	498.684	.000	-.2431	.0341	-.3100	-.1762
#2	Y	2.584	.108	-6.932	763	.000	-.2520	.0364	-.3234	-.1807
	N			-6.844	551.642	.000	-.2520	.0368	-.3244	-.1797
#4	Y	6.949		-6.091	763	.000	-.1829	.0300	-.2419	-.1240
	N		.009	-5.836	503.841	.000	-.1829	.0313	-.2445	-.1213
#5	Y	4.907		-2.218	763	.027	-.0937	.0422	-.1766	-.0108
	N		.027	-2.316	649.416	.021	-.0937	.0405	-.1732	-.0143
#7	Y	1.318	.251	-1.068	763	.286	-.0407	.0382	-.1156	.0342
	N			-1.041	531.513	.298	-.0407	.0391	-.1176	.0361
#13	Y	.126	.722	-3.804	763	.000	-.1333	.0351	-.2022	-.0645
	N			-3.791	567.748	.000	-.1333	.0352	-.2024	-.0643
#16	Y	2.795	.095	-1.499	763	.134	-.0500	.0334	-.1156	.0155
	N			-1.541	622.117	.124	-.0500	.0325	-.1138	.0137
#17	Y	.232	.630	-2.638	763	.009	-.1126	.0427	-.1963	-.0288
	N			-2.657	586.113	.008	-.1126	.0424	-.1957	-.0294
#18	Y	1.618	.204	-2.196	763	.028	-.0813	.0370	-.1540	-.0086
	N			-2.245	612.499	.025	-.0813	.0362	-.1525	-.0102
#20	Y	.375	.540	-3.729	763	.000	-.1453	.0390	-.2218	-.0688
	N			-3.715	566.890	.000	-.1453	.0391	-.2222	-.0685

The analyses of the results for hypotheses categorized under the TDT construct structure (Table 7) indicate that five of the six (HØ$_3$, HØ$_6$, HØ$_{10}$, HØ$_{11}$ & HØ$_{14}$) yielded statistically significant results. Those five hypotheses were rejected. Two of the five statistically significant hypotheses returned medium effect sizes (HØ$_6$ / *d* = .38 & HØ$_{10}$ / *d* = .46) indicating a more substantive effect.

Table: 7
Independent Samples t-Test for the Construct Structure

IDEA Item #	EQUAL of VAR ASSUM	Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig	t	df	Sig. (2-tailed)	Mean Diff	Std. Error Diff	Lower	Upper
#3	Y	.096	.757	-2.458	763	.014	-.0792	.0322	-.1425	-.0160
	N			-2.531	624.815	.012	-.0792	.0313	-.1407	-.0178
#6	Y	.214	.643	-5.057	763	.000	-.1642	.0325	-.2280	-.1005
	N			-5.029	564.137	.000	-.1642	.0327	-.2284	-.1001
#10	Y	.041	.840	-4.288	763	.000	-.1651	.0385	-.2407	-.0895
	N			-4.330	590.383	.000	-.1651	.0381	-.2401	-.0902
#11	Y	1.437	.231	-6.581	763	.000	-.2078	.0316	-.2698	-.1458
	N			-6.476	546.482	.000	-.2078	.0321	-.2709	-.1448
#12	Y	3.236	.072	-1.541	763	.124	-.0460	.0299	-.1047	.0126
	N			-1.586	623.940	.113	-.0460	.0290	-.1031	.0110
#14	Y	.022	.883	-3.096	763	.002	-.1113	.0360	-.1819	-.0407
	N			-3.079	564.220	.002	-.1113	.0361	-.1823	-.0403

DISCUSSION AND CONCLUSION

While the constructs of dialogue and structure were found to be important in reducing TD in computer mediated DE classes, the construct autonomy returning 3 of 4 statistically significant results with only small effect sizes was found not to paly an important role in reducing TD. As with the mean scores of DE and F2F classes for dialogue, those for structure are similar and skewed to the high end of 5.0, which causes one to consider the differences between student evaluations of F2F and DE classes at the research site to be more of a preference for F2F classes than dissatisfaction with DE classes.

Moore (2010, p. 19) maintained, "as dialogue increases, transactional distance decreases [and] as structure increases, transactional distance increases." We believe the results of this study indicate the opposite. That is, as structure that highlights the importance of student/instructor engagement (dialogue/interaction) increases, TD decreases. With respect to the relationship between structure and dialogue/interaction, one Ph. D. student (Jacki, 2010) blogged that student/instructor engagement (i.e., dialogue/interaction) is necessary for an online course. She references Salmon's Five Stage Model for online classes. Salmon's Stage 1 holds for instructors encouraging students to interact in the class. Stage 4 of 5 encourages students to lead the class and keep the interaction ongoing (See Salmon & Shepard, 2004).

PROPOSED MODEL

The focus of the current study has been limited to the Open University in the Mid-Atlantic region and as such is much narrower in scope than what Professor Moore intends. Nevertheless, the results of the current study have encouraged this researcher to pursue even further study of TDT

as it applies to such situations. Based on the reviewed literature as well as the results of the current study, a proposal for a computer mediated distance education model (CMDEM) is presented in Figure 3 As has been discussed in this paper and has been found by others (Benson & Samarawickrema, 2009; Kanuka, Collett, & Caswell, 2002; Murphy & Cifuentes, 2001; Wikeley & Muschamp, 2004), the results of the current study highlight the magnitude of the TM&S variables categorized in the TDT constructs of dialogue and structure. The CMDEM assumes instructor engagement and relies exclusively on DE courses delivered by way of the Internet using such systems as Blackboard, Web CT, Angel, Moodle among others existing now or in the future.
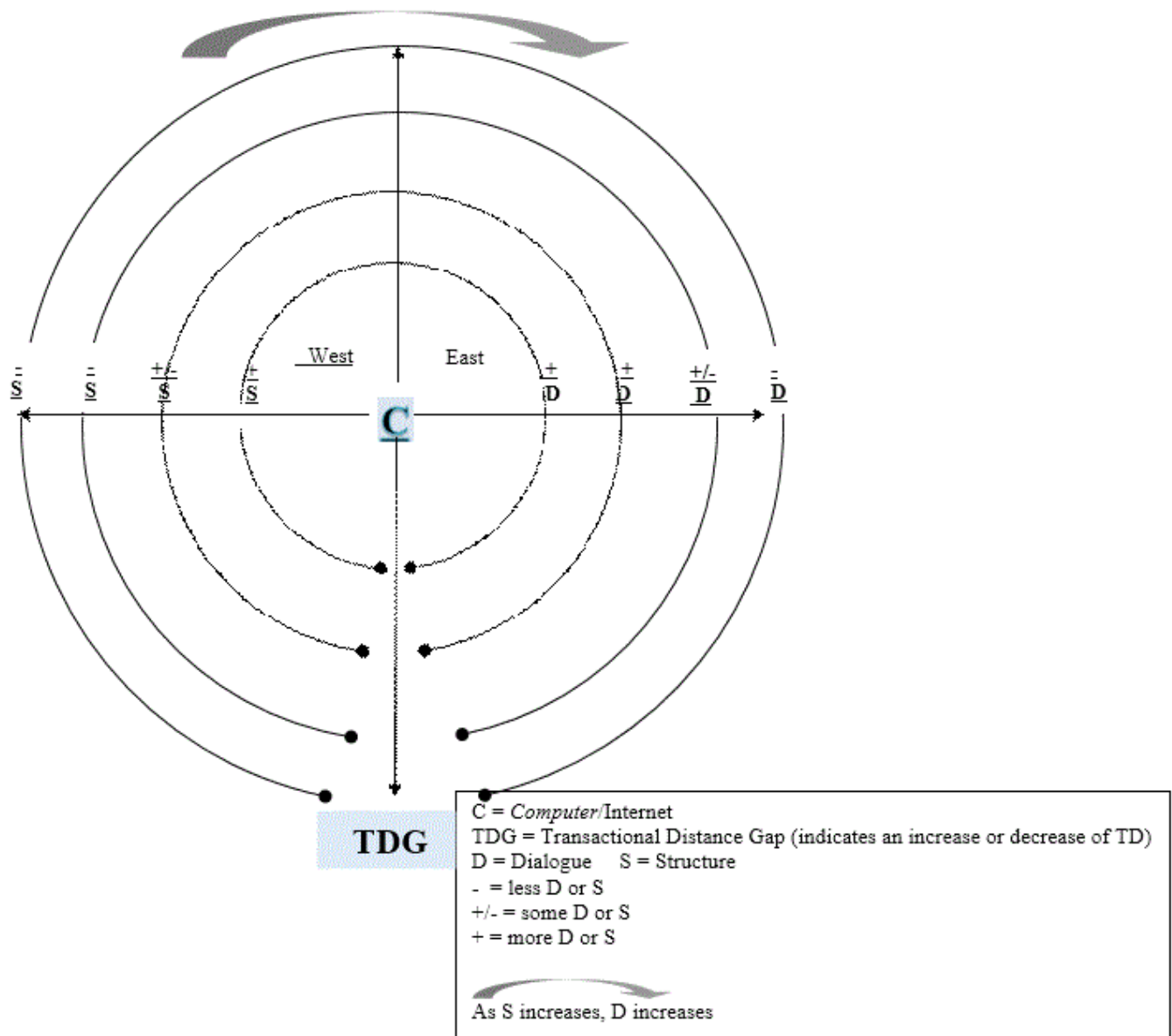

Figure: 3
Computer Mediated DE Model (CMDEM)

The model includes four (4) concentric rings around the constant (C) which represents the computer with access to the Internet. There is a vertical axis that divides each ring into an east/west orientation. The portion of the rings on the west axis represents "structure" (S); the portion on the east axis represents "dialogue" (D). Each ring is identified by a (-) indicating lesser or a (+) indicating greater or a (+/) indicating some. As an example, both the outermost western rings (representing structure) and outermost eastern rings (representing dialogue) are identified with a (-) indicating less structure/dialogue. Thus, the outermost ring indicates the largest transactional distance gap (TDG), which indicates greater TD. The innermost rings, which are comprised of an eastern half identified as (+) and a western half also identified as (+), represents the smallest TDG indicating less TD. Thus, the CMDEM model theorizes that when DE classes are structured in a way that focuses on the need for dialogue and interaction, TD will decrease. Therefore, as structure increases, so does dialogue/interaction.

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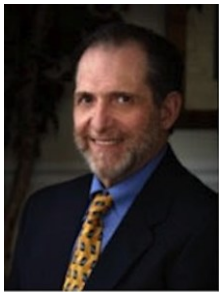
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