

Transactional Distance

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Abstract

This paper investigates the transactional distance experienced among a group of medical students in the same online course. This was measured vis a vis the previous experience of each student with online learning platforms. Results showed that there was not a significant correlation between previous online learning experience and transactional distance, negating the presupposition of a positive relationship. These findings are discussed in the context of other similar studies.

The history of distance education predates the World Wide Web (WWW) contrary to popular understanding. Friedland, Hürst and Knipping (2007) reference Sir Isaac Pitman, a shorthand professor, as one of the first educators to teach by correspondence in the form of letters to recipient students as far back as 1840. Institutionally, the University of South Africa debuted one of the earliest offerings of correspondence courses in 1946. Thereafter, technology made its way into classrooms ushering in the WWW era. As recent as the WWW is, it took over an existing medium and changed it. It made the scope of distance education offerings broader and brought a great level of interactivity to the classroom (Friedland, Hürst & Knipping, 2007).

There has never been a time like now in which distance education has experienced an ever-increasing relevance and demand. This beckons the need to study its many facets and constitutions. Despite this nascent interest, distance education has struggled with an ability to theorise its activities as revealed by the lack of synergy in existing theories (Chen, 2001a).

Some of the major ones are:

- The industrial model
- The transactional distance theory
- The theory of teaching in distance education
- The theory of reintegration of the teaching and learning acts
- And the theory of communication and learner control (Gokool-Ramdoos, 2008)

Though there isn't a unanimous consensus regarding which theory is most appropriate, the odds tipped largely in favor of the transactional distance theory by Moore (1990). Kang and Gyorke (2008) opined the lack of social variation among the learners which the theory purports to describe. Gorsky and Caspi (2005) are also among the dissenting voices arguing that the theory has no empirical and/or literary underpinnings, but is simply the philosophical culmination of an unchecked tautology. This is dispelled by the theorist,

himself Moore(1990) who admits that this work is actually informed by the work of his famed predecessor, John Dewey. These tensions are a precursor to the study that follows; first, by defining distance education as employed herein; then, chronicling its evolution into being synonymous with online learning; and finally, making the case for the empirical study of transactional distance in that context.

Distance education according to Moore(1990) is "...defined as a function of two variables called 'dialogue' and 'structure'." (p.10). He describes dialogue as the exchange of any form of discourse between teacher and student, both verbal and non-verbal whereas structure is the manner, often a logical ordering, in which the educational content/material is presented to students to facilitate learning. Although 'distance' here suggests a geographical separation, Moore had a different, more figurative approach to this definition. He posited that distance in education is not only a factor of geography but also of pedagogy. It is on this basis that transactional distance was born. "Transactional distance has been defined as barriers to students' engagement with learning in the online environment. " (Paul, Swart, Zhang & MacLeod, 2015, p. 1). Moore(1990) categorized the components of transactional distance into three; dialogue, structure and learner. The transactional distance theory implies that the greater the transactional distance, the greater the chasm between the learner and the construct(instructor, course or peers) as evidenced by the frequency of dialogue and the underlying structure.

Learning can be understood as how one comes from not knowing to retained comprehension, either as guided by self and/or an external party (Passer & Smith, 2004). These forms could be both formal and informal. Formal learning requires enrollment in a structured program, a finite duration, clear objectives and some assessment component. Informal learning on the other hand, can be any knowledge enhancing activity with full learner autonomy. It can be deduced then, that in either formal or informal learning, the

following elements are always present; a learner, an instructor and suitable content. In light of this, it then applies that the advent of the web made a significant impact on learning, one of which is morphing it into several expressions. These are, primarily;

- Online learning: formal learning in which courses are offered entirely online
- Blended Learning: formal learning in which courses are a mix of online and face-to-face instruction
- Open Learning: informal learning in which courses are offered entirely online e.g. Massive Open Online Courses (MOOC)

Today, there exists for profit institutions who only offer online courses only with no provision for physical classroom teaching. There is also a growing number of brick and mortar institutions offering distance learning through online courses. One society notable for its enthusiastic adoption of online courses is Britain, with its establishment of the Open university system (Bell & Tight, 1993). This is an accredited public university that offers up to doctoral level courses via online learning.

With popularity of online learning and a move towards this medium by several institutions of higher education, a study like this is timely. Chen (2001a) adds that there is a weakness in the empirical substantiation of distance education literature. Thus, this demand for online learning also necessitates a rationale for its empirical study. This is investigated here within the framework of the transactional distance theory. The empirical research findings indicate four dimensions of transactional distance; instructor-learner, learner-learner, learner-interface and learner-content (Chen, 2001a; Chen, 2001b; Gokool-Ramdoo, 2008; Moore, 1990; Paul et. al, 2015; Stein et. al, 2009; Zhang, 2003)

Method

Of particular interest here are two previously validated scales for measuring transactional distance in an online environment. The original scale was developed by Zhang

(2003) and the revised scale by Paul et. al(2015). The scale by Zhang(2003) had 31 survey items measuring transactional distance; 6 items for instructor-learner transactional distance, 6 items for learner-content transactional distance, 11 items for learner-instructor transactional distance and 8 items for learner-interface transactional distance. A breakdown of the instrument is provided in Appendix I. The revised scale by Paul et. al (2015) has 12 items which unilaterally measure the transactional distance, but does not account for the learner-interface transactional distance. Details of the scale are available in Appendix II

Research Design

This study focused primarily on post-secondary adult learners in a professional setting. The aim is to investigate if the learner's previous online learning experience can influence the self-reported transactional distance. The research questions are; (a) Is there a relationship between learner experience and transactional distance in online learning? (b) If any exists, what is the degree of the relationship?

The hypothesis here is that learner experience has a significant effect on transactional distance in online learning among Nigerian medical interns. Learners with substantial previous online learning experience (more than three courses) should feel less transactional distance than those with limited experience.

For the purpose of this study, the transactional interactions have been defined as:

- Learner-teacher: any academic activity between the learner and teacher that takes place online via the designated Learning Management System (LMS)
- Learner-content: any activity in which the learner either adds to the body of knowledge in the course or draws from it via the LMS
- Learner-learner: any interaction between the learner and other members of the cohort that takes place via the LMS.

Participants

Employees of a regional hospital in the capital city of one of the most populous countries in West Africa, were approached for inclusion in this study. The participants are all doctors in the first term of a two-year mandatory internship for medical school graduates. They are all enrolled in the same online study certificate course offered by the public health department of a Russell Group university in the United Kingdom. Though this course is optional, it has been observed to improve their odds of being retained after the internship. 120 students were approached to be included in this study at the start of this online course, and 70 provided consent but only 40 eventually participated in the study. 1 entry had to be dropped due to inconsistent reporting, resulting in a total of 39 responses. There were no remunerations or incentives provided for completing the survey.

Materials

The instrument involved is the 12-item Revised Scale of transactional distance by Paul et. al(2015). The first item in that scale was a reverse coded question and so for the purpose of this study only 11 items were employed as thus; questions 1-3 addressed transactional distance between student and teacher, questions 4-7 items addressed transactional distance between student and content, questions 8 to 11 addressed transactional distance between student and student (see Appendix section).

Procedure

This survey was conducted at the end of the first semester using the cross-sectional approach. It was administered via the survey collection tool survey monkey. No identifying information was collected. In addition to the validated scale, demographic information was collected about the learners' previous experience with online courses. All participants responded in a timely manner. The statistical tests performed include tests for normality, Kruskal test, correlation test and reliability analysis. The results generated follows.

Results

A descriptive test was conducted to describe the demographic information and it yielded the following results;

	Frequency	Percent
Valid 1-3 Online Courses	13	33.3
4-7 Online Courses	16	41.0
8+ Online Courses	10	25.6
Total	39	100.0

Table 1.0: Previous Online Learning Experience

Table 1.0 shows that most of the students have enough experience with online learning/courses, having taken as much as 4 or more courses prior to this study.

Next, a reliability analysis was conducted which yielded a Cronbach alpha of .70 for the 11 items tested. According to Gliem and Gliem (2003), an alpha value of .70 is acceptable. No explicit validity test was conducted again here because the instrument used has been validated in prior studies with excellent validity (Paul et. al, 2015). A non-parametric test is run to identify if there are any statistical significance in the online learning experience groups using Kruskal-Wallis test (table 2.0 and 3.0).

	Online Learning Experience		
	N	Mean Rank	
Transactional Distance	13	18.54	1-3 Online Courses
	16	19.75	4-7 Online Courses
	10	22.30	8+ Online Courses
	39		Total

Table 2.0: Kruskal-Wallis Test - Mean of Ranks

TD	
Chi-Square	.632
df	2
Asymp. Sig.	.729

a. Kruskal Wallis Test

b. Grouping Variable: Previous Online Learning Experience

Table 3.0: Kruskal-Wallis Test - Statistics

The Kruskal-Wallis test is employed for studies in which the independent variable consists of many groups and the dependent variable is ordinal. For this study, the independent variable is the previous online learning experience which is determined by how many courses the respondent is indicated to have taken. The dependent variable is the transactional distance. The result in table 2.0 shows that there is a statistical significance in transactional distance between groups.

The next logical test to get the type of distribution the transactional distance is. This is done using tests of normality.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Transactional Distance	.082	39	.200*	.986	39	.900

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Test 4.0: Test of Normality

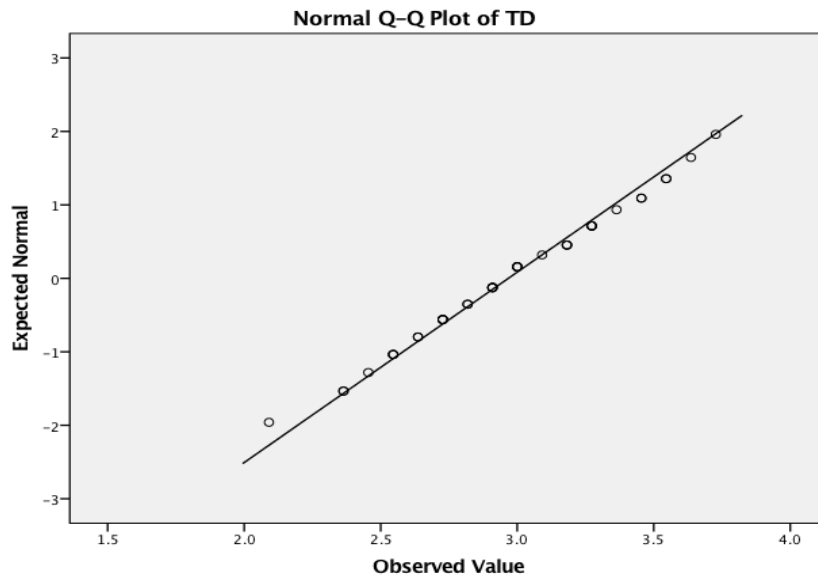


Fig 1: Graph showing a normal distribution

The Kolmogorov-Smirnov test is used for sample data of at least 2000 while the Shapiro-Wilk test is often used for small sample data as in this study. The latter has a sig value of greater than .005 which shows that the data is normal. The data plot also shows the distribution is normal. Since this is a normal distribution, it means a bivariate correlation analysis can be carried out.

			Transactional Distance	Previous Online Learning Experience
Spearman's rho	Transactional Distance	Correlation Coefficient	1.000	.125
		Sig. (2-tailed)	.	.450
		N	39	39
Previous Online Learning Experience	Previous Online Learning Experience	Correlation Coefficient	.125	1.000
		Sig. (2-tailed)	.450	.
		N	39	39

Table 5.0a: Bivariate Analysis – Spearman

		Transactional Distance	Previous Online Learning Experience
Transactional Distance	Pearson Correlation	1	.160
	Sig. (2-tailed)		.332
	N	39	39
Previous Online	Pearson Correlation	.160	1
Learning Experience	Sig. (2-tailed)	.332	
	N	39	39

Table 5.0b: Bivariate Analysis - Pearson

Both the Spearman's ρ (table 5.0a) and the Pearson's coefficient (table 5.0b) indicate a weak positive association between previous online learning experience and transactional distance for this population sample. The results address the initial research questions as thus;

(a) *Is there a relationship between learner experience and transactional distance in online learning?* For this population sample, there exists a very weak positive relationship

(b) *If any exists, what is the degree of the relationship?* The relationship is slightly more statistically significant when the scale is grouped into the three subconstructs learner-learner, learner-instructor and learner-content transactional distances than for the whole.

For these reasons, the initial hypothesis that learners with previous online learning experience will report less transactional distance is rejected.

Discussion

The apparent limitations of this study notwithstanding, the results are consistent with literature findings that the previous online learning experience does not have much impact on the overall transactional distance. In a study by Chen (2001a), a 23-item likert type questionnaire was developed to investigate what constitutes transactional distance. The variables explored were (a) the learners' skill level with the internet and (b) experience with distance education (c) peer interaction (d) support system. Much like the findings herein, even though the factor analysis on the individual variables revealed an acceptable statistical significance, the correlations were weakly positive. Chen (2001b) concluded that previous online education experience did not affect transactional distance, though, learner's internet skill had a negative correlation. Other studies however report a strong correlation of the learner-teacher and learner-interface transactional distances to the overall transactional distance. (Zhang, 2003; Paul et al, 2015).

Conclusion

Transactional distance is understood to be a psychological construct. This distance identified by the transactional distance theory exists in all educational events whether face to face or computer mediated (Chen, 2001a). In online environments, the distance is more cognizant because of the physical separation (Stein, Wanstreet & Calvin, 2009).

Summarily, the impetus for this study is summed up in this; "...the fact that nearly two decades after its development, most theorists are converging towards TDT, and moreover, their own individual theories carry elements of the TDT, appears to justify the need to explore this theory as a global one that can sustain future developments in distance education." (Gokool-Ramdoos, 2008, p. 12)

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Appendix I

Original Scale of Transactional Distance

ST = Transactional distance between students and teacher

- 1 The instructor generally answers the student's questions
- 2 The instructor pays no attention to me
- 3 I receive prompt feedback from the instructor on my academic performance
- 4 The instructor was helpful to me
- 5 The instructors are available to answer my questions
- 6 The instructor can be turned to when I need help in the course

SC = Transactional distance between student and content

- 7 The content of this course is of great interest to me
- 8 I don't know why I have to learn this
- 9 The examinations in this course have challenged me to do my best work
- 10 This course emphasized SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships
- 11 This course emphasized MAKING JUDGEMENTS about the value of information, arguments, or methods such as examining how others gathered and incorporated data and assessing the soundness of their conclusions
- 12 This course emphasized APPLYING theories and concepts to practical problems or in new situations

SS = Transactional distance between students and students

- 13 I learned a lot from observing the interactions among the students
- 14 The students in this online class challenged me to do my best work
- 15 I get along well with my classmates
- 16 I feel valued by the class members in this online class
- 17 My classmates in this online class value my ideas and opinions very highly
- 18 My classmates respect me in this online class
- 19 I am good at working with the other students in this online class
- 20 I feel a sense of kindred spirit with my fellow classmates
- 21 The class members can be turned to when I need help in the course
- 22 There are students I can turn to in this online class
- 23 The class members are supportive of my ability to make my own decisions

SI = Transactional distance between students and interface

- 24 It is difficult to pay attention to the instructor in the web environment
- 25 I have adequate access to the web resources I need
- 26 The fact that I am online does not inhibit my class participation
- 27 An efficient system is provided for students and instructor to exchange materials
- 28 I am comfortable using the computer
- 29 I hate using the web
- 30 It was easy for me to use the technology involved with this online class
- 31 The technology used in this course is difficult to learn and use

Appendix II

Revised Scale of Transactional Distance

(with one question omitted from the original scale)

TDST = Transactional distance between students and teacher

- Q1. I receive prompt feedback from the instructor on my academic performance
- Q2. The instructor was helpful to me
- Q3. The instructor can be turned to when I need help in the course

TDSC = Transactional distance between student and content

- Q4. This course emphasized SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships
- Q5. This course emphasized MAKING JUDGEMENTS about the value of information, arguments, or methods such as examining how others gathered and incorporated data and assessing the soundness of their conclusions
- Q6. This course emphasized APPLYING theories and concepts to practical problems or in new situations

TDSS = Transactional distance between students and students

- Q7. I get along well with my classmates
- Q8. I feel valued by the class members in this online class
- Q9. My classmates in this online class value my ideas and opinions very highly
- Q10. My classmates respect me in this online class
- Q11. The class members are supportive of my ability to make my own decisions

Appendix III

Survey Results from Revised Scale & Key

	POLE	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
P1	A	3	1	3	3	3	3	1	1	1	1	3
P2	A	2	2	4	2	4	2	2	2	2	2	2
P3	B	1	3	5	1	5	1	3	3	3	3	1
P4	C	2	3	1	2	4	2	4	4	4	4	2
P5	C	3	1	2	3	3	3	5	5	5	5	3
P6	A	4	2	3	4	2	4	4	4	4	4	4
P7	A	5	3	4	5	1	5	3	3	3	3	5
P8	B	4	4	5	4	2	4	2	2	2	2	4
P9	C	3	5	4	3	3	3	1	1	1	1	3
P10	A	2	4	3	2	4	2	2	2	2	2	2
P11	A	1	3	2	1	5	1	3	3	3	3	1
P12	A	2	2	1	2	1	5	1	4	4	4	2
P13	B	3	1	2	3	2	4	2	5	5	5	3
P14	C	4	2	3	4	3	3	3	4	4	4	4
P15	B	5	3	4	5	4	2	4	3	3	3	5
P16	A	4	4	5	4	5	1	5	1	1	2	4
P17	B	3	5	1	3	4	2	4	2	2	1	3
P18	C	2	4	2	2	3	3	3	3	3	2	2
P19	B	3	3	3	1	5	5	3	2	4	3	1
P20	A	4	2	4	2	4	4	4	1	5	4	2
P21	C	5	1	5	3	3	3	5	2	4	5	3
P22	B	4	2	4	2	1	2	4	3	3	4	4
P23	C	3	3	3	3	2	1	3	4	2	3	5
P24	A	2	4	2	4	3	2	2	5	1	1	4
P25	B	1	5	1	5	1	3	5	2	2	2	3
P26	C	2	4	2	4	2	1	4	3	3	3	2
P27	B	3	3	3	3	3	2	3	4	2	1	1
P28	A	4	2	4	2	4	3	2	5	3	2	2
P29	C	5	1	5	1	5	1	1	4	4	3	3
P30	B	4	2	4	2	4	2	2	3	5	4	4
P31	C	3	3	3	3	3	3	3	2	4	5	5
P32	A	2	4	2	4	2	4	4	1	3	4	4
P33	B	1	5	1	5	1	5	1	4	2	3	3
P34	B	2	4	2	4	2	4	2	5	1	2	4
P35	B	3	3	3	3	3	3	3	4	2	1	3
P36	B	4	2	4	2	4	2	4	3	3	2	2
P37	B	5	1	5	1	5	1	5	1	4	3	1
P38	B	4	2	4	2	4	2	4	2	5	4	2
P39	A	3	3	3	3	3	3	3	3	4	5	3

Key

P1 – P39: Participant Responses

Q1-Q11: Participant Questions

POLE : Previous Online Learning Experience

Numerical Responses:

1 – Strongly Disagree

2 - Disagree

3 – Neutral

4 – Agree

5 – Strongly Agree

Alphabetical Responses:

A – 1 to 3 Courses

B – 4 to 7 Courses

C – 8+ Courses

Appendix IV

Permission to Use Revised Scale from Author

Research you received



William Swart

sent you the full-text you requested

4d ago

I hope you find it interesting and useful. Best, Bill

Revisiting Zhang's scale of transactional distance: refinement and validation using structural equation modeling

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