Examining the Effects of Ethnicity on Transactional Distance in an Online Distance Learning Course

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EXAMINING THE EFFECTS OF ETHNICITY ON TRANSACTIONAL DISTANCE IN AN ONLINE DISTANCE LEARNING COURSE

DISSERTATION

A dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy
College of Education, Department of Early Childhood, Special Education, and Rehabilitation Counseling

By
Benson Kinyanjui

Lexington, Kentucky

Director: Dr. Malachy Bishop, Professor, Rehabilitation Counseling
Lexington, Kentucky
2016

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ABSTRACT OF DISSERTATION

EXAMINING THE EFFECTS OF ETHNICITY ON TRANSACTIONAL DISTANCE IN AN ONLINE DISTANCE LEARNING COURSE

Distance learning (DL), commonly referred to as online learning has grown exponentially in the past two decades with at least 85% of institutions of higher education in the US offering DL courses by 2013, serving more than 7 million students in the US. As the number of students taking online courses has increased, the number of ethnic minority students, specifically African Americans enrolled in online courses has also significantly increased. Despite this demonstrated interest in higher education, African Americans have had poorer learning outcomes and higher dropout rates than Caucasians in both online and face-to-face programs. According to Michael Moore’s transactional distance theory (TDT), the physical separation of the teacher from the learner creates a transactional distance which is defined as a communication gap or a psychological space that potentially causes misunderstandings between the instructors and the learner. The theory infers that a high level of transactional distance in a DL course leads to low levels of learner satisfaction with the course and consequently to poor learning outcomes. This dissertation utilized TDT as a theoretical framework to investigate whether ethnicity has a direct effect on transactional distance in online courses. The study did not find any relationship between ethnicity and transactional distance. Recommendations are made for additional research into this subject incorporating larger, more ethnically diverse study samples.

Keywords: transactional distance, TDT, ethnicity, distance learning, ethnic minorities

Benson Kinyanjui
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December 19, 2016
Date
EXAMINING THE EFFECTS OF ETHNICITY ON TRANSACTIONAL DISTANCE
IN AN ONLINE DISTANCE LEARNING COURSE

By

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December 19, 2016
Date
DEDICATION

Dedicated to the memory of my mother, Miriam, who saw in me as a child what I was too naïve to see, and to my father, Benson, my hero, inspiration, and enduring role model for all. Your love, guidance, and prayers made me who I am today. Thank you!

To my wife, Maggie, for putting up with me and supporting me along this journey and to Claire and Joseph whose belief in me inspires me to keep reaching higher; and to my brothers, sisters, and friends for your support and encouragement
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Chapter 1: Introduction

Distance learning (DL) has been defined as education that takes place where the teacher and the student are separated by time and space. In other words, distance learning refers to instruction provided remotely and in which lectures, assignments, and examinations are conveyed by written correspondence or through electronic means (Keegan, 1995) such as radio, television, the Internet, or other computer based media. Other definitions of DL include various scenarios such as when an instructor teaching in a traditional classroom is video recorded and the lesson is transmitted to other students in other locations live via videoconferencing or later in recorded format such as video tape or DVD (Greenberg, 1998); or when parts of the course are delivered by email or social media. An alternative simpler definition of DL is, education that is not 100 percent provided in a face-to-face setting where students and instructors interact in real time in a physical environment (Caruth & Caruth, 2013; Todhunter, 2013).

Commonly referred to as online learning, DL has grown exponentially in the past two decades. According to Allen and Seaman of the Babson Survey Research Group, who have been conducting annual surveys on DL since 2001, at least 85% of institutions of higher education in the US were offering DL courses by 2013 having increased from about 49% in 2002 (Allen & Seaman, 2014). Correspondingly, the number of students taking online courses increased at an equally fast rate from 9.6% in 2002 to 33.5% in 2012, representing more than 7 million students in the US (Allen & Seaman). DL is particularly appealing to adult learners who typically would have difficulties attending
traditional face-to-face programs due to other life demands (Belcher, 1997; Cain, Marrara, Pitre, & Amour, 2003; Clinesfelter & Aslanian, 2014).

As the overall number of students taking online courses has increased, the number of African American students enrolled in online courses has increased at an equal or higher rate. According to a comprehensive study by Clinesfelter and Aslanian (2014), 16% of all students taking undergraduate level online courses are African Americans. The percentage taking graduate courses is slightly lower at 12%. These numbers reflect an increase in the overall number of African Americans enrolling in college, especially in post baccalaureate programs, a trend that has prevailed in the past 30 years; with each year since 1983 evidencing a higher enrollment rate than the year before (Aud et al., 2012). That steady increase in enrollment has been particularly evident among African American females. According to a 2011 US Census Bureau survey, approximately 10% of African American females were enrolled in college compared to only 7% of Caucasian females. In fact, the overall percentage of Caucasian college students, though still the majority, has been decreasing while the number of minorities, specifically African Americans, has increased (Snyder, 2011).

Based on the findings of several studies on that subject (Du, Ge, & Xu, 2015; Williams, Goldstein, & Goldstein, 2002) African Americans prefer DL courses over traditional face-to-face courses and typically enroll at higher percentages in those courses than Caucasians. Among the reasons given for this preference is the need to maintain employment while attending school. Female African American single parents who have to take care of their children as they attend college are particularly partial to online asynchronous courses (Black Students and Distance Education, 2004).
Research on DL, Transactional Distance Theory, and Ethnicity

As will be seen in the literature reviewed and discussed in Chapter 2 of this dissertation, there is a relationship between the ethnicity of the learner and performance in DL courses. Students from the same ethnicity as the origin of the course tend to have a better understanding of the requirements of the course than those from other ethnicities (Chase & Macfadyen, 2002; Lemone, 2004; Lim, 2004). Arab, Chinese, and Japanese students taking online courses from American and Canadian universities have been found to experience difficulties with various aspects of the courses including interacting with the instructor, interacting with other students, and participating in online discussions (Al-Harthi, 2010; Uzuner, 2009; Zhang & Kenny, 2010) and chat rooms. To better understand these difficulties resulting from cultural differences in a manner that is measurable, the difficulties can be assumed to be a function of transactional distance.

Based on that assertion, the hypothesis in this dissertation study was that ethnicity affects transactional distance in DL courses. It was further hypothesized that African American and other minority students taking DL courses typically perceive greater transactional distance primarily due to decreased interaction with the instructor and with fellow students in the course, and are not comfortable with the course material and instructional media. Finally, it was hypothesized that decreased interaction, otherwise referred to as transactional distance, would result in low levels of satisfaction with the course, poor learning outcomes, and consequently higher rates of withdrawal from the DL course and/or program.
Statement of the Problem

Paradoxically, even with the demonstrated, clear interest in DL in the context of higher education by African Americans, they have poorer learning outcomes and higher dropout rates than Caucasians in both online and face-to-face programs ("Black students and distance education" 2014; Rankin, 2013; Richardson, 2015). Currently, the college graduation rate for African Americans in the US is 42 percent, which is significantly lower than that of Caucasian students, currently at 65 percent ("Black Student", 2015). This low rate is evident in DL and traditional education programs in all types of institutions of higher learning across the nation, including small liberal arts colleges (Rankin, 2013) and in Historically Black Colleges and Universities (HBCU). According to "Black Student", data from nearly half of the HBCUs in the nation indicated that at least two thirds of all African Americans entering HBCUs do not complete their academic programs.

Although numerous studies have been carried out on graduation rate gaps of African Americans and on their relatively inferior performance in DL courses ("Black Student", 2015; McCoy, 2012; Rankin, 2013; Richardson, 2015; Patterson & McFadden, 2009) none has come up with conclusive findings explaining the disparities. In an attempt to identify causes for the disparate performance between whites and ethnic minority students in DL, Richardson (2010; 2011; 2012; 2015) alone and with others (Richardson, Alden Rivers, & Whitelock, 2015) conducted at least five studies from which he ruled out several hypothesized reasons for the attainment gaps. The studies did not, however, reveal any specific causes for the differential performance between white and ethnic minority students.
Purpose of the Study

According to Michael Moore’s transactional distance theory (TDT), the physical separation of the teacher from the learner creates a ‘transactional distance’ (TD) which he described as “a communication gap, a psychological space of potential misunderstandings between the instructors and the learners that has to be bridged by special teaching techniques” (Moore & Kearsley, 2005, p. 224). Moore perceived that due to the unique nature of DL, in particular the physical separation of teachers and students, that distance needed to be understood and defined pedagogically. The theory infers that high levels of TD in a DL course leads to low levels of learner satisfaction with the course and consequently in poor learning outcomes; a fact that has been supported by many studies (Bray, 2008; Bolliger, 2012; Pike, 1993; Sahin, 2007).

There is very little research on the online experiences of African American students taking online courses. However, from the few that have been done; some of which are discussed in greater detail in Chapter 2 of this proposal, African American students generally do not interact as much with their instructors and fellow students in online courses as Caucasian students do. Levels of interaction, in the context of TDT, increase or decrease the amount of transactional distance (potential misunderstanding) in the course and somehow dictate the learning outcome. The general question therefore is whether African American students experience higher levels of separation (transactional distance) between them and the instructor, and between them and other students in DL courses, between them and the course material, and between them and the course delivery technology.
The purpose of this study, therefore, was to investigate whether ethnicity has a direct effect on TD in DL courses. Specifically, the study aimed to determine whether African Americans experience greater TD in online courses. If this is the case, this could potentially explain the achievement gap relative to opportunity and high attrition rates in DL.

This study findings add new information to the body of knowledge in education in general and distance learning in particular, by identifying the underlying causes of the widely documented poor learning outcomes and course completion rates among African American DL students in comparison with Caucasian students. That information could potentially be used to inform practice and policy in DL particularly in identifying best practices for application in instructional design and implementation, to ensure that the unique characteristics of African American DL students are understood and addressed at the teaching/learning level (Boyette, 2008; Flowers et al., 2012).

**Research Questions**

Based on the nature of the problem and guided by the literature reviewed, the following questions guided the study:

1. *To what extent does ethnicity affect transactional distance in students taking online courses?*

2. *What types of transactional distance are most affected by ethnicity?*

3. *Which ethnic minority group evidences most transactional distance?*

4. *What other student demographics significantly correlate with transactional distance?*

**Specific Hypotheses**

The research hypotheses (Ha) are:
Ha1: Being an ethnic minority has a significant effect on transactional distance in online courses in the US.

Ha2: Learner-Teacher transactional distance is most significantly affected by ethnicity.

Ha3: African American or Black students evidence the most transactional distance.

Ha4: Among minority students, males experience higher levels of transactional distance than females.

The hypotheses in this study were based on literature, cited above, which indicates that cross-cultural differences affect participation (and ultimately outcomes) in online courses. The study intended to evaluate these hypotheses by testing the assumption that there is no relationship between ethnicity and transactional distance. Accordingly, the null hypotheses (Ho) were:

Ho1: Ethnicity has no significant effect on TD.

Ho2: There is no difference in the effects of ethnicity in learner-teacher TD compared with other types of TD.

Ho3: There is no significant difference in TD based on African American or Black ethnicity.

Ho4: Gender among minority students has no significant effect on TD in online courses

According to TDT, interaction between students and instructors is expected to decrease LTLD and interaction between students and their peers will result in decreased LLTD (Moore, 1993; Shearer, 2010). From the literature reviewed, African American students do not participate in online discussions and other interactive activities in DL as much as Caucasian students. That decreased level of interaction will potentially increase TD and may negatively impact their learning (Chase, Macfadyen, & Reeder, 2002; Chen,
Under that assumption, African American students will experience a higher level of TD than Caucasian students.

**Theoretical Framework**

As many scholars have stated (Garrison, 2000; Gokool-Ramdoo, 2008; Giossos et al., 2009; McIsaac & Blocher, 1998; Moore, 1991; Saba, 2003), research that is not grounded in theory is not sound research as it tends to lack validity and applicability in subsequent studies. Yet, partly due to a lack of consensus on a DL theory, especially in earlier days of distance learning, many studies on DL were not based on theory. In their review of DL research, Tallent-Runnels et al. (2006) reported one of their significant findings as inconsistency in the terminology used in the studies, signifying a lack of theoretical frameworks in many of the studies reviewed. They reported finding that there was “no comprehensive theory or model that informed studies of online instruction” (p. 115).

**Transactional Distance Theory**

Moore’s (1972) TDT was preferred for this study as the theoretical framework due to its exclusive foundation in distance learning and its applicability in online education in general (Bischoff, Bisconer, Kooker, & Woods, 1996; Stein, Wanstreet, Calvin, Overtoom, & Wheaton, 2005) and its focus on learner interactions in particular. The theory is premised on the notion that “there is some transactional distance in every educational event” (p. 209).

According to TDT, the physical separation of the teacher from the learner creates a ‘transactional distance’ which Moore described as “a communication gap, a
psychological space of potential misunderstandings between the instructors and the learners that has to be bridged by special teaching techniques” (Moore & Kearsley, 2005, p. 224). Moore perceived that due to the unique nature of DL, in particular the physical separation of teachers and students, that distance needed to be understood and defined pedagogically. In several of his subsequent writings, Moore reiterated that transactional distance is a pedagogical, rather than a geographical distance (Moore 1991; 1997; Moore & Kearsley, 1996; 2005). Essentially, that psychological and communication space between the two entities can exist even in face-to-face courses. The physical separation only widens that space.

Moore presented that in the context of distance education, learners and teachers are separated not only geographically, but also by a distance associated with understanding and perception of each other, comprehension of the materials being presented, and often a lack of familiarity with the mode of delivery. That distance, which he alternatively defined as a “psychological and communications space” (Moore, 1991, p. 32) and “the gap of understanding and communication between teachers and learners” (Moore, 1973, p. 12), is what is known as transactional distance, which according to Moore negatively impacted the learning process. In order for effective learning to occur, that gap (distance), which could be of a geographical, cognitive or psychological nature, must be bridged “through distinctive procedures in instructional design and the facilitation of interaction” (Moore & Kearsley, 2005, p. 209).

TDT’s Theoretical Constructs

In further elaboration of his theory, Moore described transactional distance as a function of the interplay between three variables, namely, dialogue, structure, and
autonomy (Moore, 1972). Dialogue in that context referred to the communication and
general interaction between the teacher and student which transcends simple two-way
communication. Structure was described simply as what defined the flexibility and
rigidity in a course, and autonomy was defined as the level of control and self-reliance a
learner had. The variables are further clarified below.

**Dialogue.** The first variable, dialogue, typically describes the exchange of words,
actions, and ideas between the teacher and the learner (Moore, 1997). In the context of
transactional distance, dialogue refers to the positive interaction that occurs between the
instructor and the students in the teaching and learning process. Although dialogue is
primarily initiated by the instructor, it is a two-way process with both students and the
instructor being responsible for active listening and contributing; each adding to the
other’s contribution. In dialogue, each one involved is a respected and respectful
contributor or listener (Reyes, 2013), and is equally responsible for maintaining the
dialogue. According to Moore’s (1993) definition, dialogue in that context is purposeful
and constructive and is valued by all parties involved. Where the level of dialogue is
high, transactional distance is decreased.

Moore perceived dialogue as occurring at three primary points, namely, between
the student and teacher (learner-instructor), between the students (learner-learner), and
between the student and the course materials (learner-content). Invariably, dialogue is a
positive element and one that is crucial to teaching and learning because without it the
process would have to depend on the course structure which as mentioned earlier, can be
significantly restrictive. Therefore, the lower the structure the greater the need for
dialogue (communication) between the teacher and the learner (Moore & Kearsley,
2005). It is important to note that dialogue in this context is not synonymous with conversation or other forms of verbal interaction (though those too are subsets of dialogue). Moore (2013) points out that unlike conversation, which he describes as an act of geniality; dialogue is an act of collaboration in a synergistic, constructive manner. Notably, although dialogue is normally associated with the conversation aspect of communication, it involves a lot more than words in this context, as it encompasses non-verbal communication that typically occurs in a traditional face-to-face classroom environment (Moore & Kearsley, 2005). Therefore, even though the verbal or written messages between the teacher and student are the same, the impact on different recipients could vary considerably.

**Structure.** Paraphrasing Moore’s (1997) definition of structure, the second variable in his theory, Kang and Gyorke (2008) described it as “the extent to which a course’s elements (learning objectives, content themes, presentation strategies, evaluation activities) change to meet the specific needs of the individual learner” (p. 204). Alternatively defined, structure entails the rigidity or flexibility in a course (Moore, 1991). A course with high structure is therefore highly rigid and may not accommodate the diversity in all learners. In teaching and learning, structure is generally perceived as a positive variable in that it upholds standards and ensures order in the presentation of learning matter (Farquhar, 2013). Indeed the lack of structure, especially in the presentation of materials to beginning (distant) learners can be detrimental to learning and they may not know where to begin or how to direct themselves through the material. On the other hand, high structure can be a negative factor when it constraints the learner, limiting his or her freedom to choose, explore, or enquire outside a prescribed course or
when it leaves no room for the learner or teacher to deviate (Benson & Samarawickrema, 2009; Farquhar, 2013). In that case the maintenance of structure may inadvertently retard rather than enhance learning.

There are however, some rare situations such as in teaching scientific, technical, or mechanical subject matter, where high structure in the course is not only beneficial but also necessary (Flowers, White, & Raynor, 2012; Hallyburton & Lunsford, 2013). In the context of transactional distance, structure is perceived as decreasing the distance, as in the case of new learners who need guidance on what to learn, when to learn, and how to learn. However, among independent learners, particularly those in low consensus fields, structure is perceived to increase transactional distance as it decreases the learner’s autonomy.

**Autonomy.** The third variable in transactional distance is learner autonomy, which refers to a learner’s control over learning activities and processes (Moore, 1973; 2013). This is the only variable among the three that cannot be directly manipulated by the teacher in the design or execution of the course. It is also the most studied variable (Chen & Willits, 1999; Huang, 2002), especially in investigating learning outcomes among adult learners. Further defined, autonomy in this context refers to the learner’s central role in the teaching and learning process. Instead of the teacher determining goals, learning experiences, and evaluation outcomes, essentially directing the student on what to learn and when and where to learn it, the autonomous learner self directs through the course material with minimal dialogue or prompting from the teacher and with little emotional support from the teacher or other students (Farquhar, 2013; Reyes, 2013).
Notably, as the transactional distance increases, so does the requirement for autonomy and self-regulation skills (Moore, 1993).

Highly autonomous learners are capable of meaningful dialogue at any level due to their high self-regulating skills. Additionally, autonomous learners are adept not only at self-directing and finding resources, but also at engaging with their peers in a mutually supportive manner (Huang, 2002). Conceivably, they are able to manage courses with greater transactional distance, which is typically not the case with low autonomy learners. With that in mind, one can argue that autonomy, in particular self-direction and self-efficacy, are the primary determinants of success in DL.

**Interrelationship Between the Variables**

Moore’s theory posits that dialogue is developed by teachers and their students, and is necessary for the formation of structure, which in turn describes the rigidity or flexibility of the program, including its ability to serve individual students’ needs. Specifically, TDT takes into consideration the “personalities of teacher and learner” (Moore, 1972, p. 24) as variables that potentially affect TD. Central to the theory was the responsibility of the learner, (which he described as learner autonomy), to determine the contents, goals, and evaluation decisions of the learning program.

In this framework, each educational program, each institution, each instruction delivery mode, and most certainly each instructor is different from all others as the effects of those entities on the degree of dialogue, structure, and learner autonomy are different.

According to Moore (1997), a course that is highly rigid (structured) decreases the amount of autonomy on the part of the learner in that he or she has to adhere to the
structure. In other words, a course with strict and narrow requirements on how and when course activities are to be executed does not allow the learner the freedom to ‘think outside the box.’ Such a course also limits the amount and quality of dialogue between the teacher and the learner. Reduced dialogue (communication/interaction) results in greater TD (Moore, 1997). In the same context, if structure is excessively decreased, the TD will significantly increase as the learner could feel disoriented and unclear about the course expectations. Moore, however, does not clarify the threshold at which structure can be detrimental (Kassandrinou, Angelaki, & Mavroidis, 2014). The interplay between the three variables can be summed up thus:

- As structure increases, dialogue decreases and TD increases
- As dialogue increases, structure decreases and TD decreases
- As autonomy increases, structure decreases and so does TD
- As structure decreases, autonomy increases and TD decreases

As originally introduced by Moore, transactional distance was considered a function of those three variables (dialogue, structure, and autonomy), with dialogue playing a more significant role in determining the degree of transactional distance. At that point, the term ‘dialogue’ was limited to the interaction between the student and the teacher. With the passage of time, and upon review by other DL scholars, including Chen and Willits (1999) and Benson and Samawickrema (2009), the definition of dialogue was expanded to include the student’s interaction with other students taking the same course. Likewise, the definition of structure has evolved from simply describing the composition or construction of the course to including some elements of learner-content interaction.
and learner-interface interaction. A highly structured course (i.e. one with a large variety of pedagogical activities) results in high levels of interaction on the part of the learner.

It must be noted that Moore originated the transactional distance concept in 1972, when he recognized the need to take a critical look at the field of distance education as it was then, with the aim of defining it and articulating a governing theory. His initial goal was to differentiate, define, and describe the various components of teaching by distance learning (Moore, 1972), highlighting the important factors basic to its operation. Moore’s ideas and findings were however, not articulated into a formal theory until 1980, when he formulated and introduced them as the theory of transactional distance.

Since then, the theory has been reviewed and critiqued by several scholars within and without the field of distance learning. Many notable studies in DL that have examined TD by either comparing it with other theories (Kang & Gyorke, 2008); focusing on application of course design in reducing TD (Stein et al., 2005); or studying its applicability as a measure of teacher and learner satisfaction (Ekwunife-Orakwue, & Tian-Lih, 2014; Mbwesa, 2014; Wengrowicz, & Offir, 2013) have found it to be current and relevant in DL.

TDT has also been empirically examined for its application in various course modalities including face-to-face, online, blended and open formats (Chen, 2001; Flowers, White, & Raynor, 2012; Huang, Chandra, DePaolo, & Simmons, 2015; Kassandrinou, Angelaki, & Mavroidis, 2014; Rabinowich, 2009) and the validity of its claims (Goel, Zhang, & Templeton, 2012; Gorsky, & Caspi, 2005; Shearer, Gregg, Joo, & Graham, 2014) in predicting outcomes (Shin, 2003) and found to be consistent and reliable. There is however, little available research on the influence of ethnicity or
culture on TD (Al-Harthi, 2010). Also, whereas many studies have addressed the implications of cross-cultural differences in DL (Hannon, & D’Neto, 2007; Kim, & Bonk, 2002; Lim, 2004; Shattuck, 2005; Tapanes, Smith, & Ayers, 2006; Uzuner, 2009; Wang, 2007), no study has heretofore specifically employed TDT as its theoretical basis.

TDT provides the researcher with the opportunity to explore how the learner relates with the course based on his or her interaction with the primary entities in the course. Essentially, there are four types of interaction namely, interaction with the instructor (Learner-Teacher), interaction with other students in the course (Learner-Learner), interaction with the course material (Learner-Content), and interaction with the technology delivering the course (Learner-Interface).

**Learner-Teacher Interaction**

This interaction refers to the communication between the student and the course’s instructor, and other people who are directly involved in the delivery or facilitation of the course. The interaction is typically a two-way process (Moore & Kearsley, 1996) where both parties are engaged in mutual, respectful ‘dialogue’ which in this case does not have to be verbal in nature. The instructor contributes to the dialogue by designing and delivering a course with the goal of stimulating the student’s interest and motivation towards learning. The instructor also conducts evaluations and provides feedback to the student as well as support in the form of encouragement and answering the student’s questions. The student in turn, contributes to the dialogue by responding to the course’s activities including assignments, exams and projects; and by asking questions. Learner-teacher interaction is crucial to learning and is particularly important to the students’ application of knowledge (Rovai, 2002).
Learner-Learner Interaction

This interaction takes on many forms but is also predominantly two-way as in one student communicating with another, and also multidirectional as in group discussions whereby one student communicates with the rest of the group or class. This interaction, which can take place with or without an instructor, is equally critical to learning, especially in DL settings, because through it, students are able to exchange concepts and ideas pertaining to the course. Through this interaction students get to learn from the diversity of the class, potentially introducing them to other cultures and worldviews. Learner-learner interaction which describes the students’ ease in communicating with their peers through class discussions and mutually asking for, and providing help on course related issues, is effectively measured through the frequency of such interactions.

Learner-Content Interaction

This is the one-way interaction between the student and the subject matter. It includes breaking down the information into manageable pieces and assimilating it. Through this interaction, the learner constructs knowledge by adding new information to what is already learned in other words it involves the student’s ability to transfer or acquire information from lectures, texts, and audio-visual sources through an internal didactic conversation (Kuo, 2014) which includes talking to oneself about the information, concepts, and ideas integral to the subject being learned.

Learner-Interface Interaction

This pertains to the student’s interaction with the course delivery technology including his or her level of comfort with computers, learning management systems, the internet, and software programs that may be involved such as PowerPoint and video
conferencing programs. Although most courses only require the student to be able to operate a computer to access course material through a learning management system (LMS) such as Blackboard, this type of interaction is very important because some courses might require students to make video presentations, make a podcast, or log into a video conferencing class session. Deficits in this type of transaction signify transactional distance, which is detrimental to learning in DL (Huang, 2002).

Huang, (2002) examined student perceptions in an online course using TDT to identify the various variables of interaction (dialogue), structure and autonomy. Focusing on interactions, precisely the three types of interaction originally proposed by Moore: learner-teacher, learner-learner, and learner-content, Huang convincingly argued for the introduction of a fourth type of interaction, namely, learner-interface. Citing earlier studies by Moore (1991) and Moore and Kearsley (1996), which had highlighted the importance of the content delivery system, otherwise known as interface (or learning management system), Huang presented that as, indicated by his study, interface was “highly correlated with the three types of interaction” (p. 416). Henceforth, learner-interface interaction has been considered as one of the types of interaction in TDT. Although he is generally credited with its inception, Huang was not the originator of the concept of learner interface interaction. Earlier, Hillman, Willis, and Gunawardena (1994) had studied learner interface interaction as one of the models in DL, but the concept does not appear to have been immediately incorporated into the TD context.

These four interactions collectively describe the level of the student’s engagement in the course. It goes without saying that the degree of engagement dictates outcomes in
any learning situation, but most particularly in distance learning (Keeler, 2006; Kuo et al., 2013; 2014) where there is little external influence or control.

**Transactional Distance**

According to TD theory, there are four types of transactional distance directly associated with the four types of interaction described above. Those are the transactional distance between the student and the instructor (learner-instructor transactional distance – LITD), between the student and other students (learner-learner transactional distance – LLTD), between the learner and the course material (learner-content transactional distance – LCTD), and between the learner and the course delivery system (learner-interface transactional distance – LITD). Transactional distance theory therefore provides a solid platform on which to identify and measure, for example, African American students’ interactions with the course instructor including the nature and frequency of the interactions and compare it with those of Caucasian students. Likewise, the students’ level of comfort with each other, with the material being taught, including lectures, texts, and assigned class activities, and with the technology involved in teaching the course can be measured.

**Significance of the Study**

The current global popularity of online learning has increased awareness of and interest in ethnicity and culture as DL providers have considered reaching students from diverse cultural backgrounds (Wang, 2007). Despite that, there is little to no literature on how culture and ethnicity influence online education (Lal, 2003; Wang). According to Boyette (2008) students of color are grossly underrepresented in institutions of higher learning in the US and also in relevant literature. Apparently, it is assumed that the
majority culture is normative and that it is uniformly applicable to the entire US population (Aiken, Cervero, & Johnson-Bailey, 2001; Shore, 1997) including African Americans who share the same first language with the majority. This study will focus on the interactions of African American students through the conceptual framework of TDT with the goal of gaining a comprehensive perspective on how they perceive and approach the online learning environment, in particular, the areas where they perceive and evidence the greatest transactional distance in relation to White students. The study is significant because to the best knowledge of the author, no other study has utilized TDT in purposely examining ethnicity-based differences in DL outcomes.

**Definition of Terms**

The following terms are used in this study:

*Adult Learners:* Non-traditional student. Typically students age 25 or older but more specifically independent students including those with dependents, with full-time employment, those returning to school after long periods of employment or family responsibilities.

*African American:* An American whose ancestry is in the Black racial groups of Africa.

*Asian:* A person with origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent.

*Asynchronous:* Not occurring at the same time. Describes courses that a student can take on his or her own schedule, that do not require coordination of time with the instructor or other students taking the course.
**Black**: A person with origins in any of the Black races of the world typically from Africa, the Caribbean, or South America including first generation black people and those with no historical roots in the US.

**Blackboard**: In this context, a popular learning management system (LMS) used to deliver online courses.

**Computer Anxiety**: Individual fear or apprehension of using computers.

**Computer Based Learning**: Learning that is dependent on a computer, either online (connected to the Internet) or offline.

**Culture**: A way of life including behaviors, beliefs and customs associated with a particular group. Norms and practices of a particular group that are learned and shared and that guide the group’s thinking, decisions, and actions.

**DL (Distance Learning/Distance Education)**: Education conducted in settings where the instructor and student are separated by time and place. Online learning/education has become the common term for distance education.

**Ethnicity**: The nature or state of belonging to a social group that shares a common culture, religion, language. Refers to large groups of people classified according to their common traits or customs.

**Hispanic**: A person with origins in Spain, Mexico, Puerto Rico, Cuba, or Central and South America.

**Minority/Minorities**: People living in the US who do not have European ancestry or do not identify as Caucasian or White.
Online Course: A course of instruction which relies primarily on the Internet and personal computers as a means of content delivery and student/instructor interaction. Online courses are also referred to as web-based courses.

Online Learning: Distance learning that is delivered and accessed via the Internet.

Synchronous: Occurring at the same time. Refers to classes which require the teacher and student to be at the same place at the same time such as face-to-face classes, or that require the student to log into the internet at specified time to “attend class.”

Web-based Course: Same as online course.

Organization of the Study

This dissertation study is presented in five chapters. Chapter 1 has presented the general introduction, statement of the problem, purpose of study, research questions, theoretical framework, an introduction of transactional distance theory including a discussion of its basic principles, and its relevance to DL research in general; and this study in particular, significance of the study, definition of terms, and organization of the study. Chapter 2 presents an introduction, organization of the chapter, a comprehensive review of the relevant literature including an overview of distance learning, types of distance learning, African Americans in higher education and in distance learning, ethnicity and culture in distance learning, and a summary of the chapter. The methodology used to collect data for the study is presented in chapter 3 after an introduction to the chapter. That chapter also includes descriptions of the survey instrument, population and sample, data collection method and data analysis procedures. Chapter 4 presents the results of the study and the specific data analysis procedures used to obtain them. In addition, the chapter reports on the response rate, demographic
information, and concludes with a summary of the findings. Chapter 5 starts with an
overall summary of the study and follows with comprehensive discussion and conclusion.
Limitations and recommendations for further research are presented at the end of the
chapter.
Chapter 2 Review of Related Literature

Introduction

The purpose of this study was to investigate whether African American students experience greater TD while taking DL courses than Caucasian students. Based on transactional distance theory’s assertion that TD affects learning outcomes, and the studies that have supported that assertion by documenting a relationship between perceived TD and learner satisfaction, this study was intended to help determine whether TD experienced by African American students can help explain the phenomenon of relatively inferior performance and relatively high attrition rates among that population.

A review of literature on DL reveals that the majority of research conducted has concentrated on four primary areas of DL namely, course environment, learners’ outcomes, learners’ characteristics, and institutional and administrative factors (Tallent-Runnels et al., 2006). Studies of DL course environment have addressed issues pertaining to hybrid or blended courses, synchronous versus asynchronous presentation, learning management systems, and the internet (web) environment in general. Albeit with variations, those studies have generally found that asynchronous courses where all course materials are posted online continue to dominate and define online education.

Studies on learner outcomes have primarily dwelt on comparing face-to-face with online courses and have approached the issue from all angles particularly from the learners’ and instructors’ perspectives. The eternal debate in that arena has been about whether traditional, face-to-face format is superior to online format in terms of learning outcomes; whether online format is superior, and whether the two formats are the same in terms of delivering instruction. An unwavering proponent of this stance was Russell
(1999), who came up with the controversial No Significant Difference (NSD) phenomenon which maintains that the two modalities are the same in terms of outcomes. Russell, however, was met with substantial opposition from other scholars (Clark, 1994; Phipps & Merisotis, 1999; Ramage, 2002) and no consensus has yet been reached on which approach is clearly superior in terms of learner outcomes. However, from their comprehensive study, Tallent-Runnels et al. (2006) found the blended approach to be more effective than the other two.

Studies on learner characteristics have concerned themselves with a variety of issues including those pertaining to learner demographics, self-efficacy, technological skills and perception. A general, significant finding from those studies has been that most online students are nontraditional and Caucasian, and that students with past experiences with computers tended to do better and were more satisfied with online courses. Research on institutional and administrative issues generally found out that many institutions offering DL courses do not have written policies, guidelines, or technical support for faculty (Tallent-Runnels et al, 2006).

In addition to the above mentioned areas of common interest, a few researchers have focused on DL and its application in different pedagogical settings, and in the delivery of instruction in different professional fields such as business, health, science, technology and adult education. A significant observation is that little if any research has been done specifically on non-Caucasian, in particular African Americans’, experiences with online education, despite their increased participation in DL and the statement by many US institutions that DL is an important, long term strategy (Allen & Seaman, 2007). Most notably, Allen and Seaman (2007), who have been conducting
comprehensive annual studies on DL through the Sloan Consortium, an association of organizations committed to quality online education, have not included specifics on African Americans in their annual reports.

**Organization of the Chapter**

This literature review incorporates all topics perceived to be relevant to the study, loosely classified into three sections with the understanding that all topics are closely interrelated. Starting with a brief history of DL, the first section of the review discusses the evolution of DL into its current form and concludes with the current trends including the major issues and prevailing questions pertaining to its future. The next section comprises issues pertaining to African Americans including performance disparities and attrition; their perceptions, experiences, and preferences in DL; current research studies on African Americans in DL, and a discussion of the findings of those studies and their implications for that population. The chapter concludes with an introduction to TDT, a discussion of its basic principles, and its relevance to DL research in general, and this study in particular.

**Overview of Distance Learning**

**Definition**

The dictionary defines distance learning as “education that takes place via electronic media linking instructors and students who are not together in a classroom” (Merriam Webster, 2015). Broadly defined, distance learning refers to instruction provided remotely where the instructor and the student are at different locations (Anderson & Dron, 2011) and in which lectures, assignments, and exams are conveyed by correspondence or through electronic means such as the Internet. Other definitions
include various scenarios such as when an instructor teaching in a traditional classroom is video recorded and the lesson is transmitted to other students in other campuses or remote locations live via videoconferencing or later in recorded format; or when the course is delivered by email or social media. There being so many definitions and terms pertaining to distance learning mainly based on its multiple delivery modes (O’Lawrence, 2007), it is probably easier to define it by what it is not. Simply stated, distance learning refers to education that is not 100 percent provided in a face-to-face setting where students and instructors interact in real time in a physical environment (Caruth & Caruth, 2013; Todhunter, 2013). Alternative modes of teaching and learning fall into a plethora of classifications (Ramage, 2002), including distance education, online, web-based, web facilitated, blended, hybrid, asynchronous, mixed learning, and off-campus, among others. While many of these terms are synonymous and often confusing, there are clear distinctions among some of them (see Types of DL).

**History and Evolution of DL**

The term distance learning brings to mind the Internet and the contemporary concept of online courses. Rarely does one think of distance learning as having existed before the invention of the Internet. The reality however, is that distance learning as a concept is much older than that. In fact the concept of distance education has been in existence for more than a century (Caruth & Caruth, 2013). Arguably the first time distance learning was used was in 1840 when Isaac Pitman offered shorthand lessons through correspondence in order to reach students who could not physically attend his classes. Lessons were delivered exclusively through United States mail, which was at that time the only means of reaching students in remote locations. Subsequently, distance
learning was offered at a larger scale in the US approximately 126 years ago when International Correspondence Schools (ICS) were established in 1890 by Thomas Foster in Scranton, PA.

Initially conceived as a means of educating coal miners on mine safety, as a response to frequent serious or fatal mine accidents, the course comprised materials that helped miners prepare for the Mine Workers Certification Test. Eventually, that evolved into a Mine Safety Engineering Course offered entirely through correspondence by mail. This was followed by the introduction of other courses, and by the 1920s, millions of Americans were enrolled in correspondence courses, mostly in job related trade courses (Caruth & Caruth, 2013). However, the completion rate was very poor as fewer than 3% ever completed the courses (Banas & Emory, 1998). Subsequently, and with the inclusion of other courses, ICS expanded to the United Kingdom (UK) and later became better established there than in the US, primarily due to the expansive nature of the British Empire; taking advantage of this mode of education due to its ability to get around the barrier of physical distance between educational institutions and students some of whom were in remote locations within the empire. The postal system continued to be the primary or only means of delivering course materials until at least the 1960s when electronic technology in the form of radio and later television broadcasts started being used (Caruth & Caruth, 2013).

Headquartered in Glasgow, UK, ICS, alternatively known as ICS Learn, continues to operate today offering more than 150 professional and vocational courses in a wide array of subjects including Engineering, Construction, Hospitality, Healthcare, Education, and Business entirely through DL. In the United States, ICS changed its name
to Penn Foster Career School in 2006, and continues to offer a large number of career courses in online and hybrid formats.

Historically, distance learning has always grown with technology, essentially taking advantage of any technological inventions in the field of communication (Matthews, 1999; Rumble, 2001). The invention and eventual commercialization of radio in the 1920s provided distance learning with a new exciting means of communicating between teachers and their remotely located students. Among the countries that were first in utilizing this technology was Canada where several universities were providing educational programs through radio broadcasts in the 1920, taking advantage of the popularity of that new medium. However, being government funded, the programs, some of which contained educational current affairs and civics courses, were suspended during election campaigns in an effort to prevent political conflict of interest (Buck, 2006). Subsequently, the broadcasts were discontinued in the 1930s due to lack of funding during the great depression. In the US, Educational radio programs proliferated in the early and mid-1920s (Buck, 2006) as many universities broadcast lessons from their own radio stations. However, as with the correspondence courses, completion rates were extremely low and academic honesty was questionable (Banas & Emory, 1998), leading to the gradual demise of that form of DL.

Pennsylvania State University (Penn State) was among the first institutions of higher learning to offer a correspondence course (Banas & Emory, 1998). In that case, distance learning served the need for farmers and their families to acquire agricultural knowledge being provided to students at Penn State in 1890. Other institutions included the University of Chicago, which in 1900 pioneered in the establishment of a department
dedicated to teaching by correspondence. Borrowing from the UK and US, universities in many other countries including Germany, Australia and Japan established correspondence courses offering education and training in various fields (Matthews, 1999).

Likewise, when televisions became available to the general public, distance learning providers took advantage of that media initially to provide informal education in cookery, sewing, and gardening later evolving to formal education in the form of lessons offered by schools and universities in subjects such as algebra. However, when it comes to provision of massive educational programs such as what we see today, Britain’s Open University (OU) is considered the pioneer of modern distance teaching (The Open University, 2013). Founded in 1963 and dubbed the University of the Air, the OU was a brainchild of then British Prime Minister Harold Wilson, who upon recognition that university education had become inaccessible to all but the well to do, established the OU system to ensure the inclusion of people with low socioeconomic status in higher education (The Open University, 2013). Despite some initial opposition from some elements in the public and private sectors, OU was established with the collaborative efforts of university educators, TV broadcasters and the British government (Kaye & Rumble, 1991) and opened to the public in 1971.

The OU continued to grow during the 1970s and 1980s, introducing more subjects and courses into its curriculum, addressing both academic and professional training programs. Eventually, OU introduced graduate and postgraduate degrees and was servicing students not just from Britain but from many other countries in the European Union (EU) as well. Currently, the OU has more than 200,000 students who access
learning through a wide variety of media, including computers, tablets, and smartphones studying when and where it is convenient for them and utilizing social media when applicable.

The British Open University is credited with having revolutionized distance learning in more than one way. First, OU admission policy did not require any previous educational qualifications (Todhunter, 2013). Second, it was the first time that distance learning was offered through mixed media, i.e. radio, TV, in addition to printed materials and audio-visual aids being sent to the student by mail. It was also the first time that distance learning was offered by a public funded institution. The high quality of education being offered by Britain’s OU brought recognition to distance learning as a valid means of providing formal education and in the 20 years following its inception, several other OUs were opened in Europe and in other parts of the world, each emulating the British OU (Granger, 1990). By the late 1990s distance learning had proliferated throughout the world with the majority of colleges and universities offering at least some courses via distance learning with about 25% of distance learning programs in the US offering at least one course that could be completed exclusively via distance learning (Matthews, 1999).

In the US, DL as we know it today started in the early 1990s when private for-profit educational institutions presented it as a shorter and easier alternative to traditional face-to-face education (Bleak, n. d.), eliminating many of the prerequisites and academic requirements associated with public universities. Subsequently, a small number of public institutions started adapting some courses for presentation via the Internet for the purpose of providing education for some of their adult learners, many of whom were enrolled in
the continuing education and residency programs with those institutions. The concept gained popularity as the number of institutions offering such programs increased and so did the number of students taking online courses. By 2013, more than 80% of public universities and about 50% private institutions of higher learning in the US were offering at least one program entirely by distance learning (Aldridge, Clinefelter, & Magda, 2013).

**Types of DL**

As previously mentioned, DL has continued to evolve in tandem with the changes in technology, essentially adapting to new trends in mass communication and adopting technological innovations for its use. Currently, the predominant means of delivering DL is via the Internet. Because of that, online learning has by default become the definition for distance learning given that Internet connectivity is the current predominant mode of communication globally (Allen & Seaman, 2013). Learners can access courses primarily by computers, but also by tablets and internet phones.

**Online Courses**

In purely online courses, teaching is organized and delivered through specialized learning management systems (LMS) software programs such as BlackBoard, Canvas, Moodle, or Edmodo, which deliver pedagogical material and all of the accompanying activities including discussion groups. Online courses, which are sometimes referred to as web-based and web-facilitated, are typically asynchronous and most of the communication between students and instructors is done via email. This DL method offers the learner the greatest amount of flexibility allowing him or her to choose when and where to study. Online courses can also be partially or wholly synchronous when
some or all of the teaching is delivered at certain set times when students have to log into the course via computer or other communication devices to attend a live class being taught through web conferencing media.

Being highly dependent on technology, this mode of learning has evolved and continues to evolve particularly in the area of communication between students and teachers and among students. For example, chat rooms, though no longer commonly used, enabled students to talk to each other in real time in class discussions. Currently, discussion boards offered by LMSs provide a platform for students to discuss class topics. Significant is the incorporation of social media such as Facebook and Tweeter in teaching and learning which allows personalized and collaborative learning to occur (Garrison, 1997). Other innovations such as Skype, Adobe Connect, Elluminate Live, and Zoom enable teachers and learners to see each other and communicate in a more natural manner as opposed to e-mail and chat rooms. Students are also able to post videos and podcasts in which the teacher can observe them performing course related activities such as experiments, counseling sessions or simple simulated medical procedures.

**Hybrid, Blended, and Mixed Learning**

The terms hybrid, blended and mixed learning mean that some of the material in a face-to-face class have been moved online, essentially reducing in-class time. Materials could include course text, additional lectures, videos, PowerPoint presentations, examinations, or assignments. These courses typically have reduced in-class hours due to some materials being online. For example, a hybrid course might meet once instead of the required twice a week in an exclusively face-to-face course. This mode is also
frequently used in the process of transitioning a face-to-face course into a fully online course. However, it must be clarified that a face-to-face course that makes reference to online materials as is often the case, does not necessarily fall into this classification unless the materials being referred to are an essential, integral, and required part of the course.

**Open Learning**

Open learning as a concept is attributed to the British OU started in the United Kingdom in the 1970s. Although many other similar programs have since been established in other countries, including Australia’s Open Training and Education Network (OTEN) and Open Courseware (OCW) at Massachusetts Institute of Technology (MIT) among others, the Open University (UK) continues to stand out as the pioneer and leader in that field. Open learning is true flexible learning as it lays emphasis on the student’s preferences allowing him or her to choose from a smorgasbord of courses available at no charge (The Open University, 2013). In addition, the student chooses when to start a course, the speed at which he or she wants to progress through the course and also has the freedom to drop the course at any time without any financial or other obligations. More importantly, at least with the OU, there are no prerequisites for any of the courses.

The drawback most often cited regarding open learning is the obvious lack of scholarly or pedagogical guidance associated with a structured tuition-charging face-to-face or online course. According to Gourley & Lane (2009) OCW courses lack a pedagogical design and depend on the student’s self-direction through the course. This depends on whether or not the student has well established independent study skills,
otherwise he or she is likely to be overwhelmed (Kahu, Stephens, Zepke, & Leach, 2014; Kirmizi, 2015; Wang, Peng, Huang, Hou, & Wang, 2008). Other shortcomings associated with open learning include the fact that most open learning courses do not offer college credits after completion of the course.

**MOOCs**

The most recent development in online education, one that has led to a higher level of openness came in 2012 with the introduction of the massive open online course (MOOC). The idea behind the establishment of MOOCs was to make knowledge freely available to anyone in the world who wanted it and had the ability to access it. This concept, akin to the British OU, was highly appealing especially to those who did not have the money or the time to enroll in traditional face-to-face or conventional online educational programs; and especially for its potential to radically revolutionize education in general, and higher education, in particular (Pappano, 2012). With the Internet’s capacity to reach an ever-increasing number of people, including those in rural and remote regions of Africa, Asia, and South America, MOOCs presented as the ideal model for educating the world. Like the OU, there were no academic prerequisites, meaning that anyone from virtually anywhere in the world could enroll in any course from a reputable institution of higher learning.

Along with that proliferation came controversy on the definition and purpose of MOOCs, their effect on the nature and quality of education, and ultimately their effect on all stakeholders, i.e. students, faculty, MOOC providers, and the institutions providing them. Major points of controversy revolved around quality of education, course content ownership, intellectual property ownerships (Attle, 2014), finances, and overall
sustainability of the concept. There was little disagreement however, about the high attrition rates which ranged between 90% and 93% (Vaidhyanathan, 2012). Falling behind with coursework was one of the most frequently given reasons for failure to complete a MOOC course. Other reasons were difficulties with time management (Naurot & Doucet, 2014), difficulties understanding concepts or materials, a lack of tutorial support (Lewin, 2002), and a lack of formal college credits (Chamberlain & Parish, 2011). To critics, MOOCs symbolized “a chaotic learning environment” (Dolan, 2014, p. 269) in which the lack of timely, personalized feedback (Bottomly, 2013) and a lack of class cohesion and interaction with instructors meant that they were suitable for only a few well organized and intrinsically motivated students (Carr, 2012; Gaytan 2013).

**Current Status of Distance Learning in Higher Education**

Distance learning (DL) in particular online learning has seen a significantly rapid growth and expansion in the last 20 years. Currently, DL is the norm in higher education rather than the exception it was in the 1980s and 1990s as nearly all institutions of higher learning are offering at least one course through DL (Allen and Seaman, 2014; Kim, Kwon & Cho, 2014). To a large extent, the growth has been in response to the large number of students interested in obtaining college education during the recent economic downturn, and who prefer DL courses due to the flexibility they offer, allowing students to maintain their residence, employment and lifestyle as they attend college. In some cases, institutions of higher education have launched DL programs due to the presumed cost effectiveness and to increase their student enrollment. In either case, large numbers of students, more than 7 million by 2013 (Allen & Seaman, 2014) with the number of
students taking at least one fully online course increasing from 1.6 million in 2002 to about 4 million in 2007 (Armstrong, 2011; Clinefelter & Aslanian, 2014).

According to Allen and Seaman (2014) who have conducted comprehensive annual surveys on online education in the US for more than 14 years, approximately 50% of institutions surveyed in 2002 indicated that online learning was critical to their long-term growth. Subsequent annual surveys documented a steady increase in that number reaching 70% in the succeeding nine-year period ending in 2012. During that period, institutions that were equivocal about the strategic value of online learning decreased from about 40% in 2002 to 20% in 2012, indicating a 50% change of opinion in favor of online learning. From their 2013 survey, they reported that the number of academic leaders who perceive the quality of online education as the same or superior to face-to-face education had increased from 57% to 77% between 2003 and 2012 (Allen & Seaman, 2013). In tandem with that has come a significant increase in the number of African Americans taking online college courses (Ashong & Commander, 2012; Du, Ge, & Xu, 2015; Waits & Lewis, 2003).

**African Americans in Higher Education**

The number of African Americans attending college has significantly increased in the last three decades (Aud et al., 2012; Kena, et al., 2014; Poley, 2008). According to Du, Ge, and Xu (2015), more than 362,000 African Americans, 71% of them women were enrolled in college in 2010. Earlier, Reynolds (2004) reported that minority college enrollment in the US had ‘surged’ by 122% during the preceding 20 years. Indeed, according to a 2011 Census Bureau report, the percentage of African American females
enrolled in college was significantly higher than the percentage of Caucasian females attending college.

While that is very encouraging, the downturn is that African Americans have historically evidenced significantly lower course completion and college graduation rates than Caucasians. According to “Black Student” (2015), the graduation rate of African Americans has improved by three percentage points over the last two years. However, the overall graduation rate remains at 42% while that of Caucasians is significantly higher at 67%. In their study, Kezar and Eckel (2007) found that 30.1 percent of all African American students drop out of college before they attain a degree. The US Department of Education defines graduation as all students entering a particular institution who graduate from that same institution within six years (US Department of Education [USDE], 2015).

According to “Black Student” (2015), those low graduation rates among African Americans do not appear to follow any significant patterns as they have been observed at high ranking as well as low ranking institutions; at public as well as private institutions; and at large flagship state universities as well as at small liberal arts colleges (Rankin, 2013). In addition, also according to “Black Student”, “the graduation rate of African American at the nation’s historically black colleges and universities (HBCUs) tend to be much lower than graduation rates for African American students at the nation’s highest ranked institutions” (p. 8). Notably, according to the same report, only one third or less of all African American students at 24 HBCUs (about a half of all HBCUs) go on to earn diplomas.
Whereas there is clearly no definite reason established for this phenomenon, a number of “possible explanations” ("Black Student", 2015, p. 3) are given, among them, the racial climate at some universities, the lack of established orientation and completion programs to help African American students adapt to the White culture in some campuses, geographical location of the university, the number of African American students already in the institution, curriculum differences, and inferior K-12 preparation. Other reasons suggested include absence of a family college tradition and lack of finances to pay for tuition.

**African Americans in Distance Learning**

According to a study by Williams, Goldstein, and Goldstein (2002), a higher percentage of African American students generally prefer DL courses over traditional face-to-face courses and typically tend to enroll in online courses at higher rates than Caucasian students. Some reasons for this preference are presented in Chapter 1 of this dissertation. The flexibility afforded by online courses, which allows African Americans to continue working and supporting themselves and their families is one of the primary reasons. Also the relatively lower cost of online courses is a probable additional reason for that preference. However, there are cases where the predilection for online learning transcends financial considerations. According to Flowers, White, Raynor, and Bhattacharya (2012) many minority students are “willing to pay exorbitant tuitions even in the absence or in conjunction with federal assistance to seek the convenience and advantages online delivery methods provide” (p. 2).

Despite that, African Americans evidence as high or higher attrition rates in DL courses as they have historically evidenced in traditional courses (Rovai & Galien, 2005;
Rovai & Poton, 2005). Sadly, very little research has been done on the causes of premature withdrawal of African American students from online courses and programs (Frankola, 2001; Tyler-Smith, 2006; Willging & Johnson, 2004). Giles, (1999) speculated that the reason for the dearth of information on this topic was that offering courses totally online was a new concept. There is however, no clear reason why the dearth of research on this topic has persisted. But even from the very few studies available, there appears to be no consensus on what causes students to drop out of DL courses as there is a myriad of different explanations from DL students and instructors as to why the attrition occurs (Carr, 2000; Tyler-Smith, 2006), many of which have not been empirically studied.

In a study examining factors pertaining to failure to complete online courses, Willging and Johnson (2004) found that while dropout rates for DL are significantly higher than those for traditional, on campus courses, black students had higher dropout rates than white students. Likewise, Patterson and McFadden (2009) recorded significantly higher dropout rates for African Americans than Caucasians in both online and campus based courses. Willging et al. found that although the reasons for dropping out of an online program are “varied and unique to each individual” (p. 115), among the most common ones are related to perceptions of isolation and disconnectedness in online courses; and also to technological problems.

Earlier, Thompson (1997) had examined student demographics and other variables that directly influenced attrition in online courses and found that the relationship between the student and the instructor was a primary determinant of whether a student dropped out or persisted with the online course. This relationship, which was
defined by the amount of communication between the two, led to the student’s satisfaction or dissatisfaction with the course and consequently to whether to leave the course or to persist. Prior to that study, Martinez and Munday (1998) had conducted a similar study on 8,500 students with the goal of identifying factors that influenced dropping out or persisting with an online course. In that study, participants listed difficulties making (class) friends as one of the most important reasons they withdrew from the course. In another study that focused on students who dropped out of a web-based course, Astleitner (2000) concluded that the lack of social interaction in the form of communication between the teacher and students and between the students themselves was the primary reason for their withdrawal.

In a subsequent study, Tyler-Smith (2006) pointed to cognitive overload, in the context of Cognitive Load Theory, as a likely primary contributor to high dropout rates in DL especially among first time online course takers. More recently, Park and Choi (2009) and Patterson and McFadden (2009) conducted studies on causes of dropping out. Park and Choi’s study was meant to determine whether persistent learners and dropouts are different in terms of individual characteristics and other factors. From their sample of 147 students who had either previously completed or dropped out of DL courses, they found that the relevance of the course and family support were strong predictors of completing or dropping out of a DL course. Patterson and McFadden were interested in finding out whether the mode of course delivery, i.e. online versus face-to-face affected dropout rates. Their primary finding from the study was that online students were significantly more likely to drop out than those in traditional courses. The study also showed that Black students dropped out at a much higher rate than White students.
Reflection Summary

While empirical information on factors leading to high dropout rates in DL in general is largely unavailable, there is no research specific to African Americans taking DL courses on what factors influence their even higher attrition rates. Disregarding studies that refer to “minorities,” which include Hispanic, Asian, and other minority races in the US, little to no research has been done on the experiences of African American students in DL (Ashong & Commander, 2012; Boyette, 2009; Flowers, Flowers, Flowers, & Moore, 2014; Flowers, Moore, & Flowers 2008; Johnson, 2009; Kuo, 2014; Rovai & Ponton, 2005). Boyette, in particular highlighted the absence of literature on African Americans and strongly emphasized the need for their inclusion in research on DL. Johnson echoed that sentiment by reiterating the great need for researchers to understand the different characteristics of DL students, and Kuo emphasized that “more research is needed to understand how African Americans learn in online settings” (p. 241). The following aspects of use of DL are considered in relation to the evidence with African American college students.

Approach to Distance Learning

Despite the dearth of research mentioned above, it is reasonable to assume that the same factors that affect attrition among Caucasian students also apply to African Americans, in addition to other factors specific to their different ethnic presentation. Among the few studies that have specifically addressed issues pertaining to African Americans and their distance learning experiences are several by Lamont Flowers and his colleagues. In their first study, Flowers, Moore, and Flowers (2008) examined African American students’ satisfaction with distance education courses. Using data from the
National Postsecondary Student Aid Study, 2003-2004 (NPSAS: 2004) database, the researchers intended to find out whether African American students’ satisfaction with DL courses correlated with the number of courses taken. According to their report, the study revealed that African American students who took one DL course reported less satisfaction with DL courses than with traditional courses while those who had taken six or more DL courses indicated greater satisfaction with DL courses than with those courses offered in the traditional format. They concluded that - in agreement with findings from a similar study on White students - the more DL courses a student took, the more he or she was likely to report satisfaction with DL courses.

In a second study, Flowers et al. (2012) examined the participation of African American students in online science, technology, engineering, and mathematics (STEM) courses using data from the National Center for Educational Statistics (NCES) and the 2010 HBCU distance Learning Report. From the study they found that very low percentages of African American STEM major students enrolled in online courses in 2007-2008; that very few HBCU institutions offered online STEM courses; and that relatively few African American STEM majors were taking online courses compared to White STEM students. In the most recent study (Flowers et al. 2014) the authors examined the effects of online DL on African American students’ perceived learning in the context of equivalency theory. Based on a sample of 103 students in an online science course and 194 enrolled in a traditional science course, they found that “students taking traditional science courses reported higher perceived learning gains than students enrolled in online distance education science courses” (p. 24).
Others who have studied African Americans in online learning settings include Okwumabua (2011) and Kuo (2014). In her study on African American students’ attitudes towards online learning, Okwumabua (2011) found that a majority of them have unfavorable attitudes towards online learning. Specifically, she observed that although African Americans reported no computer anxiety or any discomfort using computers (for other purposes), they reported disinterest in using the computer for online learning. Further, 67% of the students participating in the study reported having little confidence in working with computers in an online learning environment (Okwumabua). In addition, she noted inconsistencies between the student’s attitude towards computers and the attitudes towards online learning. Kuo studied perceptions of interaction and learning outcomes among African American students and found that the interaction between students and the course content (learner-content interaction) was the only significant predictor of student satisfaction.

In another unrelated study, Merrills (2010) found that African American students preferred verbal (oral) or face-to-face communication with their course instructors instead of electronically. In addition, according to the results of that study, African American students preferred working and learning in groups with their peers where they can communicate verbally and in real time. This finding corresponds with Rovai and Ponton’s (2005) study of 108 African American and Caucasian graduate students in which they found that African American students minimally participated in discussion boards compared to Caucasian students, reportedly because of the lack of auditory and visual cues. This observation is supported by the study by Fogg, Carlson-Sabelli, Carlson, & Giddens (2013) in which the authors reported that African American students
tended to assume an assimilator position (vicarious interaction [Mabrito, 2007]) in the virtual online class community. A more recent study (Du, Ge, & Xu, 2015) that specifically examined the perspectives of African American female online students found that the students had a “timid attitude towards online discussions” (p. 152).

In examining the specific preferences of African American students, communal values play a central role as observed in several studies. Duncan and Freeman (2008) found that African American students who participated in a learning community realized significantly better academic outcomes than those who studied individually. In an earlier study, Boykin (1986) had observed that African Americans achieved better learning outcomes in communal environments where harmony and cooperation as well as affect were present. Subsequently, Otieno and Mogusu (2010) reiterated that fact in their discussion on “ways of making online learning affective for African American learners”, which include using humor and emoticons (p. 711). White (1992) concurred with others’ findings on the communal learning concept as he described African Americans as field dependent based on their preference to study with others as a group, as opposed to working individually. Finally, the findings of Ashong and Commander (2012) that African Americans perceive asynchronicity in a negative light somewhat summarizes the findings from the studies described above.

Shacaf and Snyder (2007) in their study of DL students’ use of virtual academic library services observed that African American students were more reluctant than white students to ask for help initially. However, once they asked their first question, they tended to ask more questions in their second and third messages. From that information and the observation from the study that “African Americans spent more time per week in
the library than Caucasians” (p. 364), the authors concluded that African Americans were apprehensive in making the first contact with the virtual librarian because they did not know what to expect, and that their first question was typically meant to “test the waters” to see the response they would get (Shacaf & Snyder).

Williams, Goldstein, and Goldstein (2002) explored the behavior patterns (habits) of African American students taking online courses at several HBCUs. They observed, among others, deficits in communication between students in asynchronous courses and their instructors, noting that “comments, questions and emails from the instructor are often unreturned.” (p. 25) resulting in a high percentage of missed deadlines by those students.

More significantly, Corey and Bower (2005) conducted a comprehensive case study on an African American student learning mathematics from Caucasian instructors in online and face-to-face classrooms. Among the significant observations from that study was the student’s report that he had deliberately “altered his speech, his conduct, and his appearance in order to assimilate into what he viewed as the White classroom culture. He also altered his public persona, by adopting the traits of White culture in order to gain acceptance” (p. 329) from the Caucasian instructor. In addition, “the student admitted to not pursuing clarification of some of his questions. He feared being perceived as less than intelligent and not fitting into the White classroom culture” (p. 330).
Transactional Distance Theory in DL

Definition

Transactional Distance Theory (TDT) was originated by Michael Moore in 1972 in an attempt to conceptualize distance learning from a theoretical viewpoint. Moore borrowed the term ‘transaction’ from Dewey, who had applied it in describing the interaction between individuals and their environment, and the patterns of behaviors resulting from the interaction (Moore, 1993). Noting that “there is some transactional distance in every educational event” (p. 209), Moore perceived distance education as comprising educational events that were unique in nature and organization, which affected the teaching and learning behaviors primarily due to the distance, time, and place involved (Moore, 1993). In other words, the physical separation of the teacher from the learner creates a ‘transactional distance’ which he described as “a communication gap, a psychological space of potential misunderstandings between the instructors and the learners that has to be bridged by special teaching techniques” (Moore & Kearsley, 2005, p. 224). Moore perceived that due to the unique nature of DL in particular the physical separation of teachers and students, that distance needed to be understood and defined pedagogically. In several of his subsequent writings, Moore reiterated that transactional distance is a pedagogical, rather than a geographical distance (Moore 1991; 1997; Moore & Kearsley, 1996; 2005).

Moore presented that in the context of distance education; learners and teachers are separated not only geographically, but also by a distance associated with understanding and perception of each other, comprehension of the materials being presented, and often a lack of familiarity with the mode of delivery. That distance, which
he alternatively defined as a “psychological and communications space” (Moore, 1991, p. 32) and “the gap of understanding and communication between teachers and learners” (Moore, 1973, p. 12), is what is known as transactional distance, which according to Moore, negatively impacted the learning process. In order for effective learning to occur, that gap (distance), which could be of a geographical, cognitive or psychological nature, must be bridged “through distinctive procedures in instructional design and the facilitation of interaction” (Moore & Kearsley, 2005, p. 209). **Critics of TDT**

Among the strongest and most frequently cited critiques of transactional distance theory was one by Gorsky and Caspi (2005) which stated that the propositions of TDT were neither supported nor validated by empirical research findings (Gorsky & Caspi). Basing their rather scathing criticism on their review of six empirical studies on TDT published between 1994 and 2001, the authors concluded that the data obtained in those studies either only partially supported the theory, or that those studies that appeared to fully support it lacked reliability or construct validity (Gorsky & Caspi). In addition, they found fault with variables of TDT, in particular structure and dialogue which they perceived as opposites of each other. With that perception, they opined that Moore’s proposition “as the amount of dialogue increases, transactional distance decreases,” could be construed as tautology (Gorsky & Caspi). Their conclusion was that TDT was not a scientific theory.

Kang and Gyorke (2008) looked at Moore’s TDT through the cultural historical activity theory (CHAT) perspective and found it to be lacking a social component. While acknowledging that TDT had provided valuable guidance on the field of DL for more than three decades, they pointed out that the theory had failed to consider the social
characteristics of distance students, essentially ignoring the importance of social learning. Their study was essentially a detailed comparison of transactional distance and CHAT, a theory that emphasizes the social aspects of behavior. CHAT has its roots in activity theory whose origin is attributed to Lev Vygotsky (1980) who asserted that human development is dependent on interaction between an individual and his or her environment. Basing their comparison of transactional distance and CHAT on several variables common to both theories; in particular, TDT’s ‘interaction’ versus CHAT’s ‘activity’, Kang and Gyorke presented that CHAT has a more inclusive approach to interaction and social learning than TDT. They concluded that TDT’s major constructs (dialogue, structure, and autonomy) are contradictory and complementary compared to CHAT’s view of the learner.

**Proponents of TDT**

Acknowledging the absence of consensus among existing studies on Moore’s TDT, Giossos, Koutsouba, Lionarakis, and Skavantzos (2009) reviewed the concept of transactional distance from an “epistemological framework of realism” (Giossos et al., p. 3) stating that transactional distance is a result of teaching or an outcome of the culture within an educational environment (Hauser, Paul, & Bradley, 2012). Drawing substantially from the philosophy of John Dewey on which Moore based his “transaction” theory, Giossos and his colleagues supported the continuation of TDT, stating that (from its basic tenets) TDT adequately defines the distance in understanding between teacher and learner which is present in every learning situation but which varies between cultures and contexts. The authors’ perception was that the different definitions of transactional distance are responsible for the lack of consensus among different
scholars. They opined that with agreement on Dewey’s definition of transactional
distance there would be no disagreement among scholars on its central role in distance
learning.

Gokool-Ramdoo (2008) conducted a study comparing some of the most
frequently referenced distance education theories and found that an important distinction
of Transactional Distance Theory is that it incorporates “both organizational and
transactional issues without losing sight of the learner, the institution, and the nation” (p.
4). Consequently, according to Gokool-Ramdool, other theorists appear to be rethinking
the organizational component of their theories and gravitating towards Moore’s
transactional philosophy. Gokool-Ramdoo concluded by strongly suggesting that TDT
be accepted as a universal DL theory.

**Operationalization and Measurement of TDT-Related Constructs**

Since its inception, Moore’s theory has been empirically tested by various
scholars with most of the studies focusing on dialogue, structure, and autonomy, the
theory’s foundational elements. Among the notable studies are those by Saba and
Chen (2001), Zhang (2003), Force (2004), Shearer, (2009), Flowers, White, and Raynor
(2012), and Huang, Chandra, DePaolo, and Simmons (2015), to name but a few.

Bischoff (1993), and Bischoff et al. (1996) studied 221 distance learning graduate
students using an investigator-developed rating scale to measure dialogue, structure and
TD among students in a traditional class and those in an interactive television course.
The study found that all DL courses had a significantly higher level of dialogue than
traditional courses and that the amount of structure and TD was the same in both settings.
Saba and Shearer (1994) studied the relationship between dialogue and structure and how they affected TD in a course offered via video-conferencing. Their conclusion was that there was an inverse relationship between the three, noting that as dialogue and autonomy increased, structure, and consequently TD in the course decreased.

Using a video-conferencing environment also, Chen and Willits (1998) observed that dialogue, in this case pertaining to class discussions had a direct positive effect on learner outcomes, while TD negatively affected those outcomes. Later, Chen (2001) independently conducted a factor analysis of effects of various interactions in an online learning environment as perceived by the 71 DL learners in the study, and their effect on learning. She wanted to measure the extent to which TD was experienced by the students and how previous online experience, support, and interactions affected their perception of TD. From the study Chen confirmed the existence of TD in web-based classes based on learners’ experiences. She concluded that learner-interface interaction presented “a separate and perhaps important dimension to be considered” (p. 469) in addition to the other three interactions.

In a study on students’ perceptions of TD, Zhang (2003) used a 200-item scale to measure the four types of TD (learner-teacher, learner-learner, learner-content, and learner-interface) among 100 college students. The findings from that study revealed that TD between the students and their teachers did not significantly affect their level of engagement. However, their perceived TD between them and fellow students had an effect on their engagement in the course (Zhang).

Another factor analysis of indicators for TD among DL students was conducted by Force (2004) based on an asynchronous course. The study examined students’
perceived TD in the context of dialogue, structure, and autonomy. While the results
verified Moore’s theory regarding the relationships between dialogue and structure, it did
not support his stance on autonomy. The study showed insignificant correlation between
autonomy and TD, and between autonomy and structure.

Shearer (2009) in a comprehensive study in support of TDT examined the element
of dialogue and analyzed three forms of speech acts. By extensively defining and
analyzing dialogue, Shearer meant to lay a foundation for the further testing of TDT, with
the hope that other elements will be further analyzed.

Focusing on the technological virtual classroom (VC), Falloon (2011) examined
the efficacy of promoting dialogue through a synchronous virtual classroom, in this case
a course facilitated through Adobe Connect learning platform. More specifically, he
sought to determine the degree to which the synchronous VC environment impacted
learner autonomy and dialogue. From the study, Falloon found that the VC format can
potentially “contribute to the development of quality dialogue” (p. 204). Falloon further
observed that striking a balance between the elements of dialogue, structure and
autonomy was extremely complex; and that strict external structure imposed by the VC
could (negatively) impact dialogue and autonomy. He concluded that while Moore’s
TDT was relevant in the digital age, it “needs to be revisited to reflect the move towards
using synchronous tools for DL, particularly its definition and view of structural elements
and how synchronicity affects learner autonomy” (p. 207).

A study by Flowers, White and Raynor (2012) stands out in that they explored
TDT in a virtual laboratory setting, part of a distance biology course. The authors found
that virtual laboratories may positively impact learning by increasing interaction between
learners and content and between learners and interface. However, they found a detrimental effect on learner-instructor and learner-learner interaction, which conceivably translated into greater transactional distance in the course. Flowers et al. highlighted that fact as a sticking point in the argument that learning outcomes of online students are similar to those of students in face-to-face courses.

Kassandrinou, Angelaki, and Mavroidis (2014) conducted a study aimed at examining the presence of TD among students enrolled at an open university. In particular, they wanted to identify the factors affecting TD in a blended course, and how TD influenced the students’ learning. These researchers showed that students experienced most TD between themselves and their classmates and that they perceived the distance that restricted interaction and communication with their peers as primarily geographical in nature. Based on that study, Kassandrinou et al. recommended that alternative approaches to increasing collaboration and establishing community among DL learners, including incorporation of teleconferences, be explored.

In a critical analysis of dialogue, structure, and learner autonomy, Shearer, Gregg, Joo, and Graham (2014) examined the interplay of those elements in a massive open online course (MOOC) setting, with the goal of finding out how the elements facilitated or restricted the educational exchange. The study utilized 411 postings from students in 125 courses offered by Coursera. They found that although MOOCs offered little dialogue and high structure, they did not appear to increase TD because the learners in that study had high degrees of autonomy, a finding that affirms the theoretical assertion of TDT.
In a more recent study, Huang et al. (2015) described TDT as an important theory that needed more research to support it. Following on that recommendation, they conducted a study with the goal of validating TDT by examining the relationships between its fundamental elements in light of environmental factors and learner demographics. Their study was based on a survey of 200 online students. The results of the study indicated that high levels of structure and dialogue are not necessarily incompatible” (p. 1) in reducing TD; mildly contrasting the generally accepted position that high structure leads to high TD (Benson & Samarawickrema, 2009; Moore, 1993; Saba & Shearer, 1994). Their conclusion therefore was that in web-based courses, “high structure signified by high learner-content and learner-interface interaction was necessary in order to reduce perceived TD” (p. 9); which concurred with Moore’s assertion that TD is significantly decreased in class environments with rich instructional media (Moore, 1993).

In their study of TDT, Chen and Willits (1998) used path analysis in investigating 121 learners enrolled in a course offered via videoconferencing. In particular, their goal was to examine the effects of dialogue, structure, learner autonomy, and transactional distance on learning outcomes. They found that in-class discussions had a positive, direct effect on learning outcomes, but learner autonomy had no significant effect on outcomes (Chen & Willits). Their conclusion was that the relationship among the concepts in TDT, particularly those pertaining to dialogue and transactional distance were only partially supported by the results of their study.

In 2004, Dron, Seidel, and Litten (2004) did a case study on the application of TDT in a blended learning environment based on a course that was “explicitly designed
to have dialogue at its heart” (p. 163). In particular, the authors wanted to examine the relationship between dialogue and structure and their respective effects on learning outcomes. Reportedly, there was very poor participation in discussions (dialogue) and consequently disappointing outcomes in the form of students’ experiences and retention rates. From the study, they concluded that dialogue and structure were inversely related, thus affirming Saba and Shearer’s (1994) study, among others, and lending credence to TDT (Dron, et al.)

Basing their study on 34 students taking online courses, Stein, Wanstreet, Calvin, and Wheaton (2005) applied Moore’s TDT to explain whether learner satisfaction with a course’s structure was correlated with a higher level of satisfaction with the perceived knowledge obtained from the particular course. The results of their study concurred with Moore’s theoretical perspective that high levels of structure in a course combined with learner-initiated interaction potentially decreased transactional distance (Stein, et al.) and was a significant basis for learner satisfaction with the course.

Murphy and Rodriguez-Manzanares (2008) conducted a study on the effects of transactional distance in a web-based DL high school course. Specifically, they were interested in determining the building of rapport between e-teachers and students, and among students in the context of TDT’s emphasis of dialogue as a means of reducing transactional distance. According to the researchers, the teachers included in that study reported experiencing distance between them and their students and also among students due to a lack of visual cues. They reported reducing that distance (potential misunderstanding) and improving communication in their courses through deliberate rapport building by asking the students more questions than in a face-to-face class,
keeping photographs of the students, and opening up to students by sharing personal experiences and communicating through other media outside the class structure (Murphy & Rodriguez-Manzanares); all of which are beyond what TDT defines as dialogue. However in support of Moore’s theory, the authors found through the study that the constraints of curriculum and course structure significantly increased transactional distance (Murphy & Rodriguez-Manzanares). Their overall conclusion was more supportive of Saba and Shearer’s (1994) model of TDT, which highlights the importance of control on the part of the teacher and student.

In a study designed to compare students’ learning preferences, Tesone et al. (2008) surveyed 113 college students taking online courses with questions based on the four theories associated with distance learning, namely, Transactional Distance, Cognitive Flexibility, Dual Coding, and Elaboration Theory. The study subjects were asked to indicate their preferences for several aspects of online learning. The majority of aspects endorsed were associated with Dual Coding Theory, followed by Elaboration Theory. TDT was placed third in terms of its preferred qualities followed by Cognitive Flexibility theory. From those results, the study authors concluded that a condensation of those four theories would be the most logical approach as each one had some valuable concepts (Tesone et al.).

Summary

All 14 studies reviewed here have, albeit with some minor variations in some of them, affirmed or otherwise supported TDT and its workings as proposed by Moore (1991; 1993; 1997). In general, they all agreed on the existence of the elements of
dialogue, structure, and autonomy, and the manifestation of TD in various forms as a function of one or more of those elements.

The element of dialogue in TD was predominant in the studies, as eight of them (Bischoff, 1993; Bischoff et al., 1996; Chen & Willits, 1998; Dron et al., 2004; Falloon, 2011; Flowers et al., 2012; Force, 2004; Shearer, 2009) examined its effect on TD. Collectively, those studies found that dialogue was inversely related to structure, that it decreased TD and increased learner outcomes; and that it could be increased through synchronous learning settings and face-to-face classes. The exception was the Bischoff and Bischoff et al.’s studies which documented higher levels of dialogue in a televised course than in a face-to-face one. Huang et al. (2015), while not ruling out the inverse relationship between dialogue and structure, found that among highly autonomous learners, dialogue and structure could both be high without increasing TD.

Second to dialogue, many of the studies addressed TD pertaining to the three types of interactions originated by Moore (1993) namely, learner-teacher interaction, learner-learner interaction, and learner-content interaction; and the subsequently added learner-interface interaction (Hillman et al., 1994; Huang, 2002). In all, the studies found that learner-teacher and learner-learner interaction were the most effective in reducing TD (Chen, 2001; Flowers, 2012; Kassandrinou et al., 2014; Zhang, 2003); that learner-interface interaction was as variable as the (ever changing) content delivery media (Falloon, 2011; Flowers, 2012); and that decreased learner-teacher and learner-learner interaction potentially led to poor retention in open learning and MOOC environments among learners with low autonomy (Shearer et al., 2015).
Other significant findings from these studies include that from a learner-learner and learner-teacher perspective, when it comes to hands on experiment-based learning, virtual laboratories are significantly inferior to face-to-face laboratories (Flowers et al., 2012; Hallyburton & Lunsford, 2013) and DL students perceived the TD between them and their teachers and peers as geographical, pointing to the importance of communication and interaction in the learning process.

Although the recommendation from the studies varied, the overriding recommendation in all of them was for more studies on their respective topics. Another common theme from the studies was the lack of testing of TDT in new DL settings such as web conferencing and virtual classrooms. For example, Zhang (2003) and Falloon (2011) called for a revised theory of TD in online education to take into consideration digital learning formats and focus on establishing learner interactions in online environments.

**Populations on Which TDT has Been Tested**

From the literature reviewed, it is clear that a significant majority of studies on TDT are based on students taking online courses. That may simply be because most of the studies have been conducted after the transition of DL from mail correspondence mode of delivery. Out of the 14 studies reviewed in response to this question, 11 examined TDT in DL courses. Two studies, by Bischoff (1993) and Bischoff et al. (1996), which could count as one study since they used the same dataset, were based on a face-to-face and a DL course. Three studies were based on synchronous video-conferencing courses and the rest (eight) were on students taking regular online courses. The studies represent a wide diversity of learners from different ethnicities including
Canada, Greece, Hawaii, Taiwan, New Zealand, United Kingdom, and various regions of the United States. The study sample in Bischoff’s and Bischoff et al.’s researches in Hawaii was specifically described as ethnically diverse.

The participants in the studies also varied in terms of recruitment, ranging from volunteers to purposeful samples and convenient samples. A majority of the participants (eight of the studies) were enrolled in graduate courses predominantly in general education courses. Two of the studies were conducted on students enrolled in 13 graduate public health practitioner and nurse programs. One study including both graduate and post graduate students; two studies involved undergraduate students including sophomores, juniors and seniors in a biology course; one study was based on open university students, and the other one was based on students in a MOOC whose age range is unknown; but which would most likely include adult learners typical of online students.

**Research Designs Used in TDT Studies**

Ten of the studies reviewed used exploratory methods in their research design. Out of those, eight were based on interviews and surveys using investigator-developed questionnaires. the other two exploratory studies, Shearer (2009) and Shearer et al. (2014) were based on content analyses of students’ postings in online courses, with the former study using “a mixture of content analysis methods […] and an ethnographic approach” (p. 12). Chen and Willits (1998) used a causal design and employed a path analysis to process the qualitative data obtained from the participants. In two studies, Dron et al. (2004) and Falloon (2011) used case study design in their methodology, while
Saba and Shearer (1994) used an experimental research design based on system dynamics approach.

Since the emergence of TDT in 1980, many studies have been carried out applying or putting to test some or all aspects of the theory. There has however been little to no consistency in the results of most of the studies (Goel, Zhang, & Templeton, 2012). In this author’s perception, the inconsistencies in the studies are attributable at least in part to the lack of a uniform theoretical framework guiding the different research studies, a type of cyclical dilemma and also to the rapid and consistent changes in DL in general. In other words, the DL circumstances in which one TDT study is conducted cannot be replicated in a subsequent study as they may have permanently changed in tandem with technological advances.

As a hypothetical example, a study conducted on TDT today may directly or indirectly consider interaction in terms of LMS such as Blackboard or Canvas accessed through computer as a predominant interface, whereas one done a few months later might inadvertently miss the gradual, intermediate shift into social media formats accessed via mobile devices as emergent, predominant interfaces. Inevitably such two studies might contradict each other without necessarily being aware of the fundamental causes of the discrepancies. For that matter, this review will not attempt to present all researches done on TDT, but will only discuss a few of the seminal studies including the most frequently cited, with the obvious exception of the most recent studies.

**Current Status of TDT**

From the literature reviewed, the general observation is that TDT is the predominant (de facto) theory in DL. Despite earlier criticism about its constructs and
interplay thereof (Dron, 2005; 2006; Gorsky & Caspi, 2005), the theory and its elements have prevailed albeit in an imperfect state, and has become an important pedagogical theory (Huang et al., 2015; Simonson, 2013) with a large number of proponents among prominent DL scholars (Al-Harthi, 2010; Benson & Samawickrema, 2009; Benton, Li, Gross, & Pallett, 2013; Chen, 2001; Farquhar, 2013; Garrison, 2000; Gokool-Ramdoo, 2008; Giossos, 2009; Huang, 2015; Kostina, 2011; Shearer et al., 2014; Zhang, 2003). Farquhar (2013) noted that the theory “has been subjected to a variety of empirical tests and philosophical critiques” (p. 28), and as reported elsewhere in this response, the elements of the theory have been supported by and accepted in part or in full by at least 14 of the pertinent studies that have examined it in the past 25 years. In other words, although various weaknesses have been found in its basic tenets, no study so far has succeeded in summarily disapproving or dismissing transactional distance theory. If anything, the studies have called for continued research on TDT elements to improve its functionality.

Recurring questions pertaining to TDT have primarily revolved around the interrelationship of dialogue, structure and learner autonomy and their effect on td. While many studies have found what Moore postulated about the elements to be accurate (Chen, 2001; Saba & Shearer, 1994; Giossos et al., 2009; Kassandrinou, 2014; Zhang, 2003) that as dialogue increases, structure decreases, several have not found that inverse relationship between the two (Bischoff, 1993; Huang et al, 2015). However, all studies have agreed on the existence of TD, and on dialogue being the most important determinant of its level (Chen, 2001; Dron et al., 2004; Farquhar, 2013; Shearer, 2009; Stein et al., 2005). Over the years, the effect of structure has evolved to be rather
ambiguous as studies have found that significantly increasing structure in a course has the
same negative effects as significantly decreasing it (Huang et al., 2015; Moore, 2013).
The ambiguity is significant in that there is no established yardstick to measure structure
and no set, standard thresholds for “too little” or “too much” structure, as both can
increase TD.

The more pressing questions currently pertain to TD and the evolving nature of
DL. The rapid pace of changes from one technological media to another in DL has not
allowed enough time to study the interaction between learners and the media (learner-
interface interaction) to determine the TD therein. Therefore, the questions about TD in
new and emerging media (virtual classrooms, web conferencing, mobile devices, social
media, Skype, etc.) are pending (Falloon, 2011; Kasandrinou et al., 2014).

Although some recent studies (Falloon, 2011; Kasandrinou, 2015) have shown
that learner-learner interaction can be facilitated in online environments by forming
communities of learning, there has not been sufficient research on how that can be
effectively implemented. Finally, with the large amount of new and diverse information
that has come up from an increased number of studies on TDT in the last 10 years, it is
this author’s opinion, that a meta-analysis of those studies and their findings at this time
would be timely. Such a study which would analyze and categorize the findings would
be helpful in identifying the trends pertaining to the theory and its application.

Other Theories and Mechanisms of Distance Learning

Since the 1950s, several scholars have come up with learning theories that they
perceived defined the field of distance education, and which they considered to be
standard DL theories (Gokool-Ramadoo, 2008). The overarching theme among the
scholars has been to define the unique characteristics of DL and to distinguish it from traditional forms of education. It is however, in the last 30 years or so during which DL gained recognition as a discipline that several scholars came up with constructs and theoretical frameworks aimed at defining the discipline and what it encompasses; each one of them attempting to present the most appropriate and comprehensive DL theory (Gokool-Ramdoo, 2008). In addition, several other theories, not specific to DL, but whose contexts are applicable to that system of learning have emerged. Among DL theories, the ones that have stood out are those by Wedemeyer, Holmberg, Garrison, Keegan, and Peters.

Wedemeyer (1981) perceived DL as a means of providing the learner with the freedom and independence not only to learn, but also to decide what he or she wanted to learn, when to learn and at what pace. His theory of independent study emphasized the separation of the learner from the teacher, granting the learner more responsibility and control, and utilizing available technology in DL. In formulating his model, Wedemeyer opined that the higher education system at that time had held on to traditional methods of teaching which he perceived were restraining learning as students and teachers were bound and limited by what he perceived as outdated pedagogical approaches (Sclosser & Simonson, 2006).

Holmberg’s (1989) theory of empathetic teaching-learning conversations which he referred to as guided didactic conversation, laid emphasis on the element of dialogue in DL. He described it as a predictive theory based on the premise that “the application of a methodological approach leads to increased motivation to learn and has better results than conventional representation of learning” (Bernath, 2007, p.430). Holmberg’s core
perspective was that in order for DL to be effective, it had to be conducted through effective two-way didactic conversations. Similarly, Garrison’s theory was predicated on his view that a two-way communication between the teacher and student, with control negotiated between the two (Garrison, 1989; 2003) was essential if learning was to occur in the DL setting. His perception de-emphasized the role of the teacher as the authoritative initiator and leader in the communication which in traditional settings was primarily one way, a common feature in lecture formats.

Keegan’s model emphasized the importance of replication of face-to-face transactions to compensate for the ‘distance’ of students in DL (Gokool-Ramdoo, 2008). His theory presented that DL is characterized by the separation of the teaching and learning acts in terms of time and place and therefore in order for learning to occur in a DL setting, the teaching and learning acts needed to be reintegrated by means of artificially recreating the learning moment. Peter’s industrialization theory was formed in 1983 around the concept of DL as a product of the industrialization of society (Bernath, 2007; Peters, 1993), thus focusing on the novel pedagogical changes brought about by the industrialization. Borrowing from the economic principle of large-scale production, Peter’s theory was based on the contention that DL is “best understood as the application of industrial techniques in the delivery of instruction” (Moore & Kearsley, 2005, p. 9). He, like Holmberg, advocated for the inclusion of technology in education drawing parallels with the mass production concept associated with industrialization.

One other theory that has received considerable attention is the equivalence theory proposed by Simonson, Schlosser, and Hanson (1999). Equivalence in this case refers to the similarity of learning experiences. The theory presupposes that the more
equivalent the learning experiences are for distant and face-to-face learners, the more equivalent will be the outcomes for the learning activity (Simonson et al., 1999). Therefore, although distance education is not identical to face-to-face education, if the learning experiences of distance learners can be made as similar as possible to the learning experiences of onsite learners, their learning outcomes can be expected to be equivalent. In other words, “Learning experiences are not identical, but various learning experiences can be considered equivalent if they produce the equivalent learning” (Simonson, 2008, p. 1). The equivalency theory has been criticized as providing no guiding principles in the process of developing instructional materials besides simply presenting that learning experiences in DL should be equivalent to those in traditional learning (Saba, 2003). Other theories and models that have been considered applicable in DL but have not been widely recognized include Cognitive Flexibility Theory, Dual Coding Theory, and Elaboration Theory.

Cognitive Flexibility theory which was originated by Spiro, Coulson, Feltovich, and Anderson (1988) emphasizes open thinking in the student by avoiding oversimplification of the knowledge intended to be acquired, giving the student the opportunity to develop his or her own perspectives of the information in order to properly acquire the knowledge. In order to do so, the student must be able to spontaneously restructure and rearrange his or her knowledge to fit the various changing scenarios and situational demands. The theory focuses on encouraging the student to consider multiple perspectives of the knowledge (flexibility) by occasionally presenting real life problem situations and case studies requiring the student to engage his or her analytical skills. Cognitive Flexibility Theory focuses on individual and for the most part self-guided
learning in complex and poorly structured domains and is “especially formulated to support the use of interactive technology” (Spiro & Jehng, 1990, p. 165). For that reason, the theory bears significant relevance to the online learning environment.

Dual Coding Theory, also known as dual processing for learning (Tesone, Severt & Carpenter, 2008) which was formulated by Paivio (Clark & Paivio, 1990) is based on the concept of learning through multiple senses. The theory presents that working memory comprises two systems, verbal and non-verbal learning which must be connected and maximized in order to enhances learning. Borrowing from the arguable supposition that some people learn best through visual and others through auditory stimuli, Paivio’s theory advocates for the application of multimodal instructional approaches (Clark & Paivio, 1990) in all learning environments to meet the needs of all learners. It is not clear however, how the kinesthetic mode of instruction would be applied in an online learning environment.

Another theory that has significant relevance to distance education is Elaboration Theory, which was originated by Charles Reigeluth in 1979. Also referred to as Instructional Design Theory, it focuses on simplifying information by breaking (chunking) it into smaller units (Reigeluth, 1995) to accommodate individual learner capacities, and presenting the information starting with the simplest and gradually progressing to more complex information; as each unit adds on to the preceding information. Due to its learner-centered as opposed to teacher-centered approach, and its consideration of cognitive flexibility and recognition of personal learning differences and learner autonomy in selecting topics or tasks to elaborate upon, this theory is seen to be applicable in distance learning (Gokool-Ramdoo, 2008). Criticisms of Elaboration
Theory include that it does not consider knowledge that the learner may have acquired previously (Bernath & Vidal, 2007).

**Relevance of TDT to this Study**

A primary goal of this study is to examine the interaction of African American students in DL courses and to determine whether their levels of interaction can explain their differential performance and completion rates in those courses. The study focuses on different types of interaction guided by the theory of transactional distance.

Historically, learning theories, including Moore’s transactional distance theory, have demonstrated that interaction between the instructor and the learner, and often between learners significantly affects learning outcomes. In fact, many studies (Carswell & Venkatesh, 2002; Ekwunife-Orakwue & Teng, 2014; Hawkins, 2010; Kenyon, 2013; Lim & Morris, 2009; Wu-Yuin, Jung-Lung, Tretiakov, Huey-Wen, & Ching-Yuan, 2009) have shown that the amount of interaction between the learner and other entities in DL courses, or any other courses for that matter, directly correlates with learner satisfaction and consequently with learning outcomes. Hauser et al., (2012) studied issues pertaining to computer self-efficacy and anxiety in DL classes and found that decreased transactional distance in online and face-to-face learning environments led to decreased anxiety on the part of the students which is associated with better learning outcomes. They concluded that maintaining a high level of structure in online courses and a high level of dialogue in face-to-face classes potentially resulted in increased teaching and learning effectiveness.

Ekwunife-Orakwue and Teng (2014) studied the effects of TD on student learning outcomes based on the experiences of 342 online students between 2010 and 2013. That
study which examined all four types of interaction as presented in transactional distance theory, (i.e. learner-instructor, learner-learner, learner-content, and learner-interface) found that while all learner interactions had an effect on learning, learner-content interaction had a significantly large impact on learning outcomes.

Many other studies have examined the effects of TD, specifically focusing on other types of transactional distance. In their study, Kassandrinou et al (2014) were interested in learner-learner transactional distance and how it affected learning outcomes, which in their study were determined by the level of learner satisfaction. Their findings indicated that students who had limited interaction with their peers reported greater transactional distance and poorer outcomes for their course. Falloon (2011) found that decreased learner-interface interaction had a negative impact on learning in a virtual classroom environment. Flowers (2012) examined TD particularly pertaining to learner-teacher interaction in a web-enhanced biology course and found that low levels of learner-teacher interaction significantly affected learning outcomes.

**Ethnicity and Culture in Distance Learning**

Ethnicity is defined as “belonging to a particular race or group of people who have a culture that is different […]” (Merriam-Webster Dictionary, 2015). Culture, on the other hand, is much harder to define (Uzuner, 2009). Hofstede, regarded by many as an expert in culture due to his lifelong study of the subject, defines culture as “the collective programming of the mind that distinguishes the members of one group or society from those of another” (Hofstede, 1984, p. 84).

Uzuner (2009) reviewed 27 studies on cultural influences on DL and found that students from different cultural backgrounds reacted differently to online courses. For
example, Chinese students in a Canadian online course were found to be handicapped by their cultural “reliance on nonlinguistic cues” and unfamiliarity with the Canadian disciplinary culture of education (p. 4). Arab students participating in online courses were hampered by considerations of modesty in online discussions due to culturally restricted social interaction between genders. Additionally, they perceived avidity in class as a form of ‘showing off,’ and had difficulties communicating with instructors due to fear of confrontation with authority figures. Other interesting findings from that study included relative disregard for peer feedback among Chinese students in comparison with teacher feedback, based on their culture, which stresses learning from an authority figure (p. 6). In summary, Uzuner concluded that “culture is inseparable from DL and teaching” (p. 15).

Moore (2006), in an editorial on the question of culture in DL noted that when the teacher and students are from different cultures, both remain physically and socially in their respective cultures, with little knowledge of the other culture. It is therefore upon the student to “step out of that culture and enter the culture of the teacher” (p. 1). In the only study on TD that examined cultural differences, Al-Harthi (2010) used 195 American and 195 Arab distance learners to determine the effects of TD on self-efficacy and help-seeking trends. The results of that study showed significant differences between the two populations. Specifically, Arab students “required significantly more rigid structure” and showed “a preference for significantly more interaction with their instructors” (p. 257). This revelation, though not surprising is an affirmation of the impact of cultural differences in DL that have been documented in other studies.
From the above information, it is clear that learners from different cultural backgrounds approach DL in different manners. The question therefore is how much those cultural differences influence the interaction between those learners and their instructors, their peers, course content, and the content delivery media. In other words, how do those differences influence TD and consequently learning outcomes for those learners?

Summary

For centuries, education was defined by face-to-face contact with the teacher on a regular basis. Today, through technological advances, teaching and learning can take place at anytime, anywhere (Garrison, Anderson, & Archer, 2000; Moore & Kearsley, 1996). This new approach in education is not as simple or as well understood as traditional education. In particular how different cultures and ethnicities respond to online learning is yet to be studied and understood. For example, one might assume that African Americans, who subscribe to the general American culture, would respond to online learning in the same fashion as Caucasian Americans. Yet several studies done on African American in DL (Corey & Bower, 2005; Flowers et al., 2008; 2012; 2014; Otieno & Mogusu, 2010; Williams et al. 2002) have noted differences in behavioral presentation between Caucasians and African American DL students, most of which have pertained to the nature of interaction between the African American students and other components integral to the DL environment.

Studies on the characteristics of African American students in DL courses clearly indicate a preference for high levels of communication or interaction, referred to in transactional distance theory (TDT) as dialogue (Moore, 1973). To put these
characteristics into perspective, and hopefully, empirically identify objective causes for the achievement gaps and high attrition rates associated with African American DL students, in this dissertation study I intended to use the elements of dialogue (interaction) on the parts of African American students as a conceptual platform, due to its critical importance in DL learning (Ekwunife-Orakwue & Teng, 2014; Kuo, 2014; Moore, 1973; Moore & Kearsley, 2005; Shearer, 2010). The basic premise behind this approach is that interaction leads to familiarity with the DL course and its elements (Flowers et al., 2008) and ultimately to satisfaction with the course (Bray, Aoki, & Dlugosh, 2008; Bolliger, & Wasilik, 2012; Kuo, 2014; Kuo, Walker, Belland, & Schroder, 2013; Moore, 1989) which in turn, results in good learning outcomes (Bray et al., Flowers et al., 2014; Kuo, 2014; Pike, 1993; Sahin, 2007; Seaberry, 2008).

These observations indicate that there could be genuine, innate dissimilarities between African Americans and Caucasians that should be put into consideration while planning and teaching DL courses. To provide guidance and direction into what could be incorporated into or eliminated from DL courses to make them applicable for all, empirical research needs to be conducted on issues specific to African Americans and DL. This study is a step in that direction.

From the foregoing discussion, several facts are clear. These include:

- African Americans have poorer outcomes including higher withdrawal rates in DL courses than their Caucasian counterparts.
- The causes for the phenomenon are largely unknown.
- African Americans approach online courses (learning) differently.
• The various ‘different’ behaviors observed with African American students relative to their White counterparts all pertain to decreased interaction between the student and other course-related entities.

• Transactional distance defined by that decreased interaction between the student and the instructor, the course content, the course delivery system and other students results in poor learning outcomes.

• The phenomena of inferior performance and poor course completion rates have not been examined in the context of transactional distance.
Chapter 3: Methodology

Introduction

Distance learning (DL), in the US and across the world has proliferated in the past 10 to 15 years (Allen & Seaman, 2014). Aided by the rapid technological advances in information and communication technology (ICT) that have made it easy for students to connect with institutions of higher learning in a more efficient and timely manner, DL has rapidly evolved “into a complex and dynamic instructional approach” (Mbwesa, 2014, p. 176). Throughout the world, DL has for decades been seen as a convenient means of connecting geographically removed students with their instructors while maintaining other aspects of their lives such as employment, family commitments, and social engagements (Moore, 1997; Star-Glass, 2011).

To many adult learners, DL is not just a convenience, but rather it represents an opportunity to acquire higher education while maintaining their lifestyles. This is particularly so with African American and other minorities who by nature of their life circumstances and financial limitations would otherwise not be able to attend a traditional college program. The significant increase in DL programs in recent years including massive open online courses (MOOC) is a positive move towards making higher education available to all who want it. However, in the process of expanding DL a lot has been done without sufficient planning or research (Hannon & D’Neto, 2007; Macfadyen, 2005; Maritim, 2009; Reeder, Macfadyen, Chase, & Roche, 2004). One of the important issues not fully addressed in this rapid expansion pertains to transactional distance (TD) that learners typically experience (Moore, 1993; 1997) in any learning
situation, but more particularly in distance learning environments (Benson & Samarawickrema, 2009; Chen 2001; Falloon, 2011; Huang et al., 2015).

The relatively high attrition rates among minority students, in particular African American students taking online courses has not been empirically studied or explained. The purpose of this study was to investigate that issue as it has implications on learning. Specifically, the study examined levels of TD perceived by African Americans in online courses in comparison with those of Caucasians as a potential explanation of the disparate presentation, performance, and outcomes demonstrated by African American students.

**Research Questions**

This exploratory study used Moore’s TDT to investigate the effect of ethnicity on TD in an online course in a community college system in the Midwest region of the US. The objectives of the study were to find out to what extent ethnicity influences the four types of TD (i.e. LTTD, LLTD, LCTD, and LITD) among students in a web based learning environment. The specific research questions that the study sought to answer were:

1. To what extent does ethnicity affect transactional distance among students taking online courses?
2. What types of transactional distance are most affected by ethnicity?
3. Which ethnic minority group evidences most transactional distance?
4. What other student demographics significantly correlate with transactional distance?

According to TDT, interaction between students and instructors is expected to decrease LTTD and interaction between students and their peers will result in decreased
LLTD (Moore, 1993; Shearer, 2010). From the literature reviewed, African American students do not participate in online discussions and other interactive activities in DL as much as Caucasian students. That decreased level of interaction will potentially increase TD and may negatively impact their learning (Chase, Macfadyen, & Reeder, 2002; Chen, 2001; Hannon & D’Neto, 2007; McLoughlin & Oliver, 2000; Kassandrinou et al., 2014). Under that assumption, African American students will experience a higher level of TD than Caucasian students.

**Research Design**

This study was exploratory in nature since no other research has been conducted on this question (Etchegaray, 2013). The study primarily aimed to identify the correlation between ethnicity and perceived TD. A quantitative research design was used in this study because compared to other research approaches, this presented as the method best suited for this general research question mainly due to its capacity to facilitate a broader study (Creswell, 2008) and allow the inclusion of a large number of participants which makes the results more generalizable (Babbie, 2010). With a quantitative method, the findings of the study are more objective and accurate (Nardi, 2006) since they are based on standard, quantifiable measures contained in the survey questions which, though not purely scientific, do nonetheless set parameters for the participants’ responses. In other words, their responses to closed ended questions are contained within set confines that uniformly apply to all respondents.

Limiting the number of variables in the questions and consequently in the responses, and as a result allowing the incorporation of more subjects (Nardi, 2006) increases the validity and reliability of the study. This in turn, makes it easier for the
study to be replicated (Babbie, 2010). An additional advantage of quantitative research method is its capacity to eliminate bias on the part of the researcher (Creswell, 2003) in the process of gathering data, analyzing, and interpreting it since the method leaves no room for the researcher’s input.

Admittedly, quantitative method though efficient in its ability to test hypothesis, has inherent weaknesses too. For one, the approach may fail to catch important contextual details such as attitudes or interest (Nardi, 2006); and it may also fail to capture human elements since it is numerically described. In addition, the dataset may be superficial due to restrictions built into the survey questions; and the standard nature of the questions as designed by the researcher may contain structural bias in favor of the researcher. Nonetheless, given the circumstances prevailing in the current study, the need to incorporate many subjects; complete the study within certain time restrictions; steer clear of any potential ethical dilemmas; and examine the relationship between certain variables within the confines of a known a theoretical framework, quantitative research method presents more strengths than weaknesses in light of this study compared to alternative approaches. Being aware of its limitations, the researcher made conscientious effort to minimize their impact.

In deciding to use a survey questionnaire approach, the researcher reviewed available literature on survey methods bearing in mind the nature and needs of the intended survey, the targeted population, the type of questions to be included and considerations for time restrictions. Survey questionnaire method presented as the most viable and best suited to the current study since it involves gathering information pertaining to personal opinions (Spickard, 2006). According to Berthoud (2006), survey
methodology is superior to other approaches in analyzing perceptions of ethnic minorities or in any other similar research where the ethnicity of the researcher may be evident. Additionally, a survey questionnaire minimizes interview bias which potentially results from the researcher’s ethnicity (Edwards 1998; Dillman, 2007; Fowler, 2002).

Also, according to Nardi (2006), self-administered questionnaires are the best tools for measuring variables with large numbers of response categories, for examining personal attitudes and opinions which would otherwise be difficult to observe, for studying characteristics of large populations in a short period, and in studying behavior that may be difficult for the respondents to discuss in a face-to-face interview for fear of judgment or stigma (Nardi, 2006). The anonymity provided by a self-administered web-based survey allows the respondents to be more candid in their responses (Nardi, 2006; Wright, 2005). In order to enable the respondents to express their perceived frequency or intensity of interactions and to attach weight to the response statements without using numbers, an intensity scale was used in the study. Rensis Likert’s intensity scale (Likert scale), frequently used in survey research was preferred due to its simplicity and applicability in diverse settings (Nardi, 2006).

**Population and Sample**

The focus of this study was on the population of African American and other minority students in higher education who have taken online courses. The goal was to examine that population’s participation and performance in those courses using a multiracial representative sample of college students.

A statistical power analysis was performed for sample size estimation. Based on a medium effect size (ES) of 0.5 (considered to be medium using Cohen’s d criteria;
Cohen, 1988), alpha = 0.05, and power = 0.80, the projected sample size needed with this
effect size is approximately N = 33 for the between group comparisons as calculated by
G*Power software (Faul, Erdfelder, Lang, & Buchner, 2007).

The participants in this study were drawn from a population of students enrolled
in a state-wide system of community colleges in the Midwest. The system comprises 16
community colleges with 70 campuses located across the state, serving more than
100,000 students. The study focused on a cohort of 1,070 students enrolled in an online
Introduction to Psychology course in the spring of 2016. Being a major prerequisite in
the community college system, that online course has one of the largest enrollments in
any semester. In the Spring 2016 semester, there were 1,070 students taking the 4-week,
8-week, or 16-week versions of the course.

Besides the availability of a large cohort, this particular course was selected for
the study due to the facts that it is homogeneous across the system in terms of content,
format, layout, and requirements; and is delivered through one learning management
system (Blackboard). Everyone who takes the course encounters the same content,
appearance, and structure, which would not have been the case had the study participants
been drawn from different courses or institutions. Admittedly, the structure (rigidity) of
the course may appear as varying according to the duration of the course – a 16-week
course may afford more flexibility than a 4-week course – but the overall structure and
contents remain the same irrespective of the duration.

Although there are several facilitators (instructors) for the course based at
different campuses, the course is pre-prepared and the instructors cannot change its
format, appearance or requirements. All important information pertaining to the course is
contained in the syllabus which also includes contact information for technical support if the student encounters difficulties relating to computers or access to the online materials. The instructors’ influence on the course is fairly limited since all they do is open the weekly modules and introduce them to the students, provide assistance to students who may have general questions or difficulties accessing some of the course content, and grade some assignments and discussion forums using a standard rubric. The facilitating instructors maintain a virtual presence in the courses by introducing themselves at the beginning of the course, welcoming the students to the course, drawing the students’ attention to the universal syllabus, course calendar, course activities, important deadlines, grading system, and any other important information pertaining to the course. They also make it clear to the students that they are available to help with any questions and typically provide contact information (phone and e-mail), best times to be reached, and an indication of how quickly they will respond to students’ phone or email messages. The facilitators also send messages to all students introducing the week’s module and also maintain contact with the class by participating in group discussions and giving the students feedback on an individual and collective basis.

Instrumentation

A review of literature indicated that there are no established standard tools to measure TD (Hannon & D’Neto, 2007; Huang, 2015b; Lemone, 2004; Liu, Liu, Lee, & Magjuka, 2010). For that reason, this study utilized a pre-existing survey questionnaire developed by Huang, Chandra, DePaolo, and Simmons (2015a) for the specific purpose of measuring transactional distance in a web-based learning environment. This option was an alternative to this researcher developing his own original instrument. According
to Hyman, Lamb, and Bulmer (2006), it is more advantageous to utilize a pre-existing instrument than to develop one’s own.

Permission to use the instrument was sought from the authors and granted in writing. The original instrument is a 103-item questionnaire utilizing a 7-point Likert scale with response choices ranging from ‘strongly disagree’ to ‘strongly agree.’ A 7-point scale was preferred because of its capacity to provide more precise information than a 5-point scale which often forces respondents to select extreme responses due to a lack of modest options in the scale. As described by the developers, the items forming the questionnaire were based on Moore’s TD theory and other supporting research.

From the original 103 items, 42 items were selected for this survey mainly for purposes of brevity in consideration of increasing the response rate since long surveys elicit lower response rates than shorter ones (Nulty, 2008). The items were randomly selected out of the 67 items in the original survey that specifically addressed the four types of interaction according to TD theory. Items in the original instrument that were designed to measure other constructs such as learner autonomy, study habits, closeness, and shared understanding were omitted from this survey questionnaire. The 42 items included two reversed items (items 36 and 41).

No modifications were made to the 42 items adopted from the original questionnaire except changes in verb tense used in the items. Specifically, the original items were written in the present tense because in developing the questionnaire, the authors surveyed students actively enrolled in an ongoing course. Since the current study was conducted at the conclusion of the semester, seeking the students’ retrospective view of the course, the verb tense in the items was changed from the present to the past tense.
Hence, for example, “I communicate with my instructor…once a week.” was modified to read, “I communicated with my instructor…once a week.” To maintain content validity of the items, no other changes were made to the items.

Twelve of the items in the questionnaire measured learner-teacher interactions and were meant to examine the frequency and nature of communication between the student and the instructor. Another 12 items focused on interaction between the student and others in the class with the goal of measuring the individual student’s perceptions of cohesion and cooperation in the class, manifested by a feeling of being in a learning community. Learner-content interaction was examined by 10 items which focused on the student’s perception of the course structure and how it met their learning objectives. The clarity of the syllabus and other guidelines were also addressed by these items.

Six items were designed to measure the students’ interaction with the course delivery media, its user friendliness, visual appeal, and availability of technical support. To reduce acquiescence bias (i.e. selecting one response for all items) and extreme response bias (e.g. selecting all 1s or all 7s) in the survey, two negatively phrased (filter questions) items were included in the questionnaire. This was done with the awareness that there is both support for (Paulhus, 1991; Weijters Baumgartner, & Schillewaert, 2013) and criticism of (Roszkowski & Soven, 2010; van Sonderen, Sanderman, & Coyne, 2013) this approach. According to Huang, Chandra, DePaolo, and Simmons (2015a) “the Cronbach’s alpha values for the different dimensions and components of the instrument range from 0.72 to 0.96, indicating a high consistency of the items in each component” (p. 8).
To obtain demographic information of the students, six questions were added seeking information on (1) ethnicity, (2) gender, (3) age range, (4) duration of the course taken, i.e. whether a 4-week, 8-week, or 16-week course; (5) area of residence, i.e. rural or urban, and (6) number of online courses taken.

Pilot Survey

With the approval of the Institutional Review Board (IRB) at the University of Kentucky and by the Human Subject Research Board (HSRB) at the community college system, an external pilot survey was conducted using Survey Monkey, an online survey software program. The purpose of the survey was to determine the efficiency of the survey instrument particularly whether the questions were easily understandable and also whether they addressed situations generally familiar to that cohort of students. The pilot survey participants were asked to indicate whether any of the questions were confusing or difficult to understand, if any of the questions were irrelevant or non-applicable to the online course experiences, if any items were repetitive, and if there were issues pertaining to interactions in online courses that were not addressed by the questions.

The survey was sent to 50 students randomly selected from the email list of 1,070 students taking an online Introduction to Psychology course in the spring of 2016. The sample was selected from the list because it was expected to contain similar demographics to the general community college population. Since the survey instrument had been subjected to a comprehensive pilot study by the original authors, this pilot survey was intended to only test the questionnaire to ensure that all the questions were clearly understandable and that the answer choices provided were consistent with the information being sought by the survey. The researcher did not intend to conduct data
analysis on the pilot study responses. Prior to sending out the pilot survey, the questionnaire was reviewed by the researcher’s primary advisor who has extensive knowledge and experience in survey research methodology.

Out of the 50 surveys in the pilot survey, 39 emails were opened during the one week dedicated to the study. Of those, 14 students completed the survey, providing a 28% response rate. Twelve of the respondents (86%) identified themselves as White, 1 (7%) was African American or Black, and 1 (7%) identified as Hispanic. Those demographics were consistent with expectations for the population of community college students in the region.

The 14 students who completed the pilot survey checked the box indicating that they did not identify any problems with the questionnaire. None of the respondents indicated difficulties understanding any of the questions. Also, none of the respondents provided any comments or suggestions on how to improve any of the items. Based on those results from the pilot survey, the researcher proceeded with initiating the main study.

**Data Collection**

A total of 1,020 students in the community college who had taken the online Introduction to Psychology course in the spring of 2016 were invited to participate in the survey via an e-mail letter that contained a link to the survey, posted on Qualtrics, a popular web-based survey research software program. The letter introduced the survey, including the researcher’s name and institution; and the name of the official at the community college system who was assisting with the survey. Further, the letter advised recipients that the survey was not related to their performance in the course, that it was
not a course or teacher evaluation tool, and that taking or not taking the survey would not affect the grades they had received in the course. By the same letter, students were informed that identifying personal information, limited to their e-mail addresses, was to be kept strictly confidential, and that the results of the survey would not contain any individually identifying information. In addition, the e-mail letter informed the students that after starting the survey, they were at liberty to stop and discontinue taking the survey at any time without any consequences. Since there was no requirement to sign an informed consent form in this study due in part to its low risk of harm to the subjects, the letter advised the students that by clicking on the URL link provided, the students were indicating an understanding of the risk associated with the survey, and consenting to participate in the research.

After the survey was sent, the researcher observed the responses on a daily basis through the data collection software. As expected, there was a relatively large number of responses initially, but the number of daily responses gradually decreased with time. Reminder emails were sent after one week, two weeks, and finally after three weeks, asking those students who had not already taken the survey to do so, and advising them of the time remaining before survey is closed. A surge in the number of responses was noted after the first and second reminders, but the increase in responses was insignificant after the third reminder. The survey was closed after 30 days.

At that point it was apparent through Qualtrics that no one had opened or started the survey for approximately two days. At closure, the survey program (Qualtrics) indicated that of the 1,020 e-mail letters sent, a total of 985 had been opened (96%). Of those who had received and opened their e-mail letters, 317 (32%) had clicked on the link
to the survey and started the survey. Out of that number, 266 (83%) had completed and submitted the survey. Overall, that number represented a return rate of 26%. That rate, though lower than the 31% considered average for online surveys (Millar & Dillman 2011; Ogier, 2005) is not surprising or uncommon. According to Nulty, (2008) online surveys sent to college students average a return rate of 20% to 23% except in cases where more than three reminder emails were sent, where incentives were offered for taking the survey, where there were frequent reminders by faculty to take the survey, and where taking the survey was mandatory, none of which were the case in this study.

**Demographics**

Of the 266 who completed the survey, 234 (88%) identified themselves as White, 16 (6%) were Black, 8 (3%) were Hispanic, 3 (1.1%) were Asian and 5 (1.9%) indicated they did not belong to any of those ethnic categories (Table 1).

Table 1

*Bivariate Data for Ethnicity by Gender*

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Males</th>
<th>Percent</th>
<th>Females</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>50</td>
<td>89.3</td>
<td>182</td>
<td>87.5</td>
</tr>
<tr>
<td>Black</td>
<td>3</td>
<td>5.4</td>
<td>13</td>
<td>6.3</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
<td>1.8</td>
<td>7</td>
<td>3.4</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
<td>3.6</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100.0</td>
<td>208</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Females represented 78% of the sample (N = 208) and males 21% (N = 56). Two respondents (approximately 1%) did not indicate their gender. Among the males, 89%
(N = 50) were White; 5% (N = 3) were Black; 1.8% (N = 1) were Hispanic; and 3.6% (N = 2) were Asian. There were no males in the ‘Other’ category. In the females group, 87.5% (N = 182) were White; 6.3% (N = 13) were Black; 3.4% (N = 7) were Hispanic; 0.5% (N = 1) were Asian; and 2.4% (N = 5) selected the ‘Other’ category (Table 2).

Table 2
Ethnicity of Student Participants

<table>
<thead>
<tr>
<th>Ethnicity of Participants</th>
<th>Frequency</th>
<th>% Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>234</td>
<td>88.0%</td>
</tr>
<tr>
<td>African American or Black</td>
<td>16</td>
<td>6.0%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>8</td>
<td>3.0%</td>
</tr>
<tr>
<td>Asian</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>1.9%</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

The original age groupings from the survey indicated that forty-two percent (N = 112) were between the ages of 18 and 24. The 25-34 years age group represented 30.5% (N = 81) and the 34-44 years group contained 17.7% of the sample (N = 47); while those between the ages of 45 and 54 represented 4.5% (N = 12) of the sample. Nine respondents (3.4%) were below 18 years old and 1.9% (N = 5) were at least 55 years old.

Regarding area of residence, 63% (N = 168) of the sample lived in rural areas while 36.5% (N = 97) resided in urban or suburban settings. One student did not respond to this item. Sixty-six percent of the respondents (N = 17) indicated that they had taken
two or more online courses prior to this one; 10.5% (N = 28) indicated that this was their second online course; and 22% (N = 61) indicated that this was their first online course.

Respondents were asked to indicate the duration of their course to see if that had any effect on TD perceived. Seventy-five percent of the respondents (N = 200) indicated that they took the regular 16-week course; 23.7% (N = 63) were enrolled in the 8-week course, and 1.1% (N = 3) indicated that they took the 4-week course. All of those courses were taken in the same semester.

Reliability

Probability estimates were evaluated to test the internal consistency of the items. Cronbach’s alpha indicated good consistency among the 12 LTTD items (a = .89); the 12 LLTD items (a = .93); the 10 LCTD items (a = .91); and the 6 LITD items (a = .89). The mean and standard deviation of the scores were as follows: LTTD, 12 items (M = 58.2, SD = 13.7); LLTD, 12 items (MM= 49.3, SD = 16.5); LCTD, 10 items (M = 59.4, SD = 10.0); and LITD, 6 items (M = 34.4, SD = 5.70).

Data Analysis

Data were analyzed utilizing the Statistical Package for Social Sciences (SPSS) program for statistical analysis. Prior to analysis, the data were examined for any anomalies including missing data. The first step in data cleaning was examining the two filter questions (items #36 and #41) for consistency in responses. Next, the data set was scanned for missing data. Data missingness was small; between one and four pieces, with one being the commonest number of items missed. Overall, 23 respondents had at least one piece of missing data. Since 23 is a significant percentage (8%) of the total number of respondents, a listwise deletion was avoided. Instead, multiple imputation
method was applied using SPSS to substitute for the missing data. Subsequently, SPSS was used to generate a list of 20 datasets because that is the recommended number (Osborne, 2013). A major advantage of multiple imputation is that through the process of imputing, analyzing, and pooling, the resulting data is more accurate in terms of variability for each missing value (Enders, 2010). Next, although the questionnaire items had been previously tested for internal consistency by the developers of the original survey instrument, Cronbach’s alpha was used to test the questionnaire’s reliability in this particular study.

Because ethnicity was a primary focus in this study, respondents were asked to indicate their ethnicity (Item #43 “The ethnicity that best describes me is…”) by selecting White, African American, Black but not African American, Hispanic, Asian, or Other. African American and other Black students were placed in different categories with the hope there would be significant numbers of respondents in those categories to enable exploration into their differential interactions and TD. In most cases, those who identify as Black but not African American are first generation immigrants or foreign students mostly from Africa, the Caribbean, and some South American countries for whom English is a second or third language. Consequently, the researcher was interested in examining that group’s interaction especially in learner-teacher and learner-learner interactions in which dialogue is an important component.

Incidentally, the sample did not contain enough participants in that category to enable exploration of that subsidiary question, as only 3% (N=8) of the respondents identified themselves as Black but not African American, precisely matching the demographic for African American students in the study. The researcher then decided to
revert to the standard classification of “Black or African American” by combining those two groups. Ethnicity categories in this study corresponded to the classification by the US Bureau of the Census which lists the first four racial and ethnic groups as White, Black or African America, Hispanic or Latin, and Asian. The data analysis considered the ethnography of all survey respondents, N=266. The data analysis by question is described next.

**Data Analysis Strategy for Research Question 1**

Research Question 1 (*To what extent does ethnicity affect transactional distance in students taking online courses?*) presents as the foremost question in this study, because it addresses overall TD as it pertains to the performance of the two groups in all four types of interactions. To answer this question, descriptive statistics were used to compare the mean interaction of White students with the mean for the overall interaction of all minority students. Because the two groups differed significantly in sample size, Levene’s test, an inferential statistic, was used to determine the equality of variances between the two groups. This test was preferred over other similar tests (e.g. F ratio) because it is more robust especially in situations where a perfect normal distribution is uncertain (Hatcher, 2013). The independent sample t-test was used to determine whether there was a statistically significant difference between the means of those two groups. Independent t-test was preferred in this case instead of analysis of variance (ANOVA) because there are only two groups addressed in this question. In this case, Cohen’s d, a standardized difference index of effect size, was used to determine the size of the difference between the two means (in other words, the strength of association between the variables). Cohen’s d was used because it is a more accurate measure of the effect
between two variables and because of its capacity to not be influenced by sample sizes (Ferguson, 2016). Finally, a Pearson product-moment coefficient correlation was conducted to assess the relationship between ethnicity and TD.

**Data Analysis Strategy for Research Question 2**

The goal of Research Question 2 (What types of transactional distance are most affected by ethnicity?) was to identify the types of TD in which ethnicity makes a difference. To address this question, t-tests with Levene’s test of homogeneity of variances were applied to the data. An independent samples t-test was used to compare the two groups’ interactions in each of the variables separately. A Pearson product-moment coefficient correlation was conducted to assess the relationship between ethnicity and types of TD.

**Data Analysis Strategy for Research Question 3**

Due to the small sample sizes, the Asian group and the ‘Other’ ethnic minority group were combined into one group. To address Research Question 3 (Which ethnic minority group evidences most transactional distance?) descriptive statistics were used to tabulate and display the means for each ethnic/racial group’s interactions in the course. Additionally, the statistics were used to compute the amounts of interaction in each of the four areas associated with transactional distance. The individual means for White students’ learner-teacher, learner-learner, learner-content, and learner-interface interaction were listed separately. The same was done for the other three groups (i.e. Black, Hispanic, and Asian and other minorities).

Due to the small number of participants in each of the four minority groups, the groups were combined into three groups (combined Black and African American
students, Hispanic students, and Asian students combined with students of ‘other’ ethnicities) in order to evaluate groupd differences in TD. The nonparametric Kruskal-Wallis test was chosen for this analysis because the TD distribution was not normally distributed. If the test was significant, additional chi-square tests with a Bonferonni correction for the p-value were used to determine the specific subgroups that were significantly different from each other. The α value for the Kruskal-Wallis test was set at 0.05. In addition, a Pearson product-moment coefficient correlation was conducted to assess the relationship between the variables.

Data Analysis Strategy for Research Question 4

To answer Research Question 4 (What other student demographics significantly correlate with transactional distance?), descriptive statistics and various statistical tests were utilized as described under each respective variable. By answering this question, the researcher sought to find out what other variables besides ethnicity might have a significant effect on the amount and nature of interaction in online courses. Demographic variables were used to explore this question. Among them, gender was of particular interest because there is an abundance of empirical and anecdotal literature describing disparate outcomes in higher education along gender lines especially among Black Americans.

The other demographics examined for differences were age, the student’s area of residence, number of online courses the student had taken, and the length of course taken. To examine those variables and further respond to the research question, each variable was addressed separately by different data analysis approaches including descriptive statistics, t-tests, and analyses of variance.
**Gender.** The hypothesis for this question was that the student’s gender would have a greater impact on TD than the other variables because literature indicates that males, particularly African American males have higher attrition rates than females (“Black Student”, 2015). To examine this variable, data were analyzed using descriptive statistics and an independent samples t-test with Levene’s homogeneity of variance test to compare the amounts of interaction between the genders across the four types of TD. Cohen’s d was used to determine effect size pertaining to the gender variable. Pearson product-moment coefficient correlation was used to determine if there was a relationship between gender and TD.

**Age.** Another reasonable expectation would be that older students are likely to have higher levels of TD because for one, they might not have the same level of comfort with technology as younger students. The researcher wanted to see if this common assumption was supported by the data from this study. Because of the very small sample sizes in the original age groupings (i.e., under 18 yrs., 18-24 yrs., 25-34 yrs., 35-44 yrs., 45-54 yrs., 55-64 yrs., 65 or older), the sample was recoded into two groups (students 24 years old or younger and those 25 years old or older). The data for those two groups were analyzed using descriptive statistics and an independent samples t-test. A Pearson product-moment coefficient correlation test was conducted to see if any significant relationship existed between the variables of age and TD.

**Area of Residence.** Since the students comprising the study sample came from many different campuses, located in urban and rural areas, there was interest in learning whether transactional distance would correlate with those geographical differences. Descriptive statistics were used to examine this variable because the sample sizes were
not large enough to conduct an analysis of variance. To determine the proportion of variance in the dependent variable that is accounted for by the independent variable groupings, eta squared size estimates were computed. In addition, a Pearson coefficient correlation test was conducted to see if any significant relationship existed between a student’s area of residence and TD.

**Number of Courses Taken.** A reasonable expectation is that experience in online courses would decrease TD based on the assumption that students who have taken multiple online courses were more comfortable with the technology (interface) used in those courses (Flowers, Moore, & Flowers, 2008) and also with the course expectations (content) than those taking an online course for the first time. Data pertaining to this variable were analyzed with descriptive statistics and a Pearson coefficient correlation test to assess the relationship between TD and the number of courses taken. Again the small sample size precluded using ANOVA. To determine the proportion of variance in the dependent variable that is accounted for by the independent variable groupings, eta squared size estimates were computed.

**Length of Course.** Since the course which the students in the study sample had taken was offered in three different course lengths (16-week course, 8-week course and 4-week course) the researcher was interested in finding out whether the length of the course would be reflected in the amount of TD experienced by the students. To increase sample sizes and allow for t-tests, the 4 and 8-week course groups were combined into one group. An independent samples t-tests was then conducted on the data in addition to a Pearson product-moment coefficient correlation test to assess the relationship between TD and duration of course.
Factor Analysis

Consideration was made for an exploratory factor analysis of the data to determine if any patterns could be identified in the dataset that could potentially support the study predictions (Child, 2006). The expectation was that by reducing the dimensionality of the observed variables to a smaller number of unobserved variables, the researcher could establish commonality between the variables (Bartholomew, Knott, & Moustaki, 2011). Though not as reliable as the results from statistical tests, the factor analysis would at least show common trends between the variables that were otherwise not measurable with the tests utilized. However, upon review of current literature on factor analysis in reference to the dataset at hand, the size of the sample precluded that approach.

According to several studies, factor analysis with small sample sizes results in problems emanating from sampling errors (Bartholomew, Knott, & Moustaki; Child, 2006; de Winter, Dodou, & Wieringa, 2009; Jung, 2013; MacCallum, Widaman, Zhang, & Hong, 1999; Yong & Pearce, 2013). Although factor analysis is occasionally done with small sample sizes, this often calls for significantly lowering the confidence interval (Heckmann, Gegg, Gegg, & Becht, 2014; Lingard, & Rowlinson, 2006). Most studies reviewed recommend a minimum sample size of 300 in order for the factor analysis to be meaningful (Heckmann, Gegg, Gegg, & Becht; Lingard, & Rowlinson; Pearson & Mundform, 2010; Jung, 2013). In a comprehensive, widely cited study on this subject, Costello and Osborne (2005) found that only 10% of samples with small sample sizes yielded accurate results in factor analysis compared to 70% of studies with large sample sizes.
Summary

This was a non-experimental, exploratory study primarily inspired by a need to uncover the reasons behind the well documented disparities in DL outcomes between White and minority students. The assumptions guiding the study were based on extant literature on that particular subject. As previously noted, the goal of this study was to determine the correlation between ethnicity and TD by quantifying levels of interaction students demonstrate in online courses. Data were collected by means of a survey questionnaire sent to a large cohort of students from 17 community colleges in a Midwestern state. The original intention of the study was not to examine other racial or ethnic groups’ performance in DL except in relation to and in comparison with African American students. However, as the research design evolved, the researcher developed interest in examining interaction in other minority groups to see if similar patterns are evident among minorities and/or if there are distinct variances in their interactional behavior.

Since the survey was sent to all students in the cohort, there was no control over the ethnic or racial composition of the sample as there would be in a purposeful sample (Suen, Huang & Lee, 2014). While the researcher would have wanted to compare the amounts of interaction between minority groups, such as between Black and Hispanic students or between Hispanic and Asian students, the small sample sizes precluded that. Accordingly, the data analysis was limited to the most commonly used descriptive statistics (means, standard deviations, frequency counts, and percentages); and the commonly used inferential statistics (t-tests and analysis of variance). Because of the significantly small sample size of some minorities among the respondents, more complex
statistical procedures such as multivariate analyses of variance and regression analyses were not applied. Although sample sizes among the minority groups would potentially be increased by combining some groups such as Hispanic and Asian students, that could not be done since those are distinct ethnic groups with no cultural homogeneity. The “other” group could not be combined with any other because its composition is unknown.

Limitations

Participants in this study were obtained through a convenience, non-probability sampling method which besides its many advantages including ease of sampling and the capacity to collect data in a short period, also has several disadvantages. For one, the method is susceptible to selection bias for which the researcher has no control, and also carries a higher risk of sampling error (Nardi, 2006). The convenience sample cannot be taken as a representative sample of all students who take online courses. Also, since the sample was drawn from one course in one community college system in one state of the US, the data resulting from those students’ responses should not be implied to be a representation of trends across the country. Additionally, as with all non-experimental self-reported data, generalizability of the results even in similar settings is limited since the accuracy of the data was highly dependent on the respondents’ perceptions, recollection, and honesty.

Human Subjects Research Standards

Prior to commencing the study, the researcher completed the required training on human subject research through the CITI program. Applications were filed with the Institutional Review Board (IRB) at the researcher’s institution (University of Kentucky) and with the community college system, and permission to conduct an ‘Exempt’ study
was granted after all criteria were met. The participants were informed about the confidentiality of their personal information and of any potential risks involved in taking the survey. This information, including the option to opt out of the study was conveyed to the participants through the invitation letter. Thereafter, appropriate steps were taken throughout the study period to ensure that the subjects’ information was kept confidential as stipulated by the review boards and outlined in the applications. For one, there was no personally identifiable information on the surveys when received via Qualtrics because the software program substituted the students’ email addresses with special alpha-numeric codes. The original email list and survey data were stored in a password–protected computer in a locked office at the University of Kentucky. Any data printed for analysis purposes were secured in a locked cabinet and were shredded at the completion of the study.
Chapter 4: Results

Introduction

The purpose of this study was to examine the effect of ethnicity on transactional distance by exploring how students from different ethnicities interact with human and non-human components in the web based learning environments. According to transactional distance theory, a learner’s interaction with other entities in the course decreases TD and results in better learning outcomes. TD is defined as a psychological distance between the learner and those entities which include the course instructor (learner-teacher transactional distance, [LTTD]); other students in the course (learner-learner transactional distance [LLTD]); the learning materials (learner-content transactional distance [LCTD]); and the media through which the course is taught (learner–interface transactional distance [LITD]). The theory posits that as the amount of interaction increases, transactional distance decreases, and vice versa.

The study followed an exploratory, non-experimental approach. A quantitative survey questionnaire was used to collect descriptive data which was analyzed to provide answers to the four research questions:

1. To what extent does ethnicity affect transactional distance in students taking online courses?

2. What types of transactional distance are most affected by ethnicity?

3. Which ethnic minority group evidences most transactional distance?

4. What other student demographics significantly correlate with transactional distance?
This chapter presents the findings of the study in narrative and table formats as they relate to the research questions and hypotheses. The chapter concludes with a summary of the findings.

Findings

Results for Research Question 1

*Ha1: Being an ethnic minority has a significant effect on TD in online courses in the US.*

*Ho1: Ethnicity has no significant effect on TD.*

To address this question, all minority ethnic groups were collapsed into one group to be compared with White students (Table 3). Descriptive statistics and an independent samples t-test were used to analyze the data in response to this question (Table 4). An ethnographic profile of all students in the sample was developed from the data gathered from the demographic items in the survey after data cleaning and adjustment for missingness. The means for interaction for the two groups were obtained and an independent samples t-test was conducted to examine the two population samples to see if they differed significantly in each of the four transactional distance types.

Table 3
*Original and Collapsed Demographic Data*

<table>
<thead>
<tr>
<th>Original data by Individual Ethnicity (n = 266)</th>
<th>Collapsed data (n = 266)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>234</td>
</tr>
<tr>
<td>African American</td>
<td>8</td>
</tr>
<tr>
<td>Black (not African American)</td>
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<tr>
<td>Asian</td>
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<tr>
<td>Other</td>
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<tr>
<td>White students</td>
<td>234</td>
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<tr>
<td>Minority students</td>
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99
Table 4
Descriptive Statistics for Four Types of Transactional Distance Across Combined Ethnic Groups

<table>
<thead>
<tr>
<th></th>
<th>White</th>
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<th>Minority</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Learner-Teacher TD</td>
<td>4.95</td>
<td>1.24</td>
<td>5.29</td>
<td>.99</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>4.13</td>
<td>1.41</td>
<td>4.55</td>
<td>1.40</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>5.92</td>
<td>1.02</td>
<td>6.04</td>
<td>.85</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>5.72</td>
<td>.98</td>
<td>5.88</td>
<td>.70</td>
</tr>
</tbody>
</table>

Note. TD = transactional distance. White (n = 234), Minority (n = 32).

In learner-teacher TD, White students evidenced slightly lower TD (M = 4.94, SD = 1.24) than minority students (M = 5.25, SD = .99) indicating that they interacted with their course instructors slightly more than minority students. Learner-learner TD is based on the amount of interaction among students and on their perception of belonging and being connected to a learning community. White students indicated a lower level of TD (M = 4.12, SD = 1.41) than minority students (M = 4.54, SD = 1.40) in this variable. Regarding interaction with the course material (learner-content TD) there was little difference between the two groups in terms of TD. In fact, the TD in both groups was almost identical, with White students (M = 5.91, SD = 1.01) evidencing a little less TD than minority students (M = 6.04, SD = .84). The same pattern was observed with learner-interface TD which defines the amount of difficulties or discomfort students have with the course delivery media such as computers and software programs. White students evidenced slightly lower TD (M = 5.71, SD = .98) than minority students (M = 5.87, SD = .70).
To evaluate whether the differences between the groups were statistically significant, an independent samples t-test was conducted using the equal variance option (Table 5). In addition, Levene’s test of homogeneity of variances was applied to the data to ensure that the variances in both groups were similar. The analysis indicated that no significant differences existed between the two groups in LTTD ($t(264) = -1.47, p = .14$); LLTD ($t(264) = -1.57, p = .12$); LCTD ($t(264) = -.66, p = .51$); and LITD ($t(264) = -.89, p = .38$). The results are presented in Table 5 below. Since there was no statistically significant difference between White and Minority students in any of the four TD types, the researcher failed to reject the null hypothesis.

<table>
<thead>
<tr>
<th>Learner-Teacher TD</th>
<th>Learner-Learner TD</th>
<th>Learner-Content TD</th>
<th>Learner-Interface TD</th>
</tr>
</thead>
<tbody>
<tr>
<td>df</td>
<td>$t$</td>
<td>$p$-value</td>
<td>Cohen's $d$</td>
</tr>
<tr>
<td>264</td>
<td>-1.48</td>
<td>.14</td>
<td>.28</td>
</tr>
<tr>
<td>264</td>
<td>-1.57</td>
<td>.12</td>
<td>.30</td>
</tr>
<tr>
<td>264</td>
<td>-.66</td>
<td>.51</td>
<td>.12</td>
</tr>
<tr>
<td>264</td>
<td>-.89</td>
<td>.38</td>
<td>.17</td>
</tr>
</tbody>
</table>

**Results for Research Question 2**

**Ha2:** Learner-Teacher transactional distance is most significantly affected by ethnicity.

**Ho2:** There is no difference in the effects of ethnicity between learner-teacher TD and other types of TD.

To test the hypotheses associated with Research Question 2 (What types of transactional distance are most affected by ethnicity?), data were analyzed using descriptive statistics (Table 6) in the same manner as for Research Question 1, this time with the goal of examining the difference between the means for both groups in each transactional distance to determine which transactional distance (LTTD, LLTD, LCTD, or LITD)
evidenced the greatest disparity between White and Minority students. A Pearson product-moment correlation coefficient was computed to see if there was a correlation between ethnicity and any specific TD.

The largest disparity between the two groups was in LLTD, with White students having a mean TD of 4.13 (SD = 1.41) and minority students a mean TD of 4.55 (SD = 1.40), indicating that LLTD was the type of TD most affected by ethnicity. Pearson correlation coefficient test found no correlation between ethnicity and any particular type of TD. There was no indication in the skewness or kurtosis that the results were influenced by any errant outliers. There being no statistically significant difference in any of the TD areas, and with the largest difference between the two groups being in LLTD, and not LTLD as hypothesized, the researcher lacked statistical support to reject the null hypothesis.

**Results for Research Question 3 (Which ethnic minority group evidences most transactional distance?)**

*Ha3: African American or Black students evidence the most transactional distance.*

*Ho3. There is no significant difference in TD among minority races*

The goal of this question was to help determine whether there were differences among ethnic minority groups in the overall TD. Descriptive statistics were used to summarize and describe the data for each of the ethnic minority categories (Table 6). A non-parametric statistical test (Kruskal-Wallis) was used to substitute for ANOVA due to small sample sizes. In addition, a Pearson product-moment correlation coefficient was computed to assess the relationship between the variables.
In the area of students’ interactions with their instructors (LTTD), the ‘Black students group evidenced slightly higher TD (M = 5.48, SD = 1.01) than the other minority groups, followed by Asian/Other group (M = 5.35, SD = .91), and Hispanic (M = 4.85, SD = 1.01). No group evidenced distinctly higher LTTD than the others.

Regarding interactions with class peers (LLTD), Black students had a slightly higher mean (M = 4.83, SD = 1.36) than the other groups, including Hispanic (M = 4.28, SD = 1.25); and Asian/Other group (M = 4.24, SD = 1.68).

A different trend was observed in the variable of interaction with course content (LCTD), where the highest TD was with the Asian/Other group (M = 6.09, SD = .81) followed by Black students (M = 6.04, SD = .97); and Hispanic (M = 5.99, SD = .71). Likewise, in the variable of interaction with course technology (LITD), the Asian/Other group demonstrated slightly higher amounts of TD (M = 6.13, SD = .57) than the other ethnic minority groups, including Black (M = 5.81, SD = .86); and Hispanic (M = 5.77, SD = .42). Overall, the lowest TD across all minority ethnic groups was in LLTD.

Although the Asian/Other category had slightly elevated transactional distance compared with the rest of the minority groups, the difference was not large enough to support any meaningful argument. Furthermore, the small sample size takes away any relevance from that observation.

A Kruskal-Wallis test was conducted to determine whether TD varied as a function of Ethnicity among three subgroups: (a) Black and African American, (b) Hispanic, and (c) Asian and “Other” combined. There was no statistically significant difference between TD among the three ethnic minority groups in LTTD: (H(2) = 2.039, p = .154); in LLTD: (H(2) = 0.847, p = .357); in LCTD: (H(2) = 0.377, p = .539); and in
LITD: (H(2) = 0.611, p = .435) with a mean rank of 4.83 for Black students, 4.28 for Hispanic students, and 4.24 for Asian and Other students. Pearson correlation coefficient showed no correlation between the variables. Since there was no statistical significance in any of the tests, the researcher failed to reject the null hypothesis in this question.

Table 6
Descriptive Statistics of Four Types of Transactional Distance Across All Ethnic Groups

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian/Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Learner-TD</td>
<td>4.95</td>
<td>1.24</td>
<td>5.48</td>
<td>1.01</td>
</tr>
<tr>
<td>Teacher TD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learner-TD</td>
<td>4.13</td>
<td>1.41</td>
<td>4.83</td>
<td>1.36</td>
</tr>
<tr>
<td>Learner TD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learner-TD</td>
<td>5.92</td>
<td>1.02</td>
<td>6.04</td>
<td>.97</td>
</tr>
<tr>
<td>Content TD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learner-TD</td>
<td>5.72</td>
<td>.98</td>
<td>5.81</td>
<td>.86</td>
</tr>
<tr>
<td>Interface TD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results for Research Question 4 (What other student demographics significantly correlate with transactional distance?)

Ha4: Males experience higher levels of transactional distance than females.

Ho4. Gender among minority students has no significant effect on TD in online courses
The purpose of this question was to determine whether any of the students’ demographics were strongly correlated with transactional distance. The general hypothesis behind the question was that gender would influence TD more than any other demographic variable, based on literature that has reported disparate outcomes between males and females in DL, particularly among African American students (“Black Student College graduation,” 2015; McCoy, 2012; Rankin, 2013). The other demographic variables examined in an effort to further respond to this question were age, area of residence, the number of online courses the student has taken (experience in online education), and duration of course (number of weeks in course). The results for each variable are reported separately.

**Gender**

Descriptive statistics were used to evaluate the distribution of the data (Table 7). An independent-samples t-test indicated that LTTD scores were not significantly different for male students (M = 4.89, SD = 1.27) and female students (M = 5.01, SD = 1.20; t(262) = .654, p = .51) The results are presented in Table 8. Results of the Levene’s test (equal variances) were not significant. In transactional distance between the student and others in the course (LLTD) there was no significant difference between males (M = 4.12, SD1 = .44) and females (M = 4.19, SD = 1.41; t(262) = .33, p = .74). No significant difference was observed in the interaction with the course material (LCTD) between males (M = 5.80, SD = 1.06) and females (M = 5.96, SD = .98; t(262) = 1.03, p = .30), or in the interaction with the course technology between males (M = 5.66, SD = .99 and females (M = 5.75, SD = .94; t(262) = .68, p = .50).
Table 7
Descriptive Statistics for Four Types of Transactional Distance Across Genders

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Learner-Teacher TD</td>
<td>4.89</td>
<td>1.27</td>
<td>5.01</td>
<td>1.20</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>4.12</td>
<td>1.44</td>
<td>4.19</td>
<td>1.41</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>5.81</td>
<td>1.06</td>
<td>5.96</td>
<td>.98</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>5.66</td>
<td>1.00</td>
<td>5.75</td>
<td>.94</td>
</tr>
</tbody>
</table>

Note. TD = transactional distance. Male n = 56. Female n = 208.

Table 8
$t$-Test Results Comparing Males and Females Across Different Types of Transactional Distance

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>t</th>
<th>p-value</th>
<th>Cohen's d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner-Teacher TD</td>
<td>262</td>
<td>-.65</td>
<td>.51</td>
<td>.09</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>262</td>
<td>-.33</td>
<td>.74</td>
<td>.05</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>262</td>
<td>-1.03</td>
<td>.30</td>
<td>.16</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>262</td>
<td>-.68</td>
<td>.50</td>
<td>.10</td>
</tr>
</tbody>
</table>

A Pearson product-moment correlation coefficient was computed to assess the relationship between the variables. There was a positive statistically significant correlation between gender and the cohesiveness aspect of LLTD ($r = .138$, $n = 263$, $p = .025$). There were no statistically significant correlations between gender and the other aspects of LLTD. Since no statistically significant difference was observed in TD between male and female students, the researcher failed to reject the null hypothesis pertaining to this question.

Age

Distribution of the data showing means and standard deviations was completed by means of descriptive statistics (Table 9). The ‘24 and Under’ group evidenced slightly lower transactional distance in LLTD ($M = 4.80$, $SD = 1.27$); in LCTD ($M = 5.84$, $SD = 1.03$); and in LITD ($M = 5.62$, $SD = 1.06$). The ‘25 Years and Older’ group had lower
TD in LLTD (M = 4.16, SD = 1.35). A Pearson product-moment correlation coefficient was computed to assess the relationship between the variables age and LLTD. There was a statistically significant positive relationship between the two variables (r = .155, n = 263, p = .011). There was no correlation between age and any other types of TD.

Overall, students in the under '24 and Under’ age group evidenced lower transactional distance than students in the older age group, but the differences between the two groups were not statistically significant (Table 10).

Table 9

| Descriptive Statistics of Four Types of Transactional Distance Across Age Groups |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
|                                | 24 and Under    | 25 and Older    |                  |                  |
|                                | M   | SD   | M   | SD   |                  |                  |
| Learner-Teacher TD             | 4.80| 1.27 | 5.15| 1.15 |                  |                  |
| Learner-Learner TD             | 4.20| 1.50 | 4.16| 1.35 |                  |                  |
| Learner-Content TD             | 5.84| 1.04 | 6.01| .95  |                  |                  |
| Learner-Interface TD           | 5.62| 1.06 | 5.83| .84  |                  |                  |

Note. TD = transactional distance. 24 and Under n = 121. 25 and Older n = 145.

Table 10

| t-Test Results Comparing Age Groups Across Different Types of Transactional Distance |
|---------------------------------|-----------------|-----------------|-----------------|
|                                | df  | t     | p-value     |
| Learner-Teacher TD             | 251 | 1.48  | .141         |
| Learner-Learner TD             | 260 | 0.483 | .630         |
| Learner-Content TD             | 257 | 0.779 | .437         |
| Learner-Interface TD           | 260 | 0.685 | .494         |

Area of Residence

A majority of the respondents in the study indicated that they live in rural areas.

With the awareness that the region served by the community college system includes some significantly remote areas where communication is often problematic, the researcher was interested in learning if a student’s area of residence affected his or her
perception of connectedness with the course among other issues, and if so to what extent.

The underlying assumption was that students from rural settings will experience higher levels of transactional distance than those from urban or suburban settings.

The data were first tabulated with descriptive statistics (Table 11). The data were also analyzed using one-way ANOVA with Levene test due to the unequal sample sizes among the respondents (Table 12). To augment the ANOVA, effect size was calculated using eta squared.

Table 11
*Descriptive Statistics of Four Types of Transactional Distance Across Residence Types*

<table>
<thead>
<tr>
<th>Residence Type</th>
<th>Urban/City M</th>
<th>Urban/City SD</th>
<th>Suburban M</th>
<th>Suburban SD</th>
<th>Rural/Country M</th>
<th>Rural/Country SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner-Teacher TD</td>
<td>5.20</td>
<td>1.17</td>
<td>4.99</td>
<td>.98</td>
<td>4.91</td>
<td>1.28</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>4.31</td>
<td>1.40</td>
<td>3.89</td>
<td>1.22</td>
<td>4.19</td>
<td>1.47</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>5.96</td>
<td>1.07</td>
<td>6.04</td>
<td>.90</td>
<td>5.90</td>
<td>1.00</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>5.74</td>
<td>.97</td>
<td>5.88</td>
<td>.69</td>
<td>5.71</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note.* TD = transactional distance. Urban/City *n* = 60. Suburban *n* = 37. Rural/Country *n* = 168.

Table 12
*ANOVA Results Comparing Residence Groups Across Different Types of Transactional Distance*

<table>
<thead>
<tr>
<th>Residence Type</th>
<th>df Between, df Within</th>
<th>F</th>
<th>p-value</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner-Teacher TD</td>
<td>2, 262</td>
<td>1.25</td>
<td>.29</td>
<td>.009</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>2, 262</td>
<td>1.01</td>
<td>.36</td>
<td>.008</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>2, 262</td>
<td>.30</td>
<td>.74</td>
<td>.002</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>2, 262</td>
<td>.51</td>
<td>.60</td>
<td>.004</td>
</tr>
</tbody>
</table>
There were no significant differences in LTTD (F(2,262) = 1.25, p = .29, η² = .009); in LLTD (F(2,262) = 1.01, p = .36, η² = .008); in LCTD (F(2,262) = .30, p = .74, η² = .002); or in LITD (F(2,262) = .51, p = .60, η² = .004). As noted above, effect size was consistently small in all TDs. Levene’s test was insignificant. Pearson correlation coefficient was computed to assess the relationship between the variables. No positive relationship was found between the variables of TD and area of residency.

**Number of Courses**

Item #38 in the questionnaire asked survey participants to indicate whether this was their first online course, their second, or if they had taken two or more courses online prior to this one. This question was included in the survey in order to test the general assumption that experience with the online course environment would decrease transactional distance. Descriptive statistics were used to analyze and describe the data (Table 13).

<table>
<thead>
<tr>
<th></th>
<th>First Online Course</th>
<th>Second Online Course</th>
<th>More than Two Online Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Learner-Teacher TD</td>
<td>4.95</td>
<td>1.38</td>
<td>4.79</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>4.23</td>
<td>1.66</td>
<td>4.05</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>5.93</td>
<td>1.09</td>
<td>5.92</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>5.63</td>
<td>1.10</td>
<td>5.73</td>
</tr>
</tbody>
</table>

*Note.* TD = transactional distance. First Online course *n* = 61. Second Online Course *n* = 28. More than Two Online Courses *n* = 177.
In addition, analysis of variance (ANOVA) with Levene test and eta squared were used in the analysis. From the descriptive statistics, there was almost indistinguishable variance in TD between the different course lengths. In learner-content TD for example, students who had taken two or more online courses \((n = 177)\) had almost the same level of TD \((M = 5.94, SD = .96)\) as those who indicated that this was their second course \((n = 28)\) \((M = 5.92, SD = 1.02)\) and not significantly different from those who indicated that this was their first online course \((n=61)\) \((M = 5.93, SD = 1.09)\). LLTD was relatively low across the three groups, including the ‘first course’ group \((M = 4.23, SD = 1.66)\); the ‘second course’ group \((M = 4.05, SD = 1.43)\); and for those who had taken two or more courses online \((M = 4.80, SD=1.33)\).

The results of the ANOVA (Table 14), suggested that there were no significant differences between the three groups in LTTD \(F(2, 263) = .53, p =.59, d = .004\); in LLTD \(F(2, 263) = .17, p =.85, d = .001\); in LCTD \(F(2, 263) = .01, p =.99, d = .003\); and in LITD \(F(2, 263) = .55, p =.56\). There being no significant difference in TD associated with any of the groups, experience in online courses can be ruled out as having any significant effect on TD.

Table 14

<table>
<thead>
<tr>
<th>ANOVA Results Comparing Number of Courses Taken Across Different Types of Transactional Distance</th>
<th>df(<em>{between}), df(</em>{within})</th>
<th>(F)</th>
<th>(p)-value</th>
<th>(\eta^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner-Teacher TD</td>
<td>2, 263</td>
<td>.53</td>
<td>.59</td>
<td>.004</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>2, 263</td>
<td>.17</td>
<td>.85</td>
<td>.001</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>2, 263</td>
<td>.01</td>
<td>.99</td>
<td>.003</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>2, 263</td>
<td>.55</td>
<td>.56</td>
<td>.004</td>
</tr>
</tbody>
</table>
**Length of Course**

Students who took the 8-week course ($n = 63$) and those who took the 4-week course ($n = 3$) were combined into one group to increase the sample size. The descriptive statistics used to organize and described the data are presented in Table 15. Students in the 16-Week course indicated higher TD in all four types, i.e. LTTD ($M = 5.05$, $SD = 1.20$); LLTD ($M = 4.21$, $SD = 1.40$); LCTD ($M = 5.97$, $SD = .95$); and LITD ($M = 5.76$, $SD = .90$). The differences between the two groups in were small, making the TD among the two groups almost identical. The largest difference was in LTTD. An independent-samples t-test indicated no significant difference in TD scores between the 16-week course and the 8 and 4-week courses (Table 16).

Table 15
*Descriptive Statistics of Four Types of Transactional Distance Across Terms the Course was Taken*

<table>
<thead>
<tr>
<th></th>
<th>16-Week Course</th>
<th>8- and 4-Week Course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Learner-Teacher TD</td>
<td>5.05</td>
<td>1.20</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>4.21</td>
<td>1.40</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>5.97</td>
<td>.95</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>5.76</td>
<td>.90</td>
</tr>
</tbody>
</table>

*Note.* TD = transactional distance. 16-Week Course $n = 200$. 8- and 4-Week Course $n = 66$.

Table 16
*t-Test Results Comparing Length of Course Groups Across Different Types of Transactional Distance*

<table>
<thead>
<tr>
<th></th>
<th>$df$</th>
<th>$t$</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner-Teacher TD</td>
<td>251</td>
<td>1.48</td>
<td>.141</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>260</td>
<td>0.483</td>
<td>.630</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>257</td>
<td>0.779</td>
<td>.437</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>260</td>
<td>0.685</td>
<td>.494</td>
</tr>
</tbody>
</table>
Ethnicity and Gender

Due to the small sample size, descriptive statistics only were used to describe and explain the data. A comparison of TD between Back males and Black females (Table 17) showed generally higher TD for males than for females. The most noticeable difference was in LLTD where males evidenced higher TD ($M = 6.26, SD = .49$) than females ($M = 4.50, SD = 1.28$). LLTD was the area in which the largest difference between Black males and Black females was observed. In LTLD, males demonstrated higher TD ($M = 6.25, SD = .48$) than females ($M = 5.30, SD = 1.03$) but the difference was smaller. The same pattern was observed in LCTD and LITD.

Table 17

Descriptive Statistics of Four Types of Transactional Distance for Black Males and Black Females

<table>
<thead>
<tr>
<th></th>
<th>Black Males</th>
<th>Black Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Learner-Teacher TD</td>
<td>6.24</td>
<td>.48</td>
</tr>
<tr>
<td>Learner-Learner TD</td>
<td>6.26</td>
<td>.49</td>
</tr>
<tr>
<td>Learner-Content TD</td>
<td>6.73</td>
<td>.46</td>
</tr>
<tr>
<td>Learner-Interface TD</td>
<td>6.25</td>
<td>.38</td>
</tr>
</tbody>
</table>


Relatively larger differences in overall TD were observed between Black male students and White male students (Table 13). Similar to the differences noted between Black male students and Black female students, the most significant difference was noted in LLTD where Black males evidenced much higher TD ($M = 6.26, SD = .49$) than White males ($M = 4.04, SD = 1.33$). The second highest TD was in LTLD with Black male students indicating higher TD ($6.24, SD = .48$) than White male students ($M = 4.84, SD = 1.26$). LCTD and LITD showed a comparable pattern.
Table 18
*Descriptive Statistics of Four Types of Transactional Distance for Black Males and White Males*

<table>
<thead>
<tr>
<th></th>
<th>Black Males</th>
<th>White Males</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
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<tr>
<td>Learner-Teacher TD</td>
<td>6.24</td>
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<td>Learner-Learner TD</td>
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<td>Learner-Content TD</td>
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<tr>
<td>Learner-Interface TD</td>
<td>6.25</td>
<td>.38</td>
</tr>
</tbody>
</table>

*Note.* TD = transactional distance. Black Males $n = 3$. White Males $n = 50.$
Chapter 5: Analysis and Discussion

Introduction

The purpose of this study was to examine TD in an online class and how the ethnic differences of the students might affect it. The TD was determined based on the nature of interactions between the student and other entities integral to the course. The researcher hypothesized that different ethnic groups experience TD at different levels and that ethnic minority students experience greater TD than the majority White students. That hypothesis was based on literature that indicates that, in general, ethnic minority students have higher attrition rates than White students.

This high attrition rate has been observed across all types of institutions, including Historically Black Colleges and Universities (HBCU), and in both face-to-face and distance learning. Although many attempts have been made at identifying the specific reasons behind the problem (Flowers, 2011; Rovai & Ponton, 2005; Thompson, 1997), no study has come up with a clear, empirically backed reason. Instead, many possible causes have been suggested including poor preparation for college (Richardson, 2012), social and academic challenges, lack of friends to interact with in college (Knight, 2015), peer pressure, home problems, or not liking the teacher (Bell, 2012), and racial discrimination.

Transactional distance theory (TDT) postulates a strong relationship between a student’s interaction (dialogue) in a DL course and his or her outcome in the course. By not interacting with the course instructor and other entities in the course, the psychological gap between the student and those entities increases, leading to difficulties
with the course. The researcher hypothesized that ethnicity has an effect on interaction, and consequently on the amount of transactional distance experienced by students taking DL courses. Further, the researcher hypothesized that ethnic minority students experience higher levels of TD, resulting from a lack of or poor interactions with the course instructors and other students in the course.

**Analysis and Summary of Research Question 1** *(To what extent does ethnicity affect transactional distance among students taking online courses?)*

The demographic composition of the study participants was presented in Chapter 4 (Table 1-3). For purposes of this question only, all ethnic minority groups were collapsed into one category. Typically, African Americans and Black people are described as a ‘racial’ minority group while Hispanics are referred to as an ‘ethnic’ minority group. In this study however, African American and other Black people who do not identify themselves as African Americans were combined into one group referred to as Black students. Also, instead of being referred to as a racial minority, they were included as an ethnic minority due to the fact that they are culturally and ethnically different from the majority population and also from people of Hispanic and Asian origin.

Descriptive statistics and an independent samples t-test were used to analyze the data in response to this question. The analysis indicated that there was no statistically significant difference between TD experienced by majority White students in an online course and that experienced by non-White students in the same course in any of the four interaction areas (LTTD: $p = .28$; LLTD: $p =.30$; LCTD: $p = .12$; and LITD: $p = .17$). Nonetheless, some intergroup differences were evident, particularly in LTTD and LLTD, in that ethnic minority students showed a slightly higher level of TD than White students.
Questionnaire items addressing LTTD and LLTD focused primarily on interactions, including telephone and e-mail communication, between the student and the instructor and the student and other students, respectively. Incidentally, LTTD and LLTD are the two areas where TD has the most effect on learning outcomes. This is in part because they are the two areas where dialogue, including verbal communication is highly applicable and also plays an important role.

A low TD observed among White student’s would mean that they are to a certain degree more comfortable communicating with their course instructors in matters pertaining to the course than minority students. A higher level of learner-learner interaction observed among White students would translate into reduced TD between students and others taking the same course. Items on the questionnaire that addressed this form of interaction concentrated on communication between students on course-relate issues, feeling a sense of belonging to the class and having perceptions or feeling of togetherness (camaraderie) with the fellow students. Although the difference was not statistically significant, White students indicated a higher level of comfort with talking to or otherwise communicating with one another than ethnic minority students.

Learner-content interaction includes understanding of the course requirements, including understanding of the syllabus, schedule, and deadlines, and comprehension of the subject matter. LCTD has a higher ‘structure’ component to it as it defines the rigidity or flexibility, and consequently the difficulty or ease of the course. Survey items addressing LCTD focused on a diverse range of course issues, ranging from the teaching format to the pace of the course. There was little difference between TD experienced by White students and that experienced by ethnic minority students in that interaction type.
That finding infers that minority students in this study did not have greater difficulty keeping up with the demands of the course than White students.

In the area of learner-interface interaction, minority students consistently evidenced a slightly higher level of TD compared to White students. The six items in the survey designed to measure this particular type of TD focused on comfort working with the learning management system, in this case Blackboard, and other technologies; the visual and spatial organization of the course on the Internet; ease of navigating the course; and availability of technical support. Although the difference was not statistically significant, the higher TD score among ethnic minority students in this type of interaction may suggest that as a group, they appeared to struggle with adjusting to the course’s mode of delivery more than White students. This could mean lower levels of computer literacy, especially for those taking their first online course, access to computers, or lack of familiarity with how to navigate the Internet to look for required information.

Overall, the results of the data analysis for this question showed greater TD for minority students than White students in all areas of interaction in online courses. The largest differences, in terms of difficulties between the two groups was in learner-learner (LLTD) interaction, where minorities evidenced the highest TD indicating difficulties interacting with others in the course. These differences, however, were not statistically significant.

Analysis and Summary of Research Question 2 (What types of transactional distance are most affected by ethnicity?)

This question was included in the study to enable the researcher to identify the areas in DL where ethnic minority students have the most difficulties, as evidenced by
their interactions. The theoretical framework of transactional distance theory serves best at quantifying those difficulties. Data for this question were analyzed with descriptive statistics and an independent samples t-test.

The primary focus of this question was LTTD, which was hypothesized by the researcher to be most influenced by ethnic or racial differences. As a whole, LLTD is the sector that was most affected by ethnicity according to the findings of this study. Although the difference was not statistically significant, minority students indicated decreased interaction with other students in the course compared to White students. Possible explanations for this disparity will be presented in the next section (Discussion). Suffice it to say that the small sample size in this study may explain at least part of the reason for the observed result. In any case, that finding ruled out the expectation that interaction with course instructor is most problematic for ethnic minority students.

According to the analyzed results, with respect to LTTD, minority students had higher levels of interactions with the course instructor than with their fellow students in the course. In LITD, ethnic minority students scored higher in TD than White students, but the difference was not as pronounced as in LLTD; though certainly higher than the TD in learner-content interactions.

**Analysis and Summary of Research Question 3 (Which ethnic minority group evidences most transactional distance?)**

This question was included in the study in order to find out if some minority groups (i.e. Black, Hispanic, and Asian; and the students in the ‘Other’ minorities group) perceived different levels of TD in online courses. To increase sample size, for this question, Asian students and those in the ‘Other’ group were combined into one group
(Asian/Other). The data were analyzed by means of descriptive statistics and the Kruskal-Wallis test as a non-parametric alternative to ANOVA. Black students indicated experiencing higher levels of TD than Hispanic students and those in the Asian/Other group. These differences were not, however, statistically significant. The group’s greatest difficulties interacting were in the LT TD and LL TD areas wherein their score was higher than for the other ethnic minority groups. Their highest levels of TD were in LCTD and LITD, possibly suggesting that they struggled with comprehending the course material and navigating the course media. Black students had the second highest TD score in those areas. Hispanic students evidenced moderate levels of TD across all TD types.

It is noteworthy that when the Asian and ‘Other’ groups are not combined, Black students evidenced higher TD across all types, but the difference was most pronounced in LCTD. Although the differences between the groups were not statistically significant, Black students appeared to have had more difficulties with the material and structure of the course, had less communication with their course instructors and fellow students, and also had more difficulties with course technology than Hispanic and Asian students. Comparing Hispanic with Asian students, the overall level of TD was higher with the Asian students in LT TD and LL TD, but much lower than that of Hispanics in LITD. Essentially, this indicated that although Asian students did not interact with the instructor and with other students as Hispanics did, they tended to be more comfortable with the course material than Hispanic students. Level of comfort with technology (LITD) was comparable between those two minority groups.

**Analysis and Summary of Research Question 4** *(What other student demographics significantly correlate with transactional distance?)*
This question examined other student demographics (gender, age, experience with online courses, area of residence, and the length of the course taken) which the study participants were asked to provide in order to determine whether any of those demographics were associated with differences in TD in online courses. Data analysis for each of these variables was conducted separately. The analyses and summary of the findings are presented separately as well.

**Gender**

Of all those demographic variables, gender was of particular interest because, next to race, gender has been most strongly correlated with student outcomes in higher education. This variable was examined using descriptive statistics and an independent samples t-test. Levene’s test was used to test the equality of the variances, and Cohen’s d was used to determine effect size.

Considering all types of TD, female students \(n = 208\) evidenced slightly more TD than male students \(n = 56\). In LTTD and LLTD female students indicated that they communicated with the course instructor and with each other less than male students did. This observation contrasted the hypothesized result. However, the difference in the interaction was larger in the interaction with the instructor than in student-to-student communication. It was in the level of comfort and satisfaction with the course (LCTD) that a clearer disparity was noted, with female students evidencing observably more difficulties than their male counterparts. Regarding comfort with the course technology, female students appeared to have more difficulties than male students, but the difference was relatively small and not statistically significant.
Age

Modern DL includes students with a more diverse age range than is typical in traditional face-to-face education. By including the variable, the researcher was interested in knowing the age range of the study sample and more importantly whether age had a direct impact on TD. Originally, age data had been placed in seven age ranges (Under 18 yrs., 18 to 24 yrs., 25 to 34 yrs., 35 to 44 yrs., 45 to 54 yrs.; 55 to 64 yrs., and 65 or older). Due to some of the age groups being very small, the age ranges were recoded into two groups namely those up to 24 years of age (24 and under) and those 25 years old or older (25 or older). After recoding, the data were analyzed using descriptive statistics and an independent samples t-test. The 25 and Older group evidence higher levels of TD than the 24 and Under group in LTTD, LLTD and LITD, but not in LLTD. The differences between the two groups, though observable, were not statistically significant, but they were consistent with literature that indicates that older students tend to struggle with course materials more than younger students (Ashong & Commander, 2012; Hauser, Paul, Bradley, & Jeffrey, 2012; Kahu, Stephens, Zepke, & Leach, 2014). Analysis of the Pearson product-moment correlation test showed that age and LTTD, and specifically the ‘cohesiveness’ aspect of LTTD, were correlated.

Area of Residence

Data pertaining to this variable were analyzed using descriptive statistics and a one-way ANOVA with Levene’s test of homogeneity of variances used to examine the differences in TD between the three groups, namely, urban, suburban, and rural. From the analyses, the rural group evidenced slightly higher TD, however the three groups showed no significant differences in terms of TD. The highest level of TD was within
the suburban group (N = 37), and that was in LCTD, suggesting a slightly higher level of difficulty with course material. Incidentally, the suburban group was the group that evidenced the lowest overall TD among the three groups and in all interaction types. Their lowest level of TD was in LLTD suggesting that, as a group. They communicated with their class peers at a higher level than the other two groups. Analysis of variance confirmed that there was no statistically significant difference in TD between the urban, suburban, and rural dwelling students.

**Number of Courses**

Similar to the variable discussed above, the number of courses did not have a significant influence on amounts of TD. Data pertaining to this question were analyzed using descriptive statistics and a one-way ANOVA. The group of students who indicated that this was their second online course (N = 28) had the lowest TD among any other group. The data showed that the students in that category engaged in communication with their classmates at a higher level than those in the other two groups. Surprisingly, the highest amount of TD was with the students who had taken more than two online courses and the highest levels were in learner-content interactions, an area wherein they had some experience. Those students for whom this was their first online course did not evidence as much TD as would be expected. Their responses indicated that their interactions in the four TD areas was comparable to that of students taking their second or third course.

**Length of Course**

The online course on which this study was based is offered in three term (semester) formats. Most of the students in the sample (N = 200) had taken the regular
16-week full semester course. The course is also offered in 8-week and 4-week terms. Presuming there must be differences in the demands of the course, the researcher included this variable in the study to determine if the different term lengths translated into different amounts of TD the students experienced in the course.

Due to the small sample sizes (there were only three students in the 4-week course) the 8-week and 4-week courses were combined into one group (4- and 8-Week Course). Data were analyzed using descriptive statistics and an independent samples t-test. Although the difference was not statistically significant, the students who took the 16-week course experienced higher levels of TD than those in the 8 and 4-Week group, and that was in all types of interactions. That group showed the highest level of TD in learner-content TD, indicating that they had the most difficulties with the structure and requirements of the course. They also had a high TD score in LITD, indicating that they were not as comfortable with the media used to teach the course as those in the combined group. That was not expected with this group because as one would assume, the longer course would mean familiarity with all aspects of the course and hence, lower TD. The smallest difference between the groups was in LITD, suggesting that the two groups had almost identical levels of comfort in using the course media. The largest difference was in LTITD where the 16-week course indicated much less interaction with the course instructor than the other group.

**Ethnicity and Gender**

As discussed in Chapter 2 and mentioned frequently in this dissertation, literature indicates that, on average, Black males have more difficulty completing college than Black females, and White students in general. This researcher was interested in
examining whether the TD that Black male students experience in comparison to Black female students and also in comparison to White male students to see if it could be a factor in the high dropout rates associated with that population. Due to the small sample size of Black males in this study \((n = 3)\) the data were analyzed using descriptive statistics only. Black males showed consistently higher TD in all four types than Black females in all four types of interaction. (Interestingly, in a comparison of all male students with all female students discussed in ‘Gender’ above, female students had higher TD than male students). Black male students were less comfortable with course content and with the learning management system than Black female students and did not interact with the instructor or with the other students as much as Black females did. The largest difference between the two (Black) genders was in LLTD wherein males indicated significantly higher TD than females, suggesting that they were more detached from their course mates than their female counterparts. Compared to White male students, a similar pattern was observed, with Black male students evidencing much higher levels of TD than White males in all four types of interaction. In LLTD, the amount of TD with Black males was markedly higher. These observations could have been skewed by the small number of Black males in this study.

**Discussion**

The main purpose of this study was to examine how ethnicity influences transactional distance in distance learning (DL) courses. The study was created to determine whether ethnic minority students experience difficulties with online courses manifested by the nature of their interactions with and within the course. According to TDT, the guiding theory in this study, interactions in DL courses are classified into four
areas. These are interaction with the instructor teaching the course (learner-instructor interaction), interaction with other students in the course on course related issues (learner-learner interaction), interaction with the course itself (learner-content interaction), and interaction with the electronic media through which the course is taught (learner-interface interaction). Those interactions are measured in terms of TD, which defines the amount of difficulty a student has with any of those interactions. High levels of TD result in poor learning outcomes and difficulties completing the course. By measuring the magnitude of TD based on the interactions, the study was able to reveal specific areas in which ethnic minority students demonstrated higher levels of TD, though the differences were not statistically significant.

Having summarized the findings in the previous section, this section presents interpretations of those findings and conclusions that the researcher is able to make regarding the study questions. The conclusions based on each question are presented separately.

**Research Question 1**

This was the leading question in the study. The small sample sizes of minorities in general and of the individual minority groups (i.e. Blacks, Hispanics, Asians, etc.) in particular, was of concern in the data analysis as some sample groups turned out to be too small for certain types of parametric tests to be conducted. As a whole, the total sample size (N = 266) was sufficient for the study. According to Gay and Airasian (2003) minimum sample sizes of 30 are the ideal in correlational studies. However, in exploratory studies such as the one at hand, small samples are acceptable (Janesick, 2004; Kvale, 1996). Due to the low representation of ethnic minorities in the study sample,
However, some groups were combined in addressing various research questions in this study. For purposes of responding to this research question, data originally pertaining to African Americans and that of ‘Black but not African American’ participants were combined to form one group (Black).

Despite the small sample sizes of ethnic minorities (see Limitations), it appeared that, in general, ethnicity may have an effect on TD, as evidenced by the consistent differences noted between the degree of TD experienced by ethnic minority students in online learning and that experienced by the majority White students. However, although consistent, the differences were small in this study. The differences are most noticeable in the students’ interactions with others in the course and with the course instructor. That observation is consistent with literature that indicates that ethnic minority students have difficulties assimilating into institutions wherein White students and White instructors are the clear majority (Aiken, Cervero, & Johnson-Bailey, 2001; Ashong & Commander, 2012).

A feeling of isolation, feeling unwelcome, and lack of friends are among the common reasons have been given by Black students as contributors to their withdrawal from college (Corey, & Bower, 2005). It is perceivable that a student who feels alienated will not be comfortable joining class discussion groups where they felt like the odd person out. Further, even in traditional face-to-face classes, and more so in online courses, the ethnic minority student is more likely to not have any friends in class with whom he or she can identify, communicate, or discuss course related matters; this may underlie the lower interaction rates observed in this study. On the other hand White student’s, being the majority, are less likely to experience that sense of isolation and are
more likely comfortable communicating with others; and may even have an acquaintance in the class, especially in large courses. In addition, given the low representation of minorities in college faculties, the instructor is more likely to be White. Though not every White student will be comfortable communicating with the instructor or with other students in the class, at least they will not hesitate on perceptions of being significantly and obviously different. Further, ethnic minority students, and in particular Black students, may have experienced incidents of racial discrimination in the past which may affect the nature and extent of their interactions with others in the course.

The fact that minorities are generally less well represented in higher education could be a contributing factor to the increased TD observed among them in this study. The demographic composition of the students in this study sample supports that assertion in that out of the 266 participants in the sample, only 16 (6%) were Black, and out of those only 3 (0.1%) were Black males. It is not surprising therefore that TD among those Black students is high, considering that they likely have had difficulties identifying with others in the course. Although it is much harder to identify an individual’s ethnicity in online courses, many online courses require students to introduce themselves at the beginning of the course and some even require video introductions. Moreover, blended and online courses are increasingly using web conferencing as part of their teaching format. An ethnic minority student who realizes that he or she is the only minority student in a large class is likely to experience difficulty developing a sense of belonging or a feeling of camaraderie, may not interact as much as the others, and may consequently experience higher TD than the White students in the course.
To further support this stance, the study revealed that ethnic minority students evidenced relatively lower TD in interacting with the course content and the interface, wherein they did not have to interact with people. In fact in some cases, LCTD and LITD rates for White and minority students appeared comparable. Although, based on the results of this study, the researcher was unable to conclude that ethnicity does have an effect on transitional distance, the data appeared to consistently trend in this direction. Unfortunately, based on the small sample sizes of ethnic minority students in this study, the effect observed was not large enough to be considered empirically conclusive.

**Research Question 2**

The hypothesis behind this question was based on literature which indicates that culturally different students did not interact with their course instructors and with other students as much as majority (White) students did (Al-Harthi, 2010; Zhao & McDougall, 2008) although they were very comfortable with computers and other technology used to teach the courses (Hannon, & D’Neto, 2007; Okwumabua, 2011). The assumption therefore was that learner-teacher TD and learner-learner TD were the two areas in which ethnicity makes the most difference.

The summary of the results pertaining to this question is related to some of the observations in Research Question 1 above in that both questions address the intersection of TD and ethnic differences, but that is where the similarity ends. While Research Question 1 sought to examine effects of ethnicity on TD as a whole, therefore focusing on White students as one group and all minority students as another group, Research Question 2 was meant to examine in greater detail the four types of TD to see where ethnicity made the most difference. For purposes of this question, all ethnic groups were
considered as separate entities (i.e. White, Black, Hispanic, Asian, ‘Other’) but the focus was not on differences among them, but on the four types of TD, in order to see which of those types was most influenced by ethnic differences. The goal was to examine amounts of interaction of the ethnic groups in specific areas of TD (i.e. LTTD, LLTD, LCTD, and LITD), to see if any patterns emerged that would indicate which of those TD areas was most susceptible to ethnic differences.

In other words, the researcher was interested in learning, for example, if LLTD evidenced equal TD in all the ethnic groups while in LCTD there was great variance in TD among the ethnic groups. The expectation was for a more diverse study sample that would provide more robust examination and results, but that was not the case with this study. The small study sample size precluded more detailed parametric tests. Nonetheless, the data analysis identified LTTD and LLTD as the two sectors in DL in which the effects of ethnicity were most obvious, with LLTD being most affected by ethnicity. The hypothesis for this question was that LTTD is the sector most affected by ethnic differences.

The reasoning behind that presupposition was based on the definition of TD as a psychological and communication gap, a space of potential misunderstandings between the inputs of the instructor and those of the learner and that it is a pedagogical, not geographical distance (Moore, 1993). The assumption therefore was that ethnic minority students would have more difficulty establishing rapport, and hence a comfortable level of communication with the course instructor than with their fellow students with whom they share a common goal. Arguably, in any teaching/learning situation, the teacher and students are perceived as two different entities, on opposite sides of the divide; with the
instructor directing the course and the students following. A reasonable assumption was that interaction and communication would occur more easily among the students than between the students and the instructor.

However, as observed in this study, that is not always the case. Ethnic minority students, being few in the class, may not be as comfortable interacting with other students, and may end up communicating more with the instructor than with other students. Other reasons for that observation could be (1) unlike majority students who can ask one another questions pertaining to the course, the ethnic minority student may perceive that they have no one else to ask but the instructor and (2), in cases where communication with the instructor is mandated, ethnic minority students may maintain that communication to meet the requirement, while communication with the other students does not occur. From the above, the researcher concluded that as observed in this study, ethnicity may have a greater effect on learner-learner TD than on the other TD types. However in courses where the percentage of ethnic minority students is higher than was in this study, the outcome may be different.

**Research Question 3**

This question was added to the study when the researcher decided to find out if the TD identified in Black students was also apparent in other ethnic minority groups. It must be noted here that the literature reviewed by the researcher was on African Americans only, and no extensive literature review was done on Hispanic or Asian students pertaining to their outcomes in higher education. The comparison in this study is limited to transactional distance only. Therefore the hypothesis relating to this
question was based on literature on Black students who are reported to have poorer outcomes in higher education than White students.

Disregarding the ‘Other’ group, Black students had the highest levels of transactional distance in all sectors (LTTD, LLTD, LCTD, and LITD) among the three named ethnic groups. This finding, though the differences were not statistically significant, and based on small sample sizes, lends support to the researcher’s supposition that Black students experience more TD than the other ethnic minority students. As discussed in the Summary for Question 2, being ethnically different can preclude a student from developing a sense of belonging in the course. Being ethnically different and in some cases having a different skin color could intensify the sense of alienation, lead to decreased interaction, and potentially lead to withdrawal from the course.

Research Question 4

Several factors were explored by this question with the goal of finding out what other factors besides ethnicity had an effect on TD among students taking online courses. The factors explored pertained to demographic information provided by the study participants and included gender, age, area of residence, number of online courses taken, and the duration of the course they attended.

**Gender.** The study hypothesized that a student’s gender has an effect on the TD he or she experiences in an online course; and that males evidenced higher TD than females. The results showed that although the difference was not very large, overall, female students had slightly higher TD than male students across all types of interaction. The greatest difference was observed in LCTD, indicating that female students had more difficulties than male students meeting the requirements of the course. Given that female
students have lower dropout rates than male students, that finding is confounding. As one would expect, the gender with the higher TD would also have poorer outcomes including higher dropout rates, but that was not the case according to the results.

**Age.** As a whole, students in the 24-and-Under group evidenced lower amounts of TD in LTTD, LCTD, and LITD. This means that they had less difficulty interacting with the instructor, keeping up with the course activities, and using the learning management system. This observation falls within expectations because younger students are expected to be more comfortable with technology than older students. However, probably due to the older group including many students who would be considered younger (those between 25 and 30 years), the difference between the 2 groups was not very pronounced.

The 25-and-older group had lower TD in LLTD only. Again, the difference was small and not statistically significant. Nonetheless, their lower TD score in this sector is credible given that students in that group, especially those on the higher end of the age range, are more likely to socialize with others in the class. They are also more likely to contact other students to seek and provide help on course-related issues. Additionally, a correlation test (Pearson Product-Moment Correlation Coefficient) showed a positive correlation between age and cohesiveness, one of the aspects of LLTD addressed by the survey questionnaire. Although the correlation was not strong ($r=.16$), it nonetheless supports the older group’s lower TD score in interacting and communicating with one another in the course (LLTD).

**Area of residence.** According to the results of the data analysis in this study, a student’s experience of TD is not significantly affected by his or her area of residence. Judging from the three groups in the study (urban, suburban, and rural), slightly higher
levels of TD were observed in students who reside in urban areas than in those who reside in suburban and rural areas. The most difference was observed in LTTD and LLTD in which urban students had more TD than the other two groups. While this finding is contrary to what this researcher expected (that students in rural areas perceived more TD), the finding is not as confounding when one considers that the survey items in LTTD and LLTD were designed to measure the amount and frequency of interaction or communication between the student and the instructor or other students. Granted that students in rural areas are more likely to encounter problems for which they have to contact the instructor, or other students, such as problems with technology or other course resources required for the course, their TD would considerably decrease due to that inevitable communication. Students in urban areas where resources abound, could perceivably complete the course without seeking help from the instructor or other students. Their lack of communication with those other entities could result in higher TD being ascribed to them.

**Number of courses.** Flowers, Moore, and Flowers (2008) found that a student’s satisfaction with online courses was positively correlated to the number of courses that the student had taken. Students who had taken three online courses were significantly more satisfied with those courses than students who had taken only one course. Satisfaction with a course infers comfort with the most, if not all, aspects of the course. Based on that notion, this question was meant to investigate whether that differential comfort and satisfaction with a course could be observed in terms of TD and if, indeed, TD would decrease as the number of online courses increased. The common assumption is that as one becomes more experienced in online courses, then the amount of TD in all
areas decreases as he or she becomes more familiar with how to work with the electronic
learning management system, among other aspects of the course.

Although the differences were not statistically significant, results in the study
indicated that students who had taken two online courses had lower TD than those who
had taken only one course and those who had taken three or more courses. They also
presented as more comfortable interacting with their classmates than those with greater or
lesser experience in online learning. While it is expected that those new to online
experience would perceive more TD, it is not clear why those students with more than
two courses’ experience would have greater TD than those with two courses’ experience.

Interestingly, this was the same pattern observed in the study described above
(Flowers et al., 2008). In that study, satisfaction with online education increased with the
number of courses taken, but the increase was not consistent. For example, those with
four-course experience were less satisfied than those with three-course experience; those
who had taken seven courses recorded less satisfaction than those with six-course
experience. But overall, students with more experience (seven years) were markedly
more satisfied with online courses than those with experience in only one course.

From this observation, a reasonable conclusion would be that the number of
courses taken has an effect on TD and the difference is most perceivable between
students taking their first course and those who have had previous experience in online
education. However, since not all courses, instructors, or conditions are the same, TD
may increase or decrease with the situation, regardless of the amount of experience in
online courses.
Length of course. The results of this study showed that students participating in the study had taken an Introduction to Psychology course which is offered in a 16-week, 8-week, and 4-week formats. A large majority (75%) had taken the 16-week course. Those who had taken the 4-week course evidenced high amounts of TD in all sectors. That means they perceived difficulty with interacting with the instructor and other students, getting acquainted with the course content and being comfortable with the technology in the course. It is perceivable that the TD with those students was associated with the short duration in which they had to condense 4 weeks of learning, which was originally designed for much longer periods.

It is surprising, however, that students in the 8-week course perceived less TD than those in the 16-week course. If more time means greater familiarity with the course, then those taking the 16-week course would be expected to experience the lowest amount of TD. However, other factors may be responsible, such as the decreased need to contact and seek help from the instructor or fellow students. Although, based on the results of this study, the researcher was unable to conclude that the length of course affects TD, the data appeared to consistently trend in this direction. Unfortunately, based on the small sample sizes, the effect observed was not large enough to be considered empirically conclusive.

Ethnicity and Gender. Ethnicity and TD were the main focus of this study. The primary motivation for the study was to determine whether the documented poor outcomes for Black students, particularly Black male students, are related to TD that they perceive in higher education in general, and DL in particular. Black male students have been reported to have higher dropout rates than Black female students. The findings in
this study were consistent with the researchers’ supposition that TD contributes to poor outcomes. As noted, Black males indicated much higher TD than Black females in all sectors of course interactions. They apparently had less interaction with the instructor and with other students; the two areas that require dialogue as defined by TD theory. Dialogue has a strong effect on TD as it helps reduce TD in all sectors (Shearer, 2010). Through dialogue with the instructor and others, the student may develop a clearer understanding of the course material, decreasing LCTD. Interaction with other students or instructor regarding the Learning Management System and other technology used in the course potentially decreases LITD as the student becomes comfortable with the media.

The evidence of higher TD among Black male students signified that reduced general interactions portends elevated difficulties with online learning in contrast with Black female students. Comparison with White male students yielded the same result, with Black males evidencing higher TD across all featured online domains. The small sample size of Black males did not allow parametric or even nonparametric tests, which would provide statistical support for those observations, which, in this study, are based on descriptive statistics.

**Limitations of the Study**

This study had several major limitations. The most important limitation was the small sample size and the large variance between sample sizes of ethnic minority participants. The sample included a relatively small number of minority students (3% African Americans; 3% Black; 3% Hispanic; 1% Asian) in comparison with 88% Caucasian. While that is not uncommon – the study conducted by Huang e al. 2015b)
had comparable numbers – the small percentage may not be an accurate representation of those minority groups. The small sample size of the students from ethnic minority backgrounds precluded conducting some planned statistical analyses, such as t-tests and ANOVAs, appropriate for larger samples in which statistically significant differences might have been detected. Results of an a priori power analysis discussed in Chapter 3 indicated that with the criterion for significance (alpha) set at 0.05 and the desired power at 0.80, the study needed to have at least 33 participants in each group to meet the criteria for rejecting the null hypothesis. The expectation was that the study sample, coming from a 2-year college population would be more ethnically diverse than it turned out to be. The fact that the survey was sent several weeks after the course had closed and students had received their final grades may have contributed to the low response rate in this study. It is also perceivable that students, in particular those who did not receive favorable grades, would most likely disregard the survey.

Second, since the participants were anonymous, it cannot be ascertained whether all respondents who identified as African Americans for example, were actually African Americans. If perchance, any of them inadvertently or purposely indicated the wrong ethnic group in the survey, the results of the study could be significantly affected, leading to inaccurate conclusions.

Third, since the study was concerned with the students’ experiences in a course that had already closed, thus requiring a retrospective perspective, the information provided may not be as accurate as it would be from students actively participating in an ongoing course. A fourth, related limitation pertains to the fact that the course the study was based on was offered in three different length formats, i.e. 4-week, 8-week, and 16-
week formats. For that matter, it cannot be assumed that the course is the same across term lengths because, besides length, other structural differences may have existed unbeknownst to the researcher. Also, although the course was supposed to be the same to all students in that it was ‘pre-made,’ this survey did not account for differences between facilitators (instructors). Obviously different facilitators may influence the structure (rigidity and flexibility) of the course, resulting in different experiences to different students. In addition, because the study was launched at the end of the 16-week semester, the students’ recollection of what they did or did not do in the course may have been different; with those in the 16-week course recalling events more accurately than those who had completed the 4-week or 8-week course earlier in the semester. That potential difference was not factored into the study. In addition, since the survey was sent at the end of the semester when final grades had been assigned, there is a possibility that the students’ responses could have been influenced by the grades they received in the course, potentially influencing students to rate their course experiences as better, or worse than they actually were.

Fifth, this study was limited to community college students in the Midwest region of the US. Its results therefore, may not be an accurate representation of all students in online courses in the US. It is perceivable that at different settings or circumstances, such as predominantly urban areas or four-year college students the results could be significantly different. For that reason, the results may not be generalizable for all DL courses.

Sixth, the survey asked respondents to indicate their area of residence by selecting one of three choices namely, urban, suburban or rural/country. For that reason, the
researcher was not able to identify the geographical distribution of the respondents within the region served by the community college system. The lack of that demographic information is a major limitation of this study in that the researcher was unable to know, for example, the percentage of respondents who resided in the Appalachian region for comparison with those who resided in more developed rural areas in the western parts of the region, characterized by relatively close proximity to urban areas.

Another limitation pertains to the length of the survey instrument. Although abbreviated from the original 103 items, the 48 questionnaire items used in this survey may have discouraged many potential participants from taking the survey. The software program used to collect data indicated that 17% of students who received and opened the survey did not complete it. It is highly probable that the large number of items was a contributing factor in the relatively low response rate realized in this study.

Lastly, but not least in importance, although the theory employed in this study (TDT) has been empirically tested in various settings, there is still no consensus on its universal applicability, in particular the operationalization of its constructs (Garrison, 2000). Of particular note is the lack of agreement based on various findings and interpretation of the relationship between structure and transactional distance.

**Recommendations**

Given the many limitations of the study primarily those listed above, it is recommended that another survey be conducted taking into consideration several factors not incorporated or adequately addressed in the current study including those discussed below.
Sample Diversity

Because of the small sample size realized in this study, the first recommendation is for another study to be conducted using a higher representation of ethnic minority students to facilitate data analysis with parametric tests and data processing procedures. To avoid potential pitfalls, such as the small sample sizes experienced in this study, purposeful sampling can be utilized in order to obtain a more diverse study sample.

Marital Status

Literature indicates that African American females enroll in DL courses at higher rates than Black males and White females. One of the reasons given for that phenomenon is that many African American female DL students are single parents who need to maintain employment as they attend college in order to provide for their children. The inclusion of marital status as a demographic variable would help determine whether married female students experienced different levels of TD than their unmarried counterparts.

Grades/Expected Grades

As previously discussed, high levels of TD are associated with poor overall educational outcomes. It would therefore, be beneficial to know whether a relationship existed between students’ perception of TD and their general academic performance. That important information could be obtained by asking the respondents to indicate their current average grade in the course (based on mid-term examination and other graded course activities) and also the final grade they expected to receive in the course. From that data, the researcher would be able to determine whether TD had a bearing on academic outcomes. On a broader scale, a more detailed study on a longitudinal basis
could be conducted to determine whether TD had an effect on student matriculation and retention along ethnic lines in higher education.

**Incentive**

Studies on survey research have consistently shown that offering material incentives increases response rates by 30% to 50% (Bauman, 2007; Pedersen & Nielsen, 2016). To ensure a higher response rate than in the current study, a tangible incentive could be offered to those who take the survey. For example, all students who complete the survey could be considered for a prize drawing for a tangible item such as an Amazon or Walmart gift card. Alternatively, arrangements could be made with course instructors to offer intangible incentives such as an opportunity to earn bonus points in the course by participating in the survey. It is only with a larger, more diverse study group that objective conclusions can be drawn in response to the research questions posed in this study.

**Conclusion**

The primary purpose of this study was to explore how students’ ethnic or racial differences influence their interactions in web-based courses. By applying Moore’s transactional distance theory the researcher hoped to determine the amount of TD among the different ethnic groups to see if it varied accordingly, and if there were any observable patterns between the ethnic groups and the types of transactional distance being examined. That information would help determine whether different ethnic groups approached distance learning differently in terms of their level of comfort with the course instructors, with other students, and with learning activities in the course. Since there is
no prior research on this particular subject with this population, and therefore no data to refer to, the study was exploratory and non-experimental in nature.

Overall, based on statistical analyses, the results of the study did not support any of the four hypotheses posted in the study. Although trends, tendencies, and themes were clearly observable from the data; occasionally supporting the hypotheses as described in the previous two sections, the observation lacked statistical support. The small sample sizes of minority students may have affected the observed outcome.

**Research Question 1**

The study failed to convincingly support the leading hypothesis. The differences in TD between White students and a combined minority group were very small and could not meet the standards for statistical significance. The conclusion, therefore, is ethnicity does not have a significant effect on TD in students taking online courses. However, the recurring theme across all TD types was that ethnic minority students experienced more TD than majority White students. This question merits further investigation with larger sample sizes.

**Research Question 2**

The results suggested that LLTD is the type of TD that may be most affected by ethnicity. The hypothesis that LTTD is most affected by ethnicity was not supported by the data in this study. Although there were variances throughout the results, the overriding observation is that students’ TD levels differed by ethnicity more distinctly in LLTD, (i.e. in their interaction with other students). This observation is consistent with literature that indicates that ethnically different students tend to struggle with DL courses and that interacting with other students in the course is particularly problematic.
Research Question 3

The results of the study revealed a consistent pattern of Black students evidencing higher levels of TD than all other ethnic minority groups, supporting the hypothesis. However, this observation was not supported by statistical tests, likely due to small sample sizes. Because of a lack of statistical significance in the observed differences, the researcher concluded that there is no significant difference in TD among minority ethnic groups. The question merits further exploration with larger sample sizes.

Research Question 4

The demographics explored in an attempt to answer the question were gender, age, area of residence, number of courses, and length of course. Although differences in amount of TD were apparent in most of the variables, none met statistical significance. Gender was the first variable considered. From descriptive statistics, differences were noted suggesting females of all ethnicities experienced more TD than males, but the differences were not sufficient to draw empirically-based conclusions from. The same was true for the other variables. Regarding age, younger students (under 24) evidenced lower TD than older students (25 and older), but the difference was not statistically significant. Regarding area of residence, there were no statistically significant differences in TD among the three groups (i.e. urban, suburban, rural). Students who had taken only one online course perceived more TD than those who had taken two or more courses. But the difference was not statistically significant. Students who had taken a short 4-week version of the course evidenced a higher amount of TD than those who had taken 8-week or 16-week courses. However, the difference was not statistically significant. With that
observation, the conclusion for this question is that gender did not have a significant
effect on TD in online courses.

The overall conclusion of this study therefore, is that ethnicity has no effect on
transactional distance in online distance learning courses. However, due to the
significantly disproportionate sample sizes employed in this study, it is imperative that
further examination of that subject occur by incorporating a larger study sample.

The fact that there have not been more studies on TD in higher education, and
only a few, if any, utilizing a theoretical framework is of concern. It is therefore
recommended that more research be done on the major aspects of modern DL in order to
stay abreast of the fast advances pertaining to this teaching/learning approach. As the
population grows in diversity, and the same growth is evidenced in higher education in
general, and in DL in particular, more studies need to be done on the intersection of
diversity and teaching/learning.

Finally, due to the effects of ethnicity on learning, DL educators have to be
mindful of these transitional distances and address them in course design and planning
with the aim of reducing TD. According to Moore and Kearsley (2005) when the
instructor and DL student are from different cultures, the student is expected to step into
the ethnicity of the instructor in order for teaching to be effective. Cultural
manifestations in DL have been widely documented (Al-Harthi, 2010; Bing & Ai-Ping,
2008; Moore, 1994; Zhao & McDougall, 2008; Zhang & Kenny, 2010) and their effects
on learning have been recorded in many studies (Campbell, Goold, & Goward, 2004;
Lemone, 2004; Lim, 2003; Liu et al., 2004; Moore, 1994). While it is presumable that
those cultural differences translate into increased TD, hence poorer learning outcomes,
they have not until now been observed from a theoretical point of view. Moore’s 
transactional distance theory (TDT) provides a proven theoretical framework in studying 
that phenomenon and presenting it in a more understandable manner.
Appendix A

University of Kentucky Institutional Review Board (IRB) Approval Letter
EXEMPTION CERTIFICATION

MEMO: Benson Kinyanjui, Special Education & Rehabilitation Counseling EDSRC-College of Education 229 Taylor Education Bldg PI phone #: (859)257-1135

FROM: Institutional Review Board c/o Office of Research Integrity

SUBJECT: Exemption Certification for Protocol No. 16-0358-X4B

DATE: May 9, 2016

On May 4, 2016, it was determined that your project entitled, "Examining the effects of ethnicity on transactional distance in an online distance learning course," meets federal criteria to qualify as an exempt study.

Because the study has been certified as exempt, you will not be required to complete continuation or final review reports. However, it is your responsibility to notify the IRB prior to making any changes to the study. Please note that changes made to an exempt protocol may disqualify it from exempt status and may require an expedited or full review.

The Office of Research Integrity will hold your exemption application for six years. Before the end of the sixth year, you will be notified that your file will be closed and the application destroyed. If your project is still ongoing, you will need to contact the Office of Research Integrity upon receipt of that letter and follow the instructions for completing a new exemption application. It is, therefore, important that you keep your address current with the Office of Research Integrity.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's IRB Survival Handbook web page [http://www.research.uky.edu/ori/IRB-Survival-Handbook.htm#IPresponsibilities]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site [http://www.research.uky.edu/ori]. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at (859) 257-9428.

An Equal Opportunity University
Appendix B

KCTCS Human Subjects Review Board (HSRB) Approval Letter
5/20/2016

Benson Kinyanjui
University of Kentucky
229 Taylor Education Bldg.
University of Kentucky
Lexington, KY 40506

RE: Examining the Effects of Ethnicity on Transactional Distance in an Online Distance Learning Course

Dear Benson:

After careful consideration of your application to the KCTCS Human Subjects Review Board, I have determined that you are eligible for exemption from federal regulations regarding the protection of human subjects based on your research using a procedure that meets the exempt review criteria section 7 (2).

Thank you for your cooperation in meeting the federal requirements for conducting research that utilizes human subjects. We appreciate your notification to this board and we will keep your information on file.

Sincerely,

Rhonda R. Tracy, Ph.D.
KCTCS Chancellor

Pamela M. Duncan
Associate General Counsel
Chair, KCTCS Human Subjects Review Board

cc: Alicia Crouch
Interim Vice Chancellor of Research & Policy Analysis
Appendix C

Permission to use Survey Questionnaire Items
RE: Request for Research Instrument

From: Xiaoxia Huang <xiaoxia.huang@wku.edu>
To: "Kinyanjui, Benson" <benson.kinyanjui@uky.edu>

Thank you for your interest in the transactional distance instrument. We have another article (Measuring transactional distance in web-based learning environments: an initial instrument development) detailing the development of the instrument, including the actual survey items. Feel free to use it in your study. Good luck on your dissertation!

Sincerely,

Xiaoxia "Shute" Huang, Ph.D.
Assistant Professor in Instructional Design
Gary A. Ransdell Hall #1028
School of Teacher Education
College of Education and Behavioral Sciences
Western Kentucky University
Office Phone: 270-745-4302
Email: xiaoxia.huang@wku.edu
www.wku.edu/online/ed
https://www.facebook.com/wkuInstructionalDesign

From: Kinyanjui, Benson J <benson.kinyanjui@uky.edu>
Sent: Tuesday, January 19, 2016 2:10 PM
To: Huang, Xiaoxia
Subject: Request for Research Instrument

Dear Dr. Huang,

I am a doctoral candidate in Rehabilitation Counseling at the University of Kentucky. My dissertation, which I intend to write this semester (Spring 2016) is tentatively titled, “Examining the effects of ethnicity on transactional distance in an online distance learning course.” My advisor and chair of my dissertation committee is Dr. Malachy Bishop.

I would like to review and possibly reproduce and use some sections of your survey instrument, specifically the one you developed and used to measure transactional distance as described in your article titled “Understanding transactional distance in web-based learning environments: An empirical study.”

If granted use of the survey I will abide by all formal conditions and any other specific conditions that you may stipulate.

Please let me know if this is agreeable to you.

Sincerely,

Benson J.

Benson Kinyanjui, M.Ed., CRC, CCM.
Department of Early Childhood, Special Education, and Rehabilitation Counseling
University of Kentucky
228 Taylor Education Building
Lexington, KY 40506
(859) 257-1135
benson.kinyanjui@uky.edu
Appendix D

Survey Questionnaire
EXAMINING THE EFFECTS OF ETHNICITY ON TRANSACTIONAL DISTANCE IN AN ONLINE DISTANCE LEARNING COURSE

1. I communicate with my instructor on course-related issues at least once a week.

2. I communicate with my instructor through multiple communication channels (e.g. emails, phone, discussion board and online chat).

3. Communication between me and the instructor in this online class is a dynamic two-way communication.

4. I actively engage in dialogues with my instructor to construct and share knowledge.

5. My communication with the instructor in this course is helpful in achieving learning objectives.

6. My communication with the instructor in this online class is something I look forward to.

7. I value my communication with the instructor on course-related issues.

8. The instructor values my input in our communication.

9. I communicate with my fellow students on course-related issues at least once a week.

10. I communicate with my fellow students through multiple communication channels (e.g. email, phone, discussion board and online chat).

11. Communication between me and other students in this online class is a dynamic two-way communication.

12. I actively engage in dialogues with other students to construct and share knowledge.

13. My communication with other students in this course is constructive/helpful in achieving learning objectives.

14. My communication with other students in this online class is something I look forward to.
15. I value my communication with other students on course-related issues

16. The course is structured in a way that enables me to work at my own pace to meet the course goals and objectives

17. The course is tailored to my learning needs that enable me to apply my learning to real-world experiences

18. The course is structured in a way that my difficulties during the learning process (e.g. unexpected problems) are accommodated

19. The course content is presented using multiple formats, such as text, audio and video

20. A variety of instructor strategies (e.g. discussion, reflection, demonstration, group work and case study) are used in this course to meet our learning needs

21. I have been given ample opportunities to practice before the final assessment of my performance

22. A detailed syllabus with clearly defined course objectives and schedule of content is provided at the beginning of the semester for this online course

23. Clear guidelines/rubrics on assignments, projects or other course-related tasks are provided for this online course

24. Clear guidelines regarding the desired quantity/quality of communications in this online course are provided

25. A detailed course policy (e.g. late submission, missed tests and online discussion behaviors) is provided for this online course

26. I am comfortable working with the course delivery system (e.g. Blackboard or Canvas) required for this course

27. I understand how to effectively use other technologies required for this online class.

28. I have been given ample opportunities to practice the technologies before I am required to use them for course activities
29. The course content is spatially and visually well-organized

30. The instructor provides technical support information, or tutorials/links to tutorials on technologies used in this online class

31. It is easy to navigate the course site to look for the information that I need

32. I feel a strong sense of belonging to this online course

33. I feel this online class is a cohesive learning community

34. I feel closely connected to my instructor in this online course

35. I feel the presence of my instructor in this online course, despite the physical distance between us

36. I feel a sense of isolation from my instructor in this online course

37. I feel I have a shared understanding of the course goals with my instructor

38. I feel my learning expectations have been met in this online course

39. I feel closely connected to my fellow students in this online course

40. I feel the presence of my fellow students in this online course, despite the physical distance between us

41. I feel a sense of isolation from my fellow students in this online course

42. I feel students in this online class have a shared understanding of each other’s learning experiences

43. The ethnicity that best describes me is
   - White
   - African American
   - Black (but not African American)
   - Hispanic
   - Asian
   - Other

44. I am
Male
Female

45. My age is
   Under 18
   14-24
   25-34
   35-44
   45-54
   55-64
   65 or older

46. I took PSY 110 in a
   4-Week Course
   6-Week Course
   Regular 16-Week Course

47. I reside in a/an
   Urban/City setting
   Suburban setting
   Rural/Country setting

48. This was my
   First online course
   Second online course
   I’ve had 3 or more online courses

Thank you very much for taking this survey.
Appendix E
Survey Questionnaire Items Distribution
### Survey Questionnaire Items Distribution

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<thead>
<tr>
<th>TD Types</th>
<th>Frequency</th>
<th>Items</th>
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<tr>
<td>Learner-Teacher TD</td>
<td>12</td>
<td>1-8, 34, 35, 36*, 37, 38</td>
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<tr>
<td>Learner-Learner TD</td>
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<td>9-15, 32, 33, 39, 40, 41*, 42</td>
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<tr>
<td>Learner-Content TD</td>
<td>10</td>
<td>16-25</td>
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<tr>
<td>Learner-interface TD</td>
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<td>26-31</td>
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<tr>
<td>Demographics</td>
<td>6</td>
<td>43-48</td>
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(*) Filter questions
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VITA
Benson Kinyanjui

Education:

1987 - 1989 Master of Education, Vocational Rehabilitation Counseling
Mississippi State University.

1986 - 1987 Bachelor of Science, Learning Disabilities
Mississippi State University.

1980 - 1982 Bachelor of Education, Special Education
Highridge Teachers College, Kenya.

Certifications:

2007 – 2014 Certified Brain Injury Specialist, CBIS #3079
American Academy for the Certification of Brain Injury
Specialists (AACBIS)

1997 - Present Certified Case Manager, CCM #7511
Commission for Case Manager Certification (CCMC)

1996 - Present Senior Disability Analyst #3370
Fellow, American Board of Disability Analysts (ABDA)

1990 - Present Certified Rehabilitation Counselor, CRC #24617
Commission on Rehabilitation Counselor Certification.

Professional Experience:

2015 Peer Reviewer: Sage Open Journal,
Aug. 2012 – 2016 Teaching Assistant: Masters in Rehabilitation Counseling
program, University of Kentucky, Lexington, KY.

May 2007 – Aug. 2012 Adjunct Faculty: Masters in Rehabilitation Counseling
program, Wilberforce University, Wilberforce, OH.

Specialist/Case Manager: HIRE Brain Injury Program,
Miami Valley Hospital, Dayton, Ohio.


1993 - 1995  Program Director: Family Intervention and Treatment Services (FITs), Lancaster, PA.


1987 - 1989  Vocational Rehabilitation Counselor: Mississippi Vocational Rehabilitation for the Blind, Region II, Columbus MS.


1986 - 1989  Adjunct Counselor: Student Support Services, Mississippi State University, MS.


**Manuscripts:**


communities: Challenges and solutions to service delivery. Switzerland: Springer International Publishing.


Monographs and Reports


Presentations:


**Unpublished Papers:**


**Research Activities:**

Project Number: HC 0168  
Name of Principal Investigator: Malachy Bishop  
Funding Source: NMSS  
Title of Project: Optimizing MS care: Multiple sclerosis patients’ perspectives and priorities for their MS care  
Dates of Approved/Proposed Project: 10/1/14-9/30/16

Council on Rehabilitation Education  
“Project to inform the revision of the CORE Graduate Educational Standards”  
Principal Investigator: Malachy Bishop  
Funding Period: January 2014-December 2016

Kentucky Comprehensive Statewide Needs Assessment, 2014-2015  
Principal Investigator: Allison Fleming

National Multiple Sclerosis Society  
“Comprehensive national analysis of the current and expected need for specialized housing among adults with multiple sclerosis”  
Principal Investigator: Malachy Bishop  
Funding Period: October, 2010-December 2012

**Research Training:**

NIDRR FIP Grant Writing and Advanced Multivariate Statistical Analysis Workshop. September 4-6, 2013.

**Research Interests:**

Traumatic brain injury, distance learning, multiple sclerosis, and refugees/migrants with disabilities.