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A Quantitative Comparative Analysis of EdD Persistence Factors

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by

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Lynda Leavitt, EdD

Dr. Lynda Leavitt, Dissertation Chair — January 14, 2022 Date

Bethany Alden-Rivers, Committee Member — January 14, 2022 Date

Dr. Kevin Winslow, Committee Member — January 14, 2022 Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

Whether studying physical sciences, social sciences, engineering, mathematics, humanities, or education, approximately one in every two doctoral students fail to persist to degree completion (Bowen & Rudenstine, 1992; Lovitts, 2001; Tinto, 2012). A quantitative comparative study focused on two populations; students currently enrolled in the professional doctorate EdD program and former EdD students, including students who started but did not finish the program. Research-based variables, characterized as personal and program factors driving doctoral student attrition, were tested for significance. The participation criteria defined at least 80% of the program's course content in totality was or is currently delivered online from a university offering the professional EdD degree, including affiliation with the Carnegie Project on the Education Doctorate (Allen & Seaman, 2015; Rockinson-Szapkiw et al., 2019). About half of the survey respondents attended an EdD program affiliated with the Carnegie Project on the Education Doctorate (CPED). In contrast, the other half attended an EdD program with no affiliation with CPED. The Community of Inquiry for Online Learning comprised four elements, teaching presence, social presence, cognitive presence, and emotional presence, and was the study's theoretical framework. A total of [n = 725] individuals responded to surveys, which yielded a sample size of [n = 475] usable responses from former and current EdD students. The data from 30 former students, who did not persist, was analyzed for comparative purposes. Survey respondents represented a diverse population of age, gender, ethnicity, and marital status, attending public, private, and for-profit colleges and universities from geographic locations throughout the United States. The independent variable for all but the last of 16 hypothesis tests were current and former

EdD students. The dependent variables were the personal and program factors. Five hypothesis tests included the effect of a moderating or second independent variable to reveal differences between the primary independent and dependent variables. The last hypothesis test compared time-to-degree between former students who attended an EdD program affiliated with the CPED and students who attended an EdD program with no affiliation with CPED. Within the 16 statements of hypothesis were 32 sub-hypotheses tests, of which the results indicated 19 were significant.

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Chapter One: Introduction

Historical Background of the Professional Education Doctorate

The roots of higher education in the United States began in the 17th century. Harvard University was the first institution of higher education, established in 1636 at Massachusetts Bay Colony, to students from prosperous families preparing to enter the clergy (Watts, 2015). Johns Hopkins University established the first PhD degree in 1876 (Bowen & Rudenstine, 1992). Doctoral programs in the United States provided future scholars with the opportunity to develop research skills across diverse fields. However, two options existed for students pursuing a terminal degree in education. Columbia University's Teaching College and Harvard University established the Doctor of Philosophy (PhD) for educators in 1893 and the Doctor of Education (EdD) in 1920, respectively (Cremin, 1978). Toma (2002) claimed, "the ideal [situation] is that there is a clear difference between the two degrees, the EdD, develops researching professionals, while the other [the PhD] trains professional researchers" (p. 3). Through research training, PhD students added to the body of knowledge in a selected field of study, and education professionals enrolled in EdD programs applied research-based methods to solve problems of practice (Friel, 2019; Mansfield & Stacy, 2017). Cremin (1978) found both PhD and EdD degrees had similarities–curriculum, thesis topics, and dissertation. Costley and Lester (2011) asserted the professional doctorate program, in contrast to a research-based doctorate, created an original contribution to the profession, demonstrated innovation, solved a complex problem, and then shared the study findings with other practitioners for potential implementation. Costley and Lester (2011) also asserted the

importance of sharing best practices and lessons learned from scholarly work to reach a broader audience than an organization or community of practice.

More recently, at the turn of the 21st century, with the proliferation of technology and internet connectivity, online or e-learning increased accessibility to undergraduate and graduate students, providing flexibility to working professionals (Allen & Seaman, 2015; Palvia et al., 2018). As a result, doctoral programs, traditionally taught face-to-face on college campuses, began to migrate courses and entire programs online to accommodate busy professional practitioners, who, in addition to work responsibilities, were also balancing family obligations (Fuller et al., 2014). The Carnegie Project on the Education Doctorate (CPED), established in 2007 with a consortium of 25 universities (p. 6), provided a framework for educators to prepare EdD students with the skills, tools, and knowledge to solve complex problems of practice facing education in the 21st century (CPED, 2021b; Storey et al., 2015). The CPED (2021b) stated, "a Problem of Practice is a persistent, contextualized, and specific issue embedded in the work of a professional practitioner, the addressing of which has the potential to result in improved understanding, experience, and outcomes" (para. 11).

Statement of the Problem

The significant problem related to doctoral student persistence was approximately half of all students who began doctoral programs did not complete the degree (Bowen & Rudenstine, 1992; Tinto, 1993/2012). Walker et al. (2008) claimed for PhD students, "estimates range from 20 percent to nearly 70 percent depending on [the] discipline" (p. 17). Holmes et al. (2018) asserted, "the pursuit of the doctorate is not for the weak and unmotivated" (p. 2). The high attrition rate was inclusive of Science, Mathematics,

Engineering, and Technology (STEM) fields of study pursuing doctoral degrees and non-STEM fields of study, such as Social Sciences and Education (Bowen & Rudenstine, 1992; Tinto, 1993/2012, Ross, 2009; Walker et al., 2008). The critical question was why such a large percentage of people, who previously demonstrated a track record of academic aptitude and success in baccalaureate and master's degree programs, started doctoral program studies and then failed to persist to degree completion (Gittings et al., 2018; Klocko et al., 2015). Lovitts (2001) conducted a study of [n = 816] PhD students who did and did not complete doctoral studies through a lens from the doctoral programs' perspective, asserting failure to solve the doctoral attrition problem put universities or university doctoral programs at risk of existence during periods of economic downturns or uncertainty. Furthermore, not solving the problems was losing intellectual capital to the professoriate and the labor markets. The cost to the students was devasting, demoralizing, and potentially compounded by the burden of financial debt (Lovitts, 2001).

Purpose of the Study

The purpose of the dissertation study was twofold. The first objective was to establish persistence factors related to attrition and inform an emerging three-year online, cohort-based Leadership EdD program at a private U.S. Midwest university with best practices and lessons learned to meet future scholar-practitioner needs. The second objective was to perform a quantitative comparative analysis using researched variables between students who completed the EdD with EdD students currently enrolled to assess the extent to which differences existed between the two populations.

The dissertation study differed from previous dissertations and scholarly works, utilizing the Community of Inquiry (CoI) for Online Learning theoretical framework (Garrison, 2017; Rienties & Alden Rivers, 2014) and CoI survey instruments (Arbaugh et al., 2008; Cleveland-Innes & Campbell, 2012). The researcher found no evidence of prior studies using the CoI framework to compare former and current EdD students using research-based persistence factors associated with the professional education doctorate. Furthermore, no evidence existed of previous studies testing affiliation with Carnegie Project on the Education Doctorate as a moderating variable.

Rationale

The literature review revealed many reasons why doctoral students did not finish doctoral programs. One common theme was after doctoral students completed the program's structured coursework phase, many students struggled in the program's independent dissertation phase (Ames et al., 2018; Lowery et al., 2018; Maul et al., 2018; Spronken-Smith, 2018). At the time of the study, a private Midwest University in the United States planned to launch a three-year online, cohort-based Leadership EdD. The professional doctorate program focused on developing educational leaders into scholar-practitioners who exhibited the knowledge and skills to create transformational change on relevant issues facing education. The university's current EdD program, established in 2007, held traditional on-campus, hybrid, or a blend of face-to-face and online classes, and online courses. The program also required passing a comprehensive examination upon completing coursework and writing and defending a five-chapter dissertation.

The Research Participants

The research participants came from two populations: (1) former EdD students and (2) current EdD students from universities offering an online EdD program, whether students completed the degree requirements or not. Allen and Seaman (2015) defined the criteria for an online course as having at least 80% of the course content delivered online (p. 7). In contrast, a blended/ hybrid course combined face-to-face and online instruction, which comprised 30 to 79% online content (Allen & Seaman, 2015). Rockinson-Szapkiw et al. (2019), who conducted a study of [n = 232] EdD students, expanded the online definition from course-level to program-level by defining "participation in a program in which 80% of course work is taken online" (p. 318). Student respondents were demographically diverse through the data collection process and attended small and large public, private, and for-profit colleges and universities. Universities and social media groups selected for surveying included but were not limited to those affiliated with the Carnegie Project on the Education Doctorate (CPED), whose membership included online doctoral programs. At the time of the study, the Carnegie Project on the Education Doctorate (CPED) consisted of a consortium of over 100 universities, some of which were sources of student survey data. The Carnegie Project on the Education Doctorate (CPED) mission provided a venue where participating universities discussed and shared best practices and lessons learned about how best to prepare doctoral students to become scholar-practitioners while consciously promoting social justice, diversity, and inclusion (CPED, 2021b). Thus, the participation criteria defined at least 80% of the program's course content in totality was or is delivered online from a university offering the

professional EdD degree, including affiliation with the Carnegie Project on the Education Doctorate (Allen & Seaman, 2015; Rockinson-Szapkiw et al., 2019).

Research Questions

Research Question 1: To what extent do the personal factors differ between former and current students?

Research Question 2: To what extent do the program factors differ between former and current students?

Research Question 3: To what extent do the program factors differ between former and current students with regard to attending a university affiliated with the Carnegie Project on the Education Doctorate?

Research Question 4: To what extent do the Community of Inquiry presences differ between former and current students with regard to participation in a cohort group?

Research Question 5: To what extent does Time-to-Degree differ between former students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED?

Null Hypothesis Statements

Null Hypothesis 1: There is no difference between the population of former and current EdD students' age during doctorate program studies.

Null Hypothesis 2: There is no difference between the population of former and current EdD students' gender during doctorate program studies.

Null Hypothesis 3: There is no difference between the population of former and current EdD students' ethnicity during doctorate program studies.

Null Hypothesis 4: There is no difference between the population of former and current EdD students' marital status during doctorate program studies.

Null Hypothesis 5: There is no difference between the population of former and current EdD students' number of children/ dependents during doctorate program studies.

Null Hypothesis 6: There is no difference between the population of former and current EdD students' work-life-study balance during doctorate program studies.

Null Hypothesis 7: There is no difference between the population of former and current EdD students' who attended a program orientation during doctorate program studies.

Null Hypothesis 8: There is no difference between the population of former and current EdD students' level of social presence, cognitive presence, teaching presence, and emotional presence during doctoral program studies.

Null Hypothesis 9: There is no difference between the population of former and current EdD students' relationship with the dissertation chair during doctoral program studies.

Null Hypothesis 10: There is no difference between the population of former and current EdD students' participating in a cohort group during doctoral program studies.

Null Hypothesis 11: The relationship between the population of former and current students who attended a program orientation during doctorate program studies is independent of students affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 12: The relationship between the population of former and current students' level of teaching presence, social presence, cognitive presence, and

emotional presence during doctoral program studies were independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 13: The relationship between the population of former and current students' relationship with the dissertation chair during doctoral program studies was independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 14: The relationship between the population of former and current students participating in a cohort group during doctoral program studies is independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 15: The relationship between the population of former and current students' level of teaching presence, social presence, cognitive presence, and emotional presence during doctoral program studies were independent of EdD students who students participated in a cohort group.

Null Hypothesis 16: There is no difference in time-to-degree between former students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Methodology

Quantitative methods addressed the research questions and hypotheses statements by analyzing the personal and program factors identified through the literature review process. The personal factors consisted of demographic information: age, gender, ethnicity, marital status, and children (Castelló et al., 2017; Gittings et al., 2018; Nettles & Millett, 2006; Ploskonka, 1993; Rankin & Garvey, 2015; Rockinson-Szapkiw et al., 2019). Three survey questions captured the extent to which scholar-practitioners balanced work, school, and family obligations (Ayaduri, 2018; Rockinson-Szapkiw et al., 2019). The program factors also included measures of social, cognitive, teaching, and emotional presence, defined by the Community of Inquiry 40-question survey instrument (Arbaugh et al., 2008; Cleveland-Innes & Campbell, 2012). The program factors also consisted of students attending a program orientation, being part of a cohort group, and the extent to which students were satisfied with the dissertation chair relationship (Berry, 2017; Gittings et al., 2018; Lim et al., 2019; Motte, 2019; Rockinson-Szapkiw et al., 2019; Santicola, 2013; Sverdlik et al., 2018). Also, a time-to-degree completion comparison, between students attending an EdD program affiliated with CPED and students who attended an EdD program with no affiliation to CPED, was analyzed (Bowen & Rudenstine, 1992; National Science Foundation, 2019; Sowell et al., 2015).

Two survey instruments, a 28-question survey instrument for current EdD students and a 42-question survey for former students, collected the data anonymously, using the Qualtrics platform (see Appendix A & Appendix B). The former student survey collected additional data to understand the reasons students dropped out of the EdD program. The Survey Research Information Sheet was the first question in both former

and current EdD student surveys, included informed consent verification by each survey participant (see Appendix C). A simple random sample, which "is one in which each and every member of the population has an equal and independent chance of being selected" (Fraenkel et al. 2012, p. 94), was used for the study. The Deans of Education distributed the surveys to former and current student populations, the independent variables representing the stratification, choosing to respond or not (see Appendix D). The initial IRB proposal identified 36 universities meeting the study's 80% online criteria. The most significant risk to the study was not meeting the desired sample size for the current and former student populations, including former students who did not persist to degree completion, which was a hard-to-reach population.

To achieve the desired sample sizes from the different populations of students, three additional IRB modifications, processed between late September and mid-October 2020, increased the number of universities contacted from 36 to 44. Also, the modifications addressed the Deans' or designees' request to distribute the survey to willing participants through course management systems or email, eliminating privacy concerns. While the three IRB modifications helped increase the sample size, the number of former students who did not persist through degree completion remained low. Therefore, two more modifications, processed to access social media sites, LinkedIn and Facebook, split the social media communication script into two, current students and former students. (see Appendix E & Appendix F). Gittings et al. (2018), Cleveland-Innes & Campbell (2012), and J. Taylor (personal communication, September 2, 2020) permitted either the use of and modification to existing instruments or questions (see Appendix G). The population of students responding to the survey attended about 70

small and large public, private, and for-profit universities, over 20 of which were CPED member institutions. Collectively, students responded from higher education institutions located in more than 30 states.

Definition of Terms

Asynchronous learning: "The flexibility provided by a course that is accessible 24 hours a day and provides more flexibility in terms of participation" (Allen et al., 2019, p. 125).

Attrition: "Generally refers to the failure of a student who has been enrolled to continue her or his studies; that is, the student has dropped out of the program" (Isaac, 1993, p. 15).

Blended Online Learning: "Combined asynchronous-mode learning environment (i.e., a web-based course) and synchronous-mode learning environment (i.e., a course offered in real-time via a "virtual classroom"), resulting in a completely online learning environment" (Power & Vaughan, 2010. p. 22).

Carnegie Project on the Education Doctorate (CPED): "A consortium of over 100 colleges and schools of education across the U.S. and Canada, [who] have committed to work together" to critically examine and evaluate the professional doctorate (EdD) through meaningful discourse (CPED, 2021a, para. 1).

Constructivist learning: "emphasized a learner-centered teaching environment, where the learner remains self-directed while collaborating with mentor [e.g., instructor] and peers [e.g., cohort]" (Franco & DeLuca, 2019, p. 25).

Critical friends: A concept "fostering trust among students, faculty, and stakeholders as they contribute to constructive dialogue that provides the basis for continuous improvement" (Story, 2016, p. 3).

Cronbach's alpha: "A formula that provides an estimate of the reliability of a homogeneous test or an estimate of the reliability of each dimension in a multidimensional test" (Johnson & Christensen, 2017, pp. 167–168).

Degree Completion: "The ultimate formal educational goal of the graduate student is to complete a degree" (Isaac, 1993, p. 16).

Distance Education: "The methodology of structuring courses and managing dialogue between teacher and learner to bridge the gaps through communications technology" (Moore, 2019, p. 34).

E-Learning: "The utilization of electronically mediated asynchronous and synchronous communication for the purpose of thinking and learning collaboratively" (Garrison, 2017, p. 2).

Entering cohort: "Refers to a group of degree-seeking students who begin their graduate programs at roughly the same time [such as the same year]" (Isaac, 1993, p.14).

Factor Analysis: "Refers to a group of related analytical methods, in which researchers evaluate whether the scores on a set of individual measured X variables can be explained by a small[er] number of latent variables or factors" (Warner, 2013, p. 829).

Multiple Imputation: "Is a statistical technique designed to take advantage of the flexibility in modern computing to handle missing data" (Rubin, 1987, p. vii).

Online learning: Allen and Seaman (2015) defined an online course as having "at least 80% of the course content delivered online" (p. 7).

Paralanguage: In an asynchronous learning environment, the use of emoticons or emojis were non-verbal cues to increase social presence (Gordon, 2017).

Problem of Practice: "A persistent, contextualized, and specific issue embedded in the work of a professional practitioner, the addressing of which has the potential to result in improved understanding, experience, and outcomes" (CPED, 2021b, para. 11).

Regression Model: A mathematical method that measured the relationship between a dependent variable and one or more independent variables (McClave & Sincich, 2017).

*Retention: "*The rate at which students persist in their educational program at an institution, *expressed as a percentage*" (National Center for Education Statistics, 2020, para. 1). Retention "generally refers to a student's continued enrollment. Retained students have not yet completed their studies, although students who received a degree can be counted as retained" (Isaac, 1993, p. 15).

Stop-out: "Students who interrupt their doctoral studies but return and ultimately attain their degree" (Nettles & Millett, 2006, p. 121).

Synchronous learning: A course that "requires a commitment to particular days, and specific times, when all students must access the course content to permit exercises to proceed" (Allen et al., 2019, p. 125).

The Community of Inquiry (CoI) Framework: "A generic and coherent structure of a transactional educational experience whose core function is to manage and monitor the dynamic for thinking and learning collaboratively" (Garrison, 2017, p. 24).

The Community of Inquiry for Online Learning: The Community of Inquiry Framework, adapted "by adding emotional presence" (Rienties & Alden Rivers, 2014, p. 6)

Limitations

In mid-October 2020, correspondence from a former student of one of the participating universities signaled the university's EdD program did not meet the 80% online course content criteria. The university EdD program administrator stated, "the program has always been a distance program, combination of F2F [face-to-face] and online/distance coursework" (University EdD program administrator, personal communication, October 14, 2020). Through additional communication, the administrator stated the university had "a different definition here of distance/online so unfortunately, we do not meet the 80% of the curriculum is delivered online" criteria (University EdD program administrator, personal communication, October 14, 2020). To quantify the limitation, a university director of online education claimed the university followed the Higher Learning Commission's [HLC] definition of distance education as:

> Programs as those in which 50% or more of the required courses may be taken as distance delivered courses (75% + of instruction and interaction occurs via electronic communication, correspondence, or equivalent mechanisms, with the faculty and students physically separated from each other). The university expands the [Higher Learning Commission] HLC definition to include programs delivered in nontraditional or atypical formats to reach working professionals. (Western Cooperative for Education Telecommunication, 2015, para. 1)

Limitations for underlying assumptions associated with statistical testing, such as normality of data distributions and presence of outliers are documented in Chapter Four.

Summary

The dissertation study identified statistically significant factors related to EdD doctoral student attrition. Chapter One provided contextual information for the dissertation study, which included the study objectives for a three-year online EdD program to develop scholar-practitioners to solve challenging and complex issues facing education. Through a literature review, doctoral program attrition was approximately 50% on average, ranging from 20% to 70% depending on fields of study (Bowen & Rudenstine, 1992; Lovitts, 2001; Terrell et al., 2016; Tinto, 1993/2012; Walker, 2008). The research design, addressed by quantitative methods, comprised five research questions and 16 hypothesis statements, which defined the factors driving high doctoral student attrition rates. Within some of the statements of hypothesis included sub-hypotheses statements.

Chapter Two examined the personal and program factors related to doctoral student attrition, leveraging e-learning based curriculum and delivered by engaged faculty through a learning management system. The Community of Inquiry for Online Learning, used as the theoretical framework for the study, focused on specific practices characterized by teaching, social, cognitive, and emotional presence in an e-learning environment (Rienties & Alden Rivers, 2014). The literature review concluded with the personal and program factors driving students' persistence to degree completion. Understanding the factors related to high attrition rates informed best practices and

lessons learned to support the private Midwest's university's online Leadership EdD doctoral program and potentially other EdD programs across the United States.

Chapter Two: The Literature Review

Introduction

Multiple researchers studied and quantified the doctoral persistence problem (Bowen & Rudenstine, 1992; Nettles & Millett, 2006; Ross, 2009; Terrell, 2016; Tinto, 1993/2012; Walker, 2008). With only about half of students persisting to completion across multiple academic fields, the study focused on the professional education doctorate (EdD) in the context of the degree's origins, evolution, contribution to society, and persistence factors. The study's theoretical framework was the Community of Inquiry (CoI) for Online Learning (Garrison et al., 2000; Rienties & Alden Rivers, 2014). The CoI for Online Learning was foundational for creating a productive online learning environment through meaningful discourse, reflexivity, and critically thinking about and solving educational leadership challenges. Also, the Carnegie Project on the Education Doctorate Consortium, since 2007, examined EdD best practices to develop scholar-practitioners in education and related fields capable of solving real-world and relevant problems of practice and implementing solutions leading to change (CPED, 2021).

The literature review included EdD and PhD studies with particular attention applied to EdD programs. The use of literature written no earlier than 2016 to build new knowledge was the goal. However, selective research sources, written before 2016, deemed foundational and relevant to doctoral degree persistence, were included in the Literature Review.

The History of Doctoral Student Persistence

Tinto (1993/2012) claimed approximately 50% of all doctoral students failed to complete the doctoral programs (p. 230). Bowen and Rudenstine (1992) conducted a

study collecting data "between 1967 and 1976, [with] over 13,000 students enrolled in PhD programs in the six specific fields [the humanities, economics, and political sciences, the social sciences, and mathematics and physics, the natural sciences]" in the university data set (p. 124). The completion rates, which excluded professional doctorates, ranged between 50%–65% (Bowen & Rudenstine, 1992, p. 124). Nettles and Millett (2006) conducted a stratified sample of 9,036 doctoral students from 21 universities and 11 fields of study between 1997 and 2001 (p. 41) and found on average, 62% completed doctoral studies with the remaining 38% unknown due to the study's conclusion (p. 121). Nettles and Millett (2006) claimed approximately 54% women and 49% of men in education completed the degree by 2001, respectively (p. 131). Walker et al. (2008) also claimed, "about half of today's doctoral students are lost to attrition–and in some programs, the numbers are higher yet" (p. 2), with ranges estimated between 20 to 70%, with differences attributed to the field of study and setting (p. 17). For example, Terrell et al. (2016) asserted, attrition in "an information-systems limited-residency [PhD] doctoral program" was between 60% and 70% (p. 151). Ross (2009) conducted a study of 198 students in an executive leadership, cohort, and residency-based doctoral program between 1990 and 2006 and found 45.9% of students completed the EdD. At the study's conclusion, 34.3% of students were still working toward degree completion, and 11% left the doctoral program, choosing either a master's degree or Educational Specialists certificate, and 9% dropped out (Ross, 2009, p. 76).

The retention of doctoral students, which expanded beyond the United States borders, was a multidimensional problem observed across higher education institutions worldwide (Ames et al., 2018; Castelló et al., 2017). Compounding the situation to

understanding the causes of attrition was national-level data collection organizations did not often separate education data between PhD and EdD students. As an example, K. Kang (personal communication, January 06, 2021) asserted, "only a small number of research-oriented education doctorate EdD recipients were included in the SED [Survey of Earned Doctorates]." Also, scholars, such as Bowen & Rudenstine (1992) and Nettles & Millett (2006), studied doctoral retention, attrition, and persistence focused on the PhD, not the professional doctorates such as the EdD.

While the roots of doctoral degree programs in the United States traced back to the latter half of the 19th century, the tracking of doctoral student progression did not begin until the early 20th century (Bowen & Rudenstine, 1992; Cremin, 1978). Isaac (1993) found a plethora of information on undergraduate students. Unfortunately, graduate-level details on retention and attrition were not available (Isaac, 1993), noting complexities in defining retention rates when students drop out, then returning to finish. Ploskonka (1993) claimed the National Research Council (NRC), since 1958, collected and distributed survey data, working together with graduate deans of accredited institutions of higher education. Deans provided data such as demographics and background characteristics (e.g., birthplace, national origin, marital status, and the number of dependents). Between the mid-1920s and 1957, agencies collected data on students who only completed doctoral studies, thus limiting completion rate data and other predictive measures (Bowen & Rudenstine, 1992). Additionally, Bowen and Rudenstine (1992) claimed the National Research Council data, utilized by institutions, performed different analyses for decision-making, including doctoral student predictions, such as time-to-degree completion.

Starting in the latter half of the 20th century, other government and non-profits organizations provided data and information to colleges and universities. The National Science Foundation (2020), through an annual Survey of Earned Doctorates census beginning in 1957, collected comprehensive data on doctoral student graduate characteristics; demographics, educational history, and post-graduate plans, including time-to-degree completion trends. The Integrated Postsecondary Education Data System (IPEDS), under the auspices of the National Center of Education Statistics, provided information on "tuition and fees, number and types of degrees and certificates conferred, number of students enrolled, number of employees, financial statistics, graduation rates, and student financial aid" (Ginder & Kelly-Reid, 2013, p. 1). The National Student Clearinghouse (2020), a non-profit and non-governmental organization since 1993, also provided data access to higher education institutions, among other education-related services.

The National Science Foundation (2017) claimed of the 54,904 new research doctorates granted in 2016, 98.1% were PhD, and 1.1% were EdD (para. 5). As an example of available data, Sowell et al. (2015) found, "among 3,829 underrepresented STEM doctoral students prior to April 2005, only 44% of them earned their doctorate degrees within seven years" (p. 15). Twenty percent of the cohort, still enrolled after the seven years, were no longer tracked. The National Science Foundation (2019) reported median-years-to-doctorate for over 55,000 students in multiple fields of study receiving research doctoral degrees at U.S. academic institutions. From July 01, 2017, through June 30, 2018, researchers from the National Science Foundation (2019) found the median-

time-to-doctorate for 4,834 students in education was 5.8 years (Table 54). Criteria for measurement included:

> Time to [a] doctorate from doctoral program start is based on master's degree entry if the master's degree was at the doctoral institution in the same field of study or was a prerequisite to the doctorate; otherwise, based on doctoral program entry. (National Science Foundation, 2019, Table 31)

The average time-to-degree for 62.2% of a sample of [*n* =143] doctoral [EdD and PhD] students enrolled at public universities within Missouri between 2010-2012 was 4.1 years (J. Kintzel, personal communication, June 12, 2020). The cohort of students, who began doctoral studies between 2010-2012, was tracked through 2019. Wisdom (2015) reported a private Midwest U.S. university's EdD degree time-to-completion, between 2009 and 2013, from the time students entered the first of three Capstones, was 33.05 months (p. 385). However, the time-to-degree completion could be affected by transferring credit hours from previous academic programs (Wisdom, 2015). Many researchers and organizations collected significant amounts of PhD demographic and time-to-degree data by field of study (Bowen & Rudenstine, 1992; Lovitts, 2001; National Science Foundation, 2019; Nettles & Millett, 2006). In contrast, very little national or state-level EdD data, similar to the PhD, was collected.

Distance Education and Online Learning

Moore (2019) defined distance education, of which correspondence courses and online learning were subsets, as "the methodology of structuring courses and managing dialogue between teacher and learner to bridge the gaps through communications technology" (p. 34). Anderson and Dron (2011) defined three generations of distance

learning with educational technologies described as (1) postal correspondence, (2) television, radio, and video, and (3) interactive audio-visual, internet, and conferencing technologies (p. 3). With the progression of educational technologies and pedagogies through the three-distance learning generations, the teacher-student and student-student relationships changed and adapted to different learning models, such as individual v. cohort models (Anderson & Dron, 2011). For example, in the Community of Inquiry model, Garrison (2017) claimed, "the goal is always to have students assume more teaching presence and become increasingly responsible" (p. 29) for constructing meaning and understanding.

The advent of the internet increased accessibility to graduate programs, from scheduled traditional classroom courses to more flexible e-learning venues where students connected and collaborated in a virtual environment (Garrison, 2017). Garrison (2017) asserted a community of inquiry had enormous potential through instructor-student and student-student relationships to develop and deliver curricula through online modalities, where students have meaningful discourse and develop critical thinking skills while connecting theory, research, and practice. Dron (2019) asserted online learning, in contrast to distance education, focused on data flow, building relationships, and student-student and student-faculty connections while being less concerned with the enabling technologies. Allen & Seaman (2015) conducted a survey of 4891 higher education institutions of which 2807 colleges responded, representing about 78.7% of enrollments (p. 38), and found approximately 71% claimed online learning was strategic to the university's long-term strategy from 48.8% in 2002 (p. 4), about 74% viewed learning outcomes in online education as the same or superior to face-to-face, compared to 57.2%

in 2003 (p. 5), and nearly 45% of chief academic officers reported retaining students was a more significant problem for online courses than for face-to-face-courses, compared to 27.2% in 2004 (p. 24). Allen and Seaman (2015) claimed an online course delivered 80+% of content online, while a blended or hybrid course offered 30–79% of course content online (p. 7).

Online Learning Modalities

Allen et al. (2019) defined asynchronous learning as a course accessible 24 hours per day to maximize schedule flexibility for participating students and synchronous learning as an online venue where students, connected through internet technology, required participation and commitment to specific days. Power and Vaughan (2010) claimed *blended online learning* combined an asynchronous online venue, enabled by a learning management system, with a synchronous component, enabled by audio-video conferencing capability for a complete online experience (p. 22). Garrison (2017) claimed online blended learning, which combined asynchronous and synchronous modalities, enabled teacher immediacy and increased social presence in a Community of Inquiry e-learning environment.

Richardson and Swan (2003) asserted teaching immediacy behaviors were critical for instructors teaching in an online e-learning environment. Roberts and Friedman (2013) stated teacher immediacy "behaviors included body position, vocal expression, eye contact, facial expression, use of names, personal examples, humor, and asking for student opinion" (Roberts & Friedman, 2013, pp. 40-41). Gurley (2018) conducted a mixed methods study to examine "educators' preparation to teach, perceived teaching presence, and perceived teaching presence behaviors" (p. 197), including adapting the 13

Community of Inquiry survey's Teaching Presence questions for quantitative analysis. Gurley (2018) found a significant relationship of perceived teaching presence for faculty teaching both blended and online courses who completed a certification course compared with uncertified instructors, whose means (with standard deviations in parentheses) and measured on a 4-point Likert scale (0 = *Low* to 4 = *High*) were 3.48 (.40) were 3.13 (.28), respectively (p. 210). Power and Vaughan (2010) conducted a qualitative study at two Canadian universities and synthesized feedback from multiple stakeholders highlighting the advantages and disadvantages of blended online learning (see Table 1).

Table 1

Advantages and Disadvantages of Blended Online Courses

Participants	Advantages	Disadvantages
Faculty & Students Perspectives		
Synchronous Tools	Increased student engagement	Issues/ user-friendliness with technology
	Use of breakout sessions	Time zone differences may affect scheduling for some students.
	Guest speakers' participation	The synchronous venue does reduce student schedule flexibility.
	More comfortable to form relationships with students	Potential lack of support for evening and weekend classes
	Students' access to course material from anywhere and anytime	Harder to make connections, which could impact the quality of discussion

Continued.

Table 1. Continued

	Increased geographical reach Satisfying and quality learning experience	
Administration and Instructional Designer Perspectives		
Synchronous Tools	Same courses offered by the same faculty members	Essential to not use synchronous video conferencing as a venue for lecturing students.
	Student flexibility to complete courses	Requires significant bandwidth to deliver synchronous courses
	Record and archive class sessions for later use by students	
Asynchronous Tools	Expand enrollment, potentially reduce per seat cost	

Note: The advantages and disadvantages of online courses, consisting of a blend of synchronous and asynchronous curricula. The feedback combined perspectives from faculty and students and administration and instructional designers. Adapted from Power & Vaughan (2010).

Multiple researchers claimed while asynchronous online programs provided doctoral students with schedule flexibility, students' potential to feel separated from colleagues and faculty adversely contributed to program persistence to degree completion (Ames et al., 2018; Brown, 2017; Maul et al., 2018). However, different student demographics had course delivery preferences along the continuum of asynchronous and synchronous learning. Perry (2012) and Rockinson-Szapkiw et al. (2017) claimed female

doctoral students chose an EdD program in which the work environment became the laboratory to prepare future scholar-practitioners. An integrated work environment combined with online curricula provided female doctoral students with the flexibility needed to balance the multiple identities of being a mother, having a professional career, and being a student (Rockinson-Szapkiw et al., 2017).

Fuller et al. (2014) claimed the online EdD program differentiated itself from other doctoral programs, providing schedule flexibility for practitioners to learn and apply new knowledge and research skills directly related to problems of practice (p. 4). A large public U.S. university in the South "employs a full-time faculty member to develop the program, to guide instructors, and to be a point person for all students' logistical issues" (Fuller et al., 2014, p. 4). Lee et al. (2017) surveyed 66 graduate students enrolled in educational leadership courses to assess social presence differences between three class venues; online synchronous, online asynchronous, or face-to-face learning environments using a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The results between the three learning environments were nonsignificant concerning students feeling like a group member and comfortable in-class participation; however, results indicated significance for impressions of or familiarity with classmates (Lee et al., 2017). One instructional designer asserted, "there seems to be lower attrition in a synchronous [classroom-based] course than in an asynchronous [discussion forum-based] course" (Powers & Vaughan, 2010, p. 33).

The Community of Inquiry Framework

The Community of Inquiry (CoI) framework, introduced initially by Garrison, Anderson, and Archer (2000), represented processes and procedures within three interdependent elements—social presence, cognitive presence, and teacher presence.

> Each presence in the CoI model implies some form of interaction in an online environment, i.e., teaching presence refers to interaction with instructors, social presence refers to interaction with other participants, and cognitive presence refers to interaction with [course] content. (Saadatmand et al., 2017, p. 64).

The CoI guided the structure and scaffolding of course curriculum, design, and delivery for online and distance education learners (Garrison, 2017; Saadatmand et al., 2017; Stavredes & Herder, 2019). Garrison (2017) stated the initial CoI framework, through an examination of publications between 2009 and 2013, was the most frequently referenced theoretical framework; evidence the Community of Inquiry theory was beneficial to students who generated knowledge in e-learning environments. For example, the CoI framework enabled a meaningful learning environment for faculty and students engaged in a psychologically safe climate to think critically and have meaningful discourse, providing professional development and growth for working professionals (Fuller et al., 2014; Garrison, 2017). Spoken communication in a face-to-face environment and, to a lesser extent, a synchronous environment provided instructors opportunities to demonstrate teacher immediacy behaviors, such as facial expression, body language, and tone of voice (Garrison et al., 2000). In contrast, written communication in asynchronous or blended online learning environments suggested writing had advantages over synchronous or spoken communication learning environments, giving students “time to

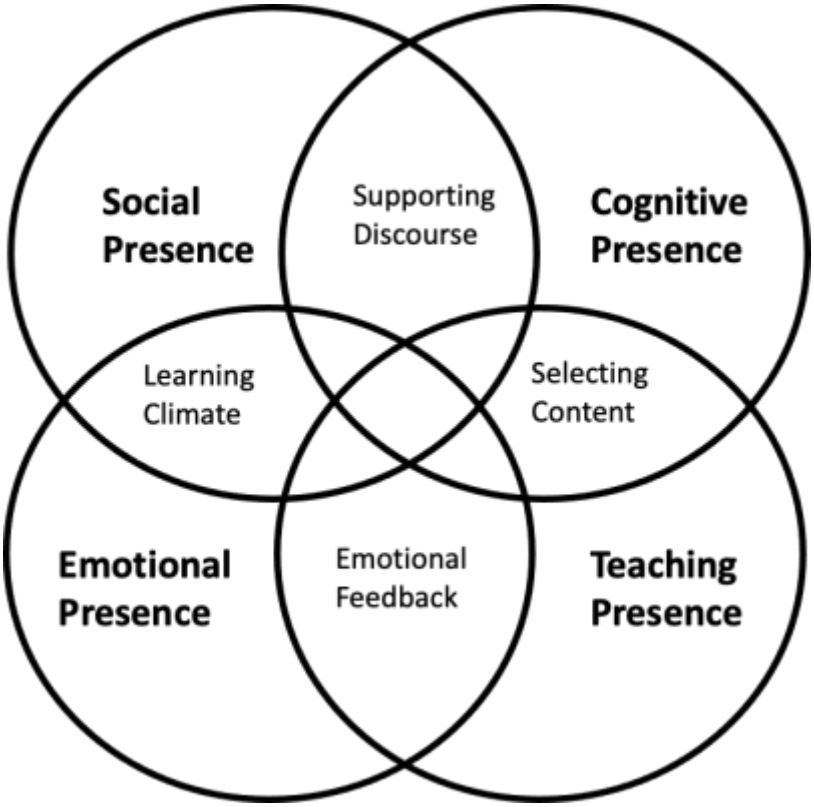
reflect, to be more explicit, and to order the importance of issues, [enabling] teachers to conduct high-level questioning" (Garrison, 2017, p. 19.).

The Community of Inquiry Framework for Online Learning

By conducting an extensive literature search of 100 or more sources, Rienties and Alden Rivers (2014) found approximately 100 different emotions could affect learners' attitudes, behavior, and cognition, which could be challenging to detect in online asynchronous environments. Several other researchers conducted studies to evaluate emotional presence in a community of inquiry (Cleveland-Innes & Campbell, 2012; Fernando & Marikar, 2017; Jiang & Koo, 2020; Stenbom et al., 2016) supported the addition of emotional presence to the Community of Inquiry framework. As a result, Rienties and Alden Rivers (2014) expanded the CoI framework, suggesting emotional presence added as a separate construct, thus, *the study's theoretical framework*. Figure 1 depicts the CoI Framework for Online learning, followed by a description of each of the four presences.

Figure 1

The Community of Inquiry Framework for Online Learning



Note. The Community of Inquiry Framework for *Online Learning* added emotional presence, recognizing the importance of instructors maintaining awareness of students' emotions in an online learning environment. From Rienties and Alden Rivers (2014). Reprinted with permission (see Appendix D).

Social Presence

"Distance education barriers can dull or even nullify online instructors' humanness, such as showing emotion, humor, sympathy, and empathy" (Lowenthal & Dunlap, 2010, p. 70). Lowenthal and Dunlap (2010) asserted the attributes, when demonstrated by instructors, cultivated social presence with students through relationship-building and trust. Garrison (2017) emphasized the increased difficulty of

achieving meaningful discourse when moving from spoken communication in a synchronous learning environment to written communication in an online, asynchronous learning environment. Garrison (2017) believed while text-based communications had limitations, the compensating advantages could result in higher levels of critical thinking and content-related discourse between students. Online learning required students to maintain a social presence through open, affective, and transparent communication and identify with and be active cohort group members (Cleveland-Innes et al., 2019). Swan and Richardson (2107) claimed social presence, in the context of the Community of Inquiry framework, "is viewed primarily in terms of the communication behaviors and perceptions of participants in online discussions" (p. 65).

Lowenthal and Snelson (2017) conducted a meta-analysis to investigate research-based social presence definitions, categorized around five themes: *Being there, being real, projecting, connecting,* and *belonging* (p. 3). Gordon (2017) claimed being there or being present in a community of inquiry was about leaders modeling behaviors for students to develop social presence skills, such as communication and collaboration in e-learning environments. Being real or being authentic was about using paralanguage in an asynchronous learning environment, such as emoticons or emojis, to "express emotions in the absence of body language indicators that typically function as social presence indicators" (Gordon, 2017, p. 105). Lowenthal and Snelson (2017) stated projecting was about the degree to which students offered thoughts and perspectives or sharing information in a community of inquiry. Whiteside et al. (2017) asserted to build connectedness in a community of inquiry, instructors at the beginning of a course assigned students the task to either create an introductory video, a written summary, or

use an icebreaker before teaching course content. The activities allowed students to develop social presence with each other and for instructors to show interest in students on an individual level (Whiteside et al., 2017). Students found receiving or providing feedback through a peer-review process improved research skills and academic writing, contributing to a sense of belonging, a positive mindset, and a readiness to learn (Smith et al., 2016).

Chen et al. (2017) found establishing protocols such as discussion instructions, rubrics depicting grading criteria, and examples from exemplary students helped students improve communication with peers, facilitate learning, and enhance online discussions while minimizing instructor facilitation. Lowenthal and Dunlap (2010) asserted digital storytelling was a powerful strategy for both faculty and students, creating social presence in e-learning environments. For example, faculty participating in a community of inquiry, through audio-visual technology, exposed personalities and styles, highlighted course success strategies, providing insights into pedagogy approach and personal values (Lowenthal & Dunlap, 2010). Stavredes and Herder (2019) noted students organized in smaller groups built more meaningful relationships with one another, which established trust and enabled deeper levels of engagement in the learning process while sharing ideas in a psychologically safe environment.

Ice et al. (2011) stated social presence was about how cohort-based learners collaborated in an online environment to make meaning of new information and knowledge by communicating thoughts, ideas, and points of view through affective expression and emotional feelings. Strengthening cohesion of the cohort required participants to engage in the active learning process continually, whether through

asynchronous (written) or synchronous (spoken) communication (Ice et al., 2011). Lowenthal and Mulder (2017) asserted implications when using education technology to keep in mind people establish social presence, not the technology. How instructors and students use technology matters, in contrast to the technology's capabilities, and when introducing new technology, people required time to become proficient (Lowenthal & Mulder, 2017).

Berry (2017) conducted a qualitative study of 20 students in a U.S. West university, participating in two EdD program cohort groups, where each cohort group started programs simultaneously, following the same curriculum sequence, and expecting to graduate together. The study's results indicated 18 of the 20 students reported a positive experience, feeling a greater sense of community, providing academic support to each other, performing peer reviews on assigned work, and emotional support (Berry, 2017). Ewing et al. (2012) asserted collaborative learning through cohort groups, used at a Southwest U.S. university Doctor of Health Sciences program, leveraged the program's learning management system, where students shared research materials, such as survey instruments, and exchange feedback through discourse and inquiry. In contrast, a large public Mid-Atlantic university in the U.S. employed a cohort model in a three-year Ed.D program, occasionally finding cohorts members who could be confrontational and demanding with faculty (Mansfield & Stacy, 2017). Rockinson-Szapkiw et al. (2017) argued female doctoral students balanced multiple identities while highlighting the difficulties in building relationships in online courses. The intersection of being a mother combined with becoming a scholar and working in a professional career led some participants to expressions of "unpleasant emotions and tensions" and "guilt and fear"

(Rockinson-Szapkiw et al., 2017, p. 61) and, therefore, expressed the need for forming groups for emotional support.

Cognitive Presence

Cognitive presence was about how students learned new material, information, or methods, then processed, evaluated, analyzed, thought critically about, discussed, and connected to previous learnings (Garrison et al., 2000). Garrison (2017) asserted cognitive presence was synonymous with critical thinking, reflection, and discourse for applying newly acquired knowledge within a learning community. Cognitive presence, defined by Garrison et al. (2000) as the most significant presence, was about the extent to which participants constructed meaning and new knowledge. Franco and DeLuca (2019) claimed a constructivist learning approach "emphasized a learner-centered teaching environment, where the learner remains self-directed while collaborating with mentor [e.g., instructor] and peers [e.g., cohort]" (p. 25).

Students, who possessed strong critical thinking skills within a constructivist educational framework, applied existing knowledge to solve new problems through inquiry, reflection, and discourse (Arbaugh et al., 2008; Cleveland-Innes et al., 2019). "Constructivist learning theory states that through consultation in the community, learning can be the process of construction and cognition of knowledge" (Xu & Shi, 2018, p. 883). Xu and Shi (2018) asserted teachers who modeled constructivist learning created environments inspiring students to practice active discovery, autonomy, and building knowledge. Fernando and Marikar (2017) conducted a study about constructivist teaching, participatory methods, and learning theory using a questionnaire consisting of 11 yes or no questions. The results from the study, measured by high percentages of yes

responses, found [*n* = 41] students claimed active learning environments, such as group discussions, educational visits, brainstorming, and question and answer venues, improved the learning experience, which confirmed the use of participatory methods (Fernando & Marikar, 2017, p. 119).

Cognitive presence consisted of "four phases of inquiry–triggering event, exploration, integration, and resolution" (Garrison, 2017, p. 26). Stavredes and Herder (2019) found triggering events, such as instructor-led problems or questions, promoted discussion among learners, then students researching to formulate potential solutions. Cleveland-Innes (2019) claimed the exploration phase meant navigating through the problem complexities searching for feasible solutions. Integration required people to exercise critical thinking and meaningful discourse by considering the multiple dimensions of a problem when formulating an explanation or answer to a question (Cleveland-Innes, 2019). Stavredes and Herder (2019) asserted the final step, problem resolution, occurred when students analyzed or tested solutions for validity.

One dimension of cognitive presence was about how students assimilated new knowledge and connected the information to previous learnings (Cleveland-Innes, 2019; Stavredes & Herder, 2019). Furthermore, research studies found instructors motivated students through group activities, brainstorming, and conducting research (Fernando & Marikar, 2017; Stavredes & Herder; 2019). Instructors inspired students through challenging course content and assignments to increase cognitive presence, and students responded by thinking critically and engaging in active learning, reflection, and productive discussion with peers (Cleveland-Innes, 2019; Stavredes & Herder, 2019; Xu & Shi, 2018).

Teaching Presence

Having teacher presence consisted of developing, designing, and implementing the curriculum while encouraging discourse between students and providing timely feedback. Anderson et al. (2001) defined teaching presence "as the design, facilitation, and direction of cognitive and social processes to realize personally meaningful and educationally worthwhile learning outcomes" (p. 5). Garrison (2017) claimed teaching presence integrated social and cognitive presence, which aligned learners' needs in an e-environment. In addition to instructors, Garrison (2017) argued the students' goal was also to take responsibility for developing and evolving teaching presence skills. Teaching presence included providing actionable feedback to the learners to achieve purposeful cognitive and social presence in a community of inquiry (Arbaugh et al., 2008). Other researchers identified multiple teaching presence strategies, enabling student learning in online environments by keeping students connected with faculty and other students (Cleveland-Innes & Campbell, 2012; Holbeck & Hartman, 2018; Kennette & Redd, 2015; Thompson et al., 2017).

> The emerging internet and communications technology have made communities of inquiry possible, allowing students to interact where and when they choose and collaboratively engage in a purposeful group environment. As a result, there is a growing awareness and responsibility in terms of applying technology with greater understanding and purpose. (Cleveland-Innes et al., 2019, p. 74)

Holbeck and Hartman (2018) believed combining technology with teaching strategies helped "online classrooms to become communities of inquiry" (p. 92). Technology tools, such as video capability in discussion board assignments, enabled instructors and students

to put faces with names (Holbeck & Hartman, 2018). Thompson et al. (2017) also believed instructors in an online environment needed to go beyond setting up the course in a learning management system (LMS) and populating learning modules for students to work through and complete assignments. As an example of strategic technology use aligned with the Community of Inquiry framework, Thompson et al. (2017) used an online tool with audio-visual capability to introduce lessons and prepare students for upcoming assignments, thus increasing an instructor's teaching presence and cognitive presence by the students. Kennette and Redd (2015) claimed the instructor increased presence by being available by email, in addition to regular office hours, and posting daily announcements, grades, and upcoming events for added course content. Kennette and Redd (2015) also claimed, "the instructor provided detailed feedback, which was often personalized for that specific student" (para. 20). Patterson (2012) asserted instructors increased focus on students' diverse population in online courses and incorporated teaching practices to mitigate the implications of different cultures and backgrounds to enable student success. Patterson (2012) also asserted social justice issues of equity and inclusion existed in online learning environments and suggested instructors keep abreast of trends and soliciting feedback from students on the degree of and reliance on technology usage.

The results of three studies, one quantitative and two qualitative, supported the Community of Inquiry for Online Learning as the theoretical framework. Rockinson-Szapkiw et al. (2016) conducted a quantitative analysis of 131 students in two educational technology graduate-level courses; one course taught in an asynchronous format, the other a blended online learning format. The independent variable was the

original Community of Inquiry's three presences—social, cognitive, and teaching—combined with three constructs of *perceived learning*, cognitive, affective, and psychomotor scales (independent variables); the dependent variable was total points earned during the semester. The model found teaching, cognitive, and social presence, and *affective learning* significant, explaining 55.6% of the variation in course points with results between the two different course formats nonsignificant (Rockinson-Szapkiw et al., 2016, p. 28). Affective learning in an online environment reflected the extent to which students were satisfied with learning course material, the learning management system, awareness of the course subject, the learning environment, and overall course enjoyment (Russo & Benson, 2005). Pool et al. (2017) conducted a qualitative analysis and found teaching was the integrating presence in blended courses where the instructor created the learning environment through purposeful communication and discourse, enabling students to develop social and cognitive presence. Well-structured courses combined with active lectures and learning strategies strengthened critical thinking skills (Pool et al., 2017). Blau et al. (2020) conducted a qualitative study of 78 students in four graduate online education courses to examine a course design, which encouraged teamwork and participation, reflecting students' level of cognitive, social, and emotional perceived learning. Out of a total of [n = 1870] codes, 568 aligned with perceived learning, consisting of 189 cognitive responses, 173 positive-emotional responses, 103 negative-emotional responses, 79 social-positive responses, and 24 negative-social responses (Blau et al., 2020, p. 6).

Thus, teaching presence was the integrating presence for enhancing students' cognitive, social, and emotional presence in a community of inquiry e-learning

environment (Garrison, 2017). Exemplary teaching presence was about instructors who developed and delivered curriculum using multiple sources of information, provided timely feedback on assignments, identified misperceptions or lack of understanding (Cleveland-Innes et al., 2019). Also, teaching presence engaged students in an e-learning environment through collaboration, productive discourse, and reflection with faculty and peers to strengthen critical thinking and achieve learning outcomes (Anderson et al., 2001; Garrison, 2017). Also, given the high number of cognitive and positive social responses (Blau et al., 2020), the findings aligned with Rockinson-Szapkiw et al.'s (2016) study, which found cognitive presence, social presence, and cognitive learning, one perceived learning construct, statistically significant in predicting course points.

Emotional Presence

Cleveland-Innes and Campbell (2012) asserted students and instructors transitioning to learning in online environments, combined with emerging technologies, resulted in emotional responses, which could adversely impact student learning. Furthermore, Cleveland-Innes and Campbell (2012) were one of the first researchers to claim, "emotional presence may exist as a fundamental element in an online community of inquiry" (p. 269). Afterwards, multiple researchers also argued for adding emotional presence to the CoI framework (Jiang & Koo, 2020; Kim et al., 2014; Majeski et al., 2018; Rienties & Alden Rivers, 2014; Stenbom, 2016). Garrison (2017) resisted, arguing unnecessary complexity to the framework, and asserted the social presence construct encompassed emotional presence, and "care must be taken to preserve its [the CoI's] integrity and parsimony" (p. 31). The original three-presence CoI model, limited to emotional expression and incorporated within the social presence dimension, benefitted

from a broader emotional intelligence construct, which combined learner motivation and cognition (Majeski et al., 2018; Shea & Bidjerano, 2010). “Emotional intelligence referred to an ability to recognize the meanings of emotions and their relationships, and to reason and problem-solve on the basis of them” (Mayer et al., 2000, p. 267). Majeski et al. (2018) suggested, “emotional intelligence would support a much broader role for emotional presence in learning and embrace to a larger extent how emotions play out in the learning process” (p. 53). Trejo (2016) defined four components of emotional intelligence as emotional self-awareness, emotional self-management, emotional self-awareness of others, and emotional management of others, and measured by the Genos EI 70-question survey (Consortium for Research on Emotional Intelligence in Organizations, 2021; Trejo, 2016). Stenbom et al. (2016) also argued emotional presence as a fourth and distinct construct in a community of inquiry, categorized as activity emotion, outcome emotion, and directed affectiveness. These three categories described how students responded to a learning or coaching activity requiring critical thinking, student responses to achieving success or failure, and emotional expressions or moods during conversations with an instructor (Stenbom et al., 2016). Emotionally intelligent instructors combined subject matter expertise with pedagogical skills to maximize student learning (Mortiboys, 2012). Mortiboys (2012) asserted instructors equipped with high emotional intelligence levels could meet students’ needs through active listening, being attentive to students by displaying confidence, exercising flexibility, and being ready to respond constructively to increase cognitive and emotional presence.

A literature review conducted by Rienties and Alden Rivers (2014), who suggested adding emotional presence as a fourth and distinct construct, found limited

research to quantify the relationship between emotions, learning, and student achievement, especially in an online environment. Additionally, Rienties and Alden Rivers (2014) argued for understanding students' emotions and reactions across the spectrum of situations during the learning process, citing advances in analytics, such as face and voice recognition, smartphones, and tablets could monitor learners' emotions in real-time. Garrison (2017) claimed the challenge of teaching in an asynchronous online learning environment was the lack of visual cues, which provided a perspective on students' emotions during the learning process. Hillaire (2016) claimed teaching in online programs diminished an instructor's ability to detect students' emotions in written text-based assignments, such as discussion boards. To mitigate the problem, Hillaire (2016) suggested incorporating videos or synchronous communication into assignments reintroduced visual cues such as facial expressions, tone of voice, and body language to increase the instructor's situational awareness of students' emotions.

Jiang and Koo (2020) conducted a mixed-methods study using the CoI model of [n = 45] with education graduate students using the 40-question survey and found emotional responses "[statistically] significantly lower [and with a higher spread] than cognitive, teaching, and social presence ratings" (p. 93) in an e-learning environment. Participants expressed enjoyment and happiness related to the convenience of online learning while exhibiting frustration and disappointment regarding the transition to the dissertation process, which likely explained the lower scores and higher standard deviations in the survey scores (Jiang & Koo, 2020). Mortiboys (2012) claimed international students, in addition to affective emotions such as anxiety and loneliness resulting from being away from home, "reported feeling powerless, excluded, ignored,

isolated, marginalized, distanced, indignant, and afraid" (p. 144). When teaching international students, Mortiboys (2012) argued emotional intelligence behaviors were about developing self-awareness, planning for exchanges, developing and demonstrating empathy regarding cultural differences, being respectful, and valuing the experiences international students brought to a classroom. Kim et al. (2014) developed a hierarchical regression model to test for a relationship between student achievement with three independent variables, motivation, achievement emotions, and cognitive processes. The regression model's results indicated achievement emotions explained 37% of student achievement variation when combined with motivation variables, self-efficacy and intrinsic value (p. 179). Stenbom et al. (2016) conducted a study of one-on-one coaching between a tutor and student in mathematics using technology to simulate synchronous communication, which provided the coach and student the ability to use a virtual whiteboard to display mathematical equations combined with text discussion. After coding 60 conversations, Stenbom et al. (2016) asserted "the almost complete absence of outcome emotion in this study was surprising, as prior investigations have found strong emotional expressions among coaches regarding assignments and tests" (p. 49). Trejo (2016), using the Genos 70-question survey, conducted a quantitative study of a project team to determine if a relationship existed between emotional intelligence (EI) competencies (independent or predictor variables) and project outcomes (dependent variable), such as completing the project on schedule, within the budget, and without adding scope or additional project requirements. Results from the study, consisting of a sample size of 88 people assigned to teams of five or more individuals, indicated moderate positive correlations between the project outcomes and all four EI variables and

supported the rejection of the null hypothesis (Trejo, 2016, 2016, p. 69). Furthermore, the results indicted significance of emotional management of others and emotional self-awareness of others as a predictor for achieving project outcomes in a regression model.

Thus, multiple researchers argued emotional presence as a much broader construct than affective expression incorporated by Garrison et al. (2000) into the three-presence Community of Inquiry model (Cleveland-Innes & Campbell, 2012; Kim et al., 2014; Majeski et al., 2018; Mortiboys, 2012; Rienties & Alden Rivers, 2014; Shea & Bidjerano, 2010; Stenbom et al., 2016; Trejo, 2016). Also, two researchers quantified emotional presence, adding six additional questions to Arbaugh et al.'s (2008) survey, resulting in the 40-question CoI survey instrument (Cleveland-Innes & Campbell, 2012; Jiang & Koo, 2020). Blau et al.'s (2020) qualitative study found 173 emotional-positive and 103 emotional-negative responses, differentiated from social-negative and -positive responses, also supported the inclusion of emotional presence as a separate construct. The former and current student surveys incorporated the 40-question CoI survey (see Appendix A & Appendix B) in the study's research design.

The Carnegie Project on the Education Doctorate

The Carnegie Project on the Education Doctorate was a driving force in developing and evolving the professional education doctorate. Perry, Zambo, and Abruzzo (2020) examined the Carnegie Project on the Education Doctorate (CPED), which partnered with universities to develop the EdD. Over 100 consortium "members have committed to work together to undertake a critical examination of the doctorate in education (EdD) through dialog, experimentation, critical feedback, and evaluation" (CPED, 2021a, para. 1). Perry, Zambo, and Abruzzo (2020) asserted an outstanding

success of leading change by faculty representatives from member universities, establishing the CPED Vision, Mission, and Guiding Principles, reflected in Table 2.

Table 2

Descriptions of CPED Guiding Principles

Principles	Description
1	Is framed around questions of equity, ethics, and social justice to bring about solutions to complex problems.
2	Prepares leaders who can construct and apply knowledge to make a positive difference in the lives of individuals, families, organizations, and communities.
3	Provides opportunities for candidates to develop and demonstrate collaboration and communication skills to work with diverse communities and to build partnerships.
4	Provides field-based opportunities to analyze problems of practice and use multiple frames to develop meaningful solutions.
5	Is grounded in and develops a professional knowledge base that integrates both practical and research knowledge and that links theory with systemic and systematic inquiry.
6	Emphasizes the generation, transformation, and use of professional knowledge and practice.

Note. The Carnegie Project on the Education Doctorate (CPED) Guiding Principles for Design. Adapted from Carnegie Project on the Education Doctorate (2021b).

Signature Pedagogy

Shulman (2010) claimed, "the sharp distinction between preparation for research and preparation for professional practice is distracting and dysfunctional" (para. 9), arguing professional education was about preparing scholar-practitioners who addressed critical societal problems. By applying lessons learned from the pedagogies used in other professions, e.g., medicine, Shulman (2010) advocated for experimenting with doctoral

programs where consortia of doctoral programs "agree to collaborate by exchanging ideas, curriculum models, data from students, and alternative prototypes for capstone performances and assessments" (p. 28). Shulman (2005) introduced three dimensions of *signature pedagogy*, surface structure, deep structure, and implicit structure. These three structures consisted of teaching and learning, assumptions about how students make meaning of the information imparted, and professional beliefs, including attitudes, judgment, integrity, and ethics (Shulman, 2005). Signature pedagogies teach students to think critically by learning to connect ideas and concepts by applying new knowledge gained through curricula, reflection, discourse, research-based methods, and problem-solving skills (Kochhar-Bryant, 2016). Kochhar-Bryant (2016) claimed professional practice doctorates pedagogies "begin with real problems that engage students and deepen understanding or research-based and practical knowledge" (p. 191).

Perry, Zambo, and Crow (2020) asserted students began working on the Dissertation in Practice (DiP) as early as the first semester, defining the problem of practice. Concurrent with coursework, students refined the problem of practice through the literature review, developed the research design, and tested and analyzed solutions. (Perry, Zambo, & Crow, 2020). Data from CPED Member Reports showed 30% of CPED affiliated EdD programs start students on the DiP in the first year and 35% in the second year (Carnegie Project on the Education Doctorate [CPED], 2020, p. 20). Storey and Maughan (2016) asserted the scholar-practitioner had a bias for action and motivated to solve problems of practice aligned with an organization's vision and mission. As an example of a signature pedagogy applicable to the professional education doctorate, students accepted into a private midwestern university's three-year online EdD program

are experiencing a design-thinking and human-centric leadership curriculum (L. Leavitt, personal communication, September 4, 2020). The design thinking innovation process, following Stanford University's Hasso Plattner Institute of Design (d. school), consisted of five stages; empathy, define, ideate, prototype, and test – a pedagogical framework applicable to doctoral students solving a problem of practice (Ulibarri et al., 2014).

"Within most systemic [organizational] structures, [in which leaders have the responsibility to move organizations forward] decision-making has not only become data-driven, but it has also become evidence-based" (Mansfield & Stacy, 2017, p. 308-309). A study conducted at 21 CPED member universities examined how the EdD programs changed and evolved due to being CPED members and found two significant themes by analyzing survey results (Perry & Abruzzo, 2020). Perry and Abruzzo (2020) claimed scholar-practitioners acquired the skills to enable more profound inquiry levels and strengthened quantitative and qualitative research methods and learning to lead change–allowed evidence-based and data decision-making. Buss (2018b) found the CPED framework had a significant and positive influence on a large public Southwest United States university's cohort-based three-year EdD program. Students brought problems of practice to the EdD program for transformational change by building knowledge through theory and practice (Buss, 2018b). Phillips et al. (2018) stated a large private Northeast United States University also established a three-year EdD in which students could "participate either completely online or in a hybrid, executive weekend format" (p. 31) to develop scholar-practitioner skills. Consortium members from CPED (2021) stated: "A Problem of Practice is a persistent, contextualized, and specific issue embedded in the work of a professional practitioner, the addressing of which has the potential to result in

improved understanding, experience, and outcomes" (para. 11). Buss (2018a) argued, "[Cycle] action research, [the first of two signature pedagogies] is scaffolded over time to foster EdD students' use of action research as an inquiry of practice" (p. 26). Practitioners have an action research attitude when addressing a real-world problem, then developing research-based solutions by testing new strategies and measuring outcomes (Johnson & Christensen, 2017). Johnson and Christensen (2017) also emphasized the importance of reflection in the action research process until achieving the desired improvement.

Buss (2018a) detailed the coursework for the three-year program, including the associated course content to develop inquiry skills and the action research activity. Phillips et al. (2018) stated a private Northeast United States University's EdD program, established in 2009, became a CPED member in 2015 and faced a crucial challenge in establishing Council for the Accreditation of Educator Preparation (CAEP) accreditation for the EdD program in 2017 while also satisfying the university's regional accreditation requirements. As a result, the faculty established measurable program learning outcomes for all EdD courses in the curriculum, including process descriptions for data evaluation, reviewing the evidence, and translating findings into continuous improvement (Phillips et al., 2018). The second signature pedagogy occurred when students became members of Leader Scholar Communities at the beginning of the second year of the three-year program. LSCs consisted of five to seven students and one faculty member who served as chair for all students in the cohort (Buss, 2018b).

Thus, the CPED has been a driving force in developing and evolving the professional education doctorate (CPED, 2021a; CPED, 2021b; Perry, Zambo, & Abruzzo, 2020; Perry, Zambo, & Crow, 2020). Carnegie Project on the Education

Doctorate (2020) claimed 49 out of 87 universities' surveys reported member EdD programs delivered curricula in a hybrid model, and 25% of the 87 programs offered programs fully online (p. 4). A large public Southwest United States University and a large private Northeast United States University were two examples of three-year EdD programs (Buss, 2018; Phillips et al., 2018). Success factors for both programs included strong leadership, faculty working together, and using the CPED framework for curriculum development, instructional practices, and assessment methods (Buss, 2018; Phillips et al., 2018). To sustain gains made to date, member institutions required continued support from deans and university administration, including providing and aligning resources necessary to implement new curricula, tailor admissions processes, etc. (Perry, Zambo, & Abruzzo, 2020). Perry, Zambo, and Abruzzo (2020) also asserted faculty leaders connected with students to share information about CPED, specifically the consortium's role "aimed at improving their profession" (p. 5).

EdD Programs in the United Kingdom

The United Kingdom's Open University provided online education to thousands of students for decades. Butcher and Sieminski (2006) found the United Kingdom's Open University (O.U.) EdD provided higher education accessible to practitioners in education on leadership through a tightly scheduled yet highly flexible program. Unlike the PhD program, the EdD program retained students at a higher rate while offering a high level of support to completion; 80% of the students completed the degree in three years (Butcher & Sieminski, 2006). The students started working immediately on the research upon acceptance and registration, as the program did not require any coursework. However,

students accessed tutorial courses in foundational subjects, such as research ethics and academic writing (Lindsay et al., 2018).

In contrast to the Open University, Smith et al. (2016) found students at the Northeast United Kingdom University completed five writing assignments formally assessed throughout the program's first two years before beginning the thesis. A diverse group of students attended The Northeast United Kingdom online EdD program as practitioners in education originating from North American, African, European, and Asian countries (Smith et al., 2016). Lindsay et al. (2018) found the Open University's entrance requirements required an education master's degree or a related discipline, with a research proposal reviewed by Open University's faculty. The highly motivated students in attendance ranged between the ages of 40–55 years old, and "became confident, autonomous researchers in the process able to combine the academic demands associated with doctoral study with their professional lives" (Butcher & Sieminski, 2006, p. 68), through the quality and the structure of the EdD program and with the exceptional support provided by the Open University's distance supervisors. For the Open University graduates, Butcher & Sieminski (2006) found the professional doctorates' outcomes and impact on scholar-practitioners elevated the level of professionalism, and strengthened leadership skills to inform and lead curriculum and policy-related changes. The doctorate also increased personal presence in the broader professional community through conference participation and review of scholarly journal articles and enhanced professional self-esteem.

The Dissertation Chair-Student Relationship

Researchers revealed trust between the doctoral committee chair and the student crucial throughout the doctoral program's dissertation phase (Cockrell & Shelley, 2010; Lim et al., 2019; Rademaker et al., 2016; Rockinson-Szapkiw et al., 2016; Sverdlik et al., 2018). Sverdlik et al. (2018), through a meta-analysis of 42 studies, described students' pairing with supervisors with similar work ethic, such as commitment to timelines, as vital for success. Rademaker et al. (2016) conducted a qualitative study to address how [*n* = 16] dissertation chairs in an online doctoral program established trust with students and perceived students' vulnerabilities, including actions to mitigate the vulnerabilities. Dissertation chairs asserted providing timely feedback, and following through on promises increased students' confidence, and building relationships, including learning more about students' interests outside the virtual classroom, were steps to build trust (Rademaker et al., 2016). Rockinson-Szapkiw et al. (2016) conducted a quantitative analysis of [*n* = 148] EdD students to examine persistence factors and found students most likely to persist attended programs whose curriculum prepared them for conducting research during the dissertation program stage. Crucial to student success was receiving timely and critical feedback from faculty and the dissertation chair, encouraging students to ask questions, making connections in the field, and "having confidence that the dissertation committee will be supportive" (p. 109). Cockrell and Shelley (2010) conducted a quantitative study on [*n* = 141] doctoral students to examine the relationships between academic support systems and to what extent the systems helped students navigate the transitions of doctoral studies. Using Pearson's Correlation Coefficient, the student wants, rated in priority order, were satisfaction in the selection of the dissertation

chair, satisfaction with chair accessibility, emotional support, constructive and timely feedback, empathy, support in career path, and guidance on research best practices (Cockrell & Shelley, 2010).

Lim et al. (2019) asserted the student's roles and responsibilities were equally crucial with the dissertation chair and committee's roles and responsibilities. An expectation of the working relationship meant students were responsible for earning a supervisor's respect by meeting timelines, preparing for meetings, and demonstrating scholarly capability (Lim et al., 2019; Sverdlik et al., 2018). Rademaker et al. (2016) suggested ideas for addressing vulnerabilities were making frequent contact, "recognizing student strengths, offering scholarly resources to develop academic strengths" (p. 66), and highlighting potential opportunities commensurate with a distinguished doctoral degree.

Through a quantitative analysis of supervision-related issues, Cornér et al. (2017) claimed, "Supervision activities not only contribute to experiences of the doctoral journey and burnout but also to the completion of the journey" (p. 101). As communication between supervisors and students increased, Cornér et al. (2017) found less burnout and lower attrition risk. In contrast, unhealthy student-dissertation chair relationships resulted in overall student dissatisfaction and exhaustion. Rockinson-Szapkiw et al. (2017) conducted a study of female EdD doctoral students and found women mentored by a female dissertation chair provided role-model and inspiring leadership, timely and actionable assignment feedback, and motivation to persist through the program. Rockinson-Szapkiw et al. (2017) asserted study participants believed some male

dissertation chairs might not offer “feedback and affirmation and tone” (p. 64), which could compound the stress of balancing multiple identities and affect persistence.

To address the communication gap between students and dissertation chairs, Ames et al. (2018) found a Doctoral Community (D.C.) Network, accessible only to doctoral students in online programs and dissertation supervisors, improved fragmented communication with dissertation supervisors and committees. The DC Network provided an infrastructure for manuscripts, communications, and videoconferencing, including “dissertation templates, videos describing research methodologies, and tools for novice researchers” (Ames et al., 2018, pp. 87–88). As another intervention to address closing the communication gap, Maul et al. (2018) surveyed dissertation chairs supervising PhD and EdD students to gauge Zoom video conferencing usage frequency and why, finding 90% of dissertation chairs used Zoom at least once per month for relationship building. About 80% used the program to provide feedback on assignments, and 72% used it for coaching academic writing (Maul et al., 2018, p. 63). Lim et al. (2019) developed a doctoral student readiness evaluation tool (Figure 1, pp. 197–199), in which the faculty used a template to assess whether students were ready to begin the program’s dissertation phase. The nine-item assessment evaluated critical juncture points throughout the dissertation process. Specific juncture points included the students’ proficiency in searching, reviewing, writing, and synthesizing resources; understanding what needs to be researched, including required data; productive relationship with the dissertation chair and willingness to receive constructive feedback; and time, passion, and commitment (Lim et al., 2019). According to S. Freed (personal communication, July 22, 2020), the developers of the doctoral student readiness evaluation tool used the tool for self-

assessment purposes and "as a point of conversation, helping the doctoral students see all that is necessary to start thinking about the dissertation."

The Development of and Transition to Independent Scholarship

Doctoral studies required students to develop academic research and writing skills and identify with faculty and peers throughout the program. Rockinson-Szapkiw et al. (2019) and Tinto (1993/2012) defined three distinct phases in which doctoral students persisted. In Stage one, Transition and Adjustment comprised the first-year curriculum when students began forming relationships with peers and faculty, and also building academic skills through coursework. In Stage two, Development of Competence, students focused on acquiring research skills through intellectual interaction, culminating in completing the comprehensive doctoral examination. Stage three of doctoral student persistence included the span between completing the comprehensive doctoral examination and the dissertation defense (Rockinson-Szapkiw et al., 2019; Tinto, 1993/2012) when the candidate's community was limited to the dissertation chair and committee members. Throughout the literature, scholars identified the transition from the coursework stage to the dissertation phase as a critical juncture for EdD and PhD students, where attrition occurred most often (Ames et al., 2018; Lowery et al., 2018; Maul et al., 2018). As one example, Ames et al. (2018) stated, "the transition to [the] independent scholarship [phase] can be daunting for doctoral students as they transform into independent researchers" (p. 80). Researchers described the doctoral program's unstructured dissertation stage, when students transition from coursework to independent research, as difficult for novice researchers, resulting in students dropping out (Ames et al., 2018; Maul et al., 2018). Failure to recognize the challenges of navigating the

program's ambiguous dissertation phase could lead to attrition (Maul et al., 2018). As an indicator of the challenge associated with the transition, Lowery et al. (2018) found a mid-sized Midwestern United States university experienced a 56% attrition rate in the third year of an online EdD program (p. 2). To address the attrition problem, the university implemented a voluntary peer-mentoring program to provide additional social and emotional support to EdD students during the first two years of the program, focusing on work-life balance and future career opportunities (Lowery et al., 2018).

Adding Structure to the Independent Research Phase

To ease the transition to independent scholarship, Buss (2018b) asserted at a large public university in the Southwest United States, leader-scholar communities provided support to students while developing the research proposal, completing data analysis, preparing for the comprehensive examination, and writing the final dissertation. These actions "[kept] students connected to the program, student peers, and faculty to assist them in completing the dissertation in practice efforts" (Buss, 2018b, p. 43). Ewing et al. (2012) developed a curriculum model for a blended 95% online and a cohort-based professional doctorate in a Health Science program at a private medical school in the Southwest United States, "in which a vital component of the program is the completion of an applied research project" (p. 36). The Ewing Model added structure to the independent research phase of doctoral programs through a scaffolded curriculum, through a prerequisite course, Research Methods, Design, and Analysis, followed by five courses: Literature Review, Proposal Development, Data Collection, Data Analysis, and Dissemination (Ewing et al., 2012, p. 37). Breitenbach (2019) applied best practices from the Ewing model to the new online EdD program at the university's Midwest United

States campus to improve persistence and graduation rates after being named program chair. Breitenbach (2019) incorporated a doctoral research project (DRP) for the EdD program, instead of the Applied Research Project used in the Doctor of Health Sciences program, however, implemented the sequential curriculum structure used in the Doctor of Health Sciences program. “We are still using the Ewing Model, and so far, 95.8% of students who start the DRP process finish it” (Breitenbach, personal communication, July 7, 2021).

Academic Writing

Many researchers cited developing academic writing skills through the three phases was crucial to doctoral program persistence to degree completion (Bailey, 2019; Boyson, 2019, Holmes et al., 2019, Inouye & McAlpine, 2019; Perry, Zambo, & Abruzzo, 2020; Smith et al., 2016). Holmes et al. (2019) asserted, “immersing learners in writing establishes an academic baseline that enabled faculty to chart student writing growth and guide the [scholarly] writing development process” (p. 1). Inouye and McAlpine (2019) also believed actionable writing feedback from instructors improved academic writing, thus increasing student confidence. Successful doctoral students learned how to obtain scholarly information, conduct research, and synthesize multiple sources into coherent themes (Bailey, 2019). Boysen (2019) asserted the master of citing research material, using the American Psychological Association (APA) guidelines, as vital to completing a doctoral program’s coursework and dissertation phases.

Perry, Zambo, and Abruzzo (2020) claimed the population of students pursuing the professional education doctorate, many of whom were practitioners, were challenged with academic writing skills required for the Dissertation in Practice (DiP). For faculty

leaders designing or redesigning EdD programs, closing students' gaps between incoming writing competency skills with the skills required to complete the DiP meant developing actionable strategies (Perry, Zambo, & Abruzzo, 2020). As an example of best practice, Smith et al. (2016) examined a university in the United Kingdom conducting a weekend-intensive residential program to help students develop critical writing skills, attended by ten students and facilitated by faculty and tutors. Results revealed a relationship between persistence and the development of persuasive academic writing skills (Smith et al., 2016). Klocko et al. (2015) conducted a mixed-methods study to determine to what extent doctoral students believed incorporating remedial writing skills into coursework would improve academic writing quality, efficiency, and response to faculty feedback. The study results identified teaching writing strategies beginning at program orientation and reinforced throughout the program. The competencies requiring mastery were academic writing, conducting literature reviews and synthesizing sources, concept mapping, citing sources, and writing in the appropriate voice and tense (Klocko et al., 2015).

Motivation Theories

Holmes et al. (2019) asserted motivation was a critical factor to persist in doctoral programs. Motivation referred to a condition of activation, which, when experienced, influenced initial and continued engagement in a particular activity (Anderman & Wolters, 2006). Anderman and Wolters (2006) argued activating emotions, such as academic learning toward a successful outcome, energized students to engage in an assignment or project; however, "[they] claimed a naïve assumption among many equated motivation with achievement or performance" (p. 369). Doctoral studies, a multi-

year journey, required developing academic writing skills, building self-efficacy, thinking critically, and working independently to strengthen research capabilities and scholarly identity while managing multiple obligations such as work-life balance (Holmes et al., 2019). For example, Sverdlik and Hall (2020) conducted a study of 3004 doctoral students to examine the extent to which a relationship existed between program phases, e.g., coursework, comprehensive examination, or dissertation with internal or intrinsic motivation and ability to achieve a positive outcome (p. 97). Sverdlik and Hall (2020) indicated internal motivation was highest during the coursework phase and lowest during the comprehensive examination, attributed to coursework curriculum, assignments, and assessments being structured and, therefore, with predictable outcomes.

Bailey (2019) claimed both internal and external motivations drive students to pursue doctoral studies, claiming career opportunities, career advancement, and higher earnings potential. Becoming a better educator was another motivation for pursuing a terminal degree (De La Fosse, 2019). Deciding to pursue doctoral-level education required the willingness to sacrifice family and work commitments (Bailey, 2019; Santicola, 2013). Having a "failure is not an option" mindset when committing to a doctoral degree" (De La Fosse, 2019, p. 33) was critical for persistence. Santicola (2013) conducted a phenomenological study of persistence factors of [n = 9] doctoral students participating in cohort groups, (p. 257), who found four attributes vital for persistence, students who were (1) dedicated and committed, (2) prioritized doctoral studies, and (3) worked independently conducting research while (4) maintaining full-time employment.

Attribution Theory

Scholars of attribution theory defined attributions as "the perceived causes of event outcomes" (Demetriou & Schmitz-Sciborski, 2011, p. 6), in which students rationalized cause-and-effect relationships on school performance. Attribution theory began with an event, such as success or failure, then ending with a behavioral response, such as dropping out of school (Weiner, 2000). If the outcome was "unexpected, negative, or important" (p. 3), the motivational process was guided by attributional inferences, which closed the gap between the event and the outcome. Weiner (2000) asserted internal failure, driven by low aptitude or ability, resulted in low self-esteem and low expectancy of success, decreasing the probability of persistence. Weiner (1972) argued people who strived for achievement attributed failure to lack of effort, as "effort is an unstable causal attribute" (p. 208), which increased or decreased under volitional control. Low achievers, who lacked ability and aptitude, a stable but controllable attribute, would likely experience continued failure and likely not persist (Weiner, 1972).

An external attribution example was a racial or ethnic bias, where a person maintained self-esteem but had a low expectancy of success and directing anger at others, affecting persistence or engagement in social activism (Weiner, 2000). Smith (2016) characterized attributions along a continuum, called the "Locus of Causality" (para. 6), which spanned internal to external behaviors, with significant consequences for students' motivation and persistence. For example, a student might attribute failure on an exam internally due to a lack of intelligence, something difficult to control. In contrast, a student could have attributed the same failure externally, resulting from the teacher not covering the material well enough before an exam (Smith, 2016). Demetriou and Schmitz-Sciborski (2011) claimed, "emotions are an important part of understanding

attribution, which may serve as motivations for future behaviors" (p. 6). When a failure was internal or outside students' control, self-esteem could be affected, and a decision not to persist was a potential outcome (Demetriou & Schmitz-Sciborski, 2011).

Self-Determination Theory

Many researchers discussed the differences between intrinsic and extrinsic motivation and the relationship with doctoral student persistence (Deci et al., 2017; Harnett, 2019; Lynch et al., 2018). "Self-determination theory (SDT) is a macro theory for human motivation, [which] postulate[d] employees have three basic psychological needs - competence, autonomy, and relatedness—the satisfaction of which promotes autonomous motivation, high-quality performance, and wellness" (Deci et al., 2017, p. 19). Lynch et al. (2018) defined autonomy as the drive to take the initiative without being asked, competence to achieve results and relatedness as wanting meaningful relationships and acceptance by others. Individuals who displayed these attributes tended to recognize challenges as opportunities and mitigated outside pressures (Lynch et al., 2018). Employees in organizations felt a sense of purpose and autonomy when understanding assigned work tasks and when supervisors or peers exercised more inclusive behavior, such as open communication, and provided clear feedback on performance (Deci et al., 2017). Harnett (2019) asserted, "An intrinsically motivated learner enjoys engaging in a task because of the challenge, interest, and enjoyment it offers rather than because of any external pressure" (p. 148), which resulted in self-efficacy and, ultimately, positive learning outcomes. Also, Tinto (2017) stated, "personal goals, self-efficacy, [a] sense of belonging, and perceived value of the curriculum" (p. 2) drove student motivation and hence, persistence.

In contrast to intrinsic motivation, scholars defined extrinsic motivation as more focused on rewards or recognition from an outside source, including grades from instructors (Harnett, 2019). Sverdlik et al. (2018) found some students who received high grades during coursework exhibited difficulties mastering academic writing or synthesizing sources while performing independent scholarly work. Tinto (2017) argued students "have to want to persist and expend the effort to do so even when faced with challenges they sometimes encounter" (p. 2). Motivated students attended college for different reasons, such as career advancement and professional development (Bailey, 2019; Tinto, 2017). A common motivation for practitioners to pursue the EdD degree was to become a scholar-practitioner and lead transformational change by conducting actionable research on a relevant problem of practice related to cultural, policy, or curriculum challenges (Stark, 2019).

Self-Regulation Theory

Wong et al. (2019) argued the criticality of student self-regulation in online environments, especially when instructor presence was low. For example, students were responsible for reviewing study materials, completing assignments, and whether through cohort groups or not, to achieve learning outcomes (Wong et al., 2019). Jones (2014) asserted self-regulation strategies for students included self-instruction, e.g., asking instructors or peers for help and employing time management skills, such as setting short-term, measurable goals and strategies to achieve academic success. Students who attributed achievement due to effort were more likely to continue in academic programs than students who attributed success or failure to ability (Jones, 2014). Schnuck and Zimmerman (2006) claimed competence beliefs, which were students' perceptions on

capabilities to successfully complete assigned tasks, in contrast, to control beliefs, defined as the expectancy of academic success outside the students' control, led to different problem-solving approaches. For example, students lacking competence required educational interventions. Examples of lacking control might be students who believed a teacher only gave good grades to favorite students only or a timed-essay examination not favoring some students (Schnuck & Zimmerman, 2006).

Shea and Bidjerano (2010) conducted a study of 2418 undergraduate students in online and blended classes to determine the extent to which a relationship existed between Community of Inquiry teaching presence, social presence, and cognitive presence, with student self-efficacy and student self-regulation (p. 1726). Results indicated a correlation between learner self-efficacy with teaching and social presence, in which Shea & Bidjerano (2010) claimed for students in blended courses, "the relationship between students' perception of teaching presence on their sense of efficacy is much stronger" (p. 1727). Williams et al. (2019) conducted a study of 91 students in an online EdD program to address "(1) to what degree do parent education level and cohort progression, measured by how many courses each student completed, predict academic self-regulation and (2) to what extent did family, friends, spouse or significant other, or doctoral program peers predict academic self-regulation? Results from regression analyses indicated parental education level and support from classmates were significant in predicting academic self-regulation (Williams et al., 2019) but found cohort progression not significant. Jones (2014) asserted instructors understood and applied self-regulation theory to curriculum design and assessments, including teaching students how to set measurable goals and develop strategies and provide timely and quality feedback

on assessments. For example, instructors might "give students short daily quizzes that over-estimate their self-efficacy and attribute failures to lack of effort or improper strategies" (Jones, 2014, 13:30).

Thus, student motivation theories applied to doctoral students' persistence. Attribution theory prescribed highly motivated individuals look at challenges as opportunities to succeed because of high levels of self-confidence or efficacy (Demetriou & Schmitz-Sciborski, 2011; Smith, 2016; Weiner, 1972; Weiner, 2000). Highly motivated students who experienced failure did not attribute failure to lack of ability and took necessary steps to apply additional effort to achieve positive results (Demetriou & Schmitz-Sciborski, 2011; Smith, 2016; Weiner, 1972; Weiner, 2000). Self-determination theory stated students who developed the competencies to transition to academic scholarship were self-starters exemplifying autonomous behaviors, e.g., intrinsic motivation to build the skills necessary to become scholar-practitioners possessed the attributes vital for persistence (Deci et al., 2017; Lynch et al., 2018). Self-regulation theory was about students taking responsibility for learning, such as asking for help from peer colleagues for support and instructors implementing interventions, such as additional formative assessments for students to demonstrate learning outcomes.

Admissions Process

L. Leavitt (personal communication, September 4, 2020) attributed students who did not persist as more about who you let in on the front end of the program. Lovitts (2001) claimed persistence was unrelated to background characteristics, "it is what happens to them [the students] after they arrive" (p. 2), citing the school and programs' culture, structure, and processes. Fiore et al. (2019), who conducted a qualitative study of

former and doctoral students, claimed internal drive and motivation was critical to persistence, with some All But Dissertation (ABD) students attributing the failure to persist "to be their own responsibility" (p. 116). The students who participated in the study argued interventions would not have made a difference in the decision to persist in the doctoral program (Fiore et al., 2019).

Multiple researchers examined admissions processes identifying candidates most likely to persist in doctoral programs, with some attempting to establish predictive relationships between selection criteria scoring and doctoral students who became scholar-practitioners (Allen et al., 2014; Jones et al., 2019; Kimbrel & Varga, 2020; Lewis et al., 2020). Jones et al. (2019) conducted a study of [n = 102] doctoral students enrolled in two different cohort groups at a United States southern region university to assess whether a predictive relationship existed between pre-admission test scores and graduate and undergraduate GPA with doctoral student persistence. By grouping the sampled doctoral students into two ethnic groups, white students and students of color, the study outcome resulted in "the inability of a single model to predict adequately the propensity of students of color and White students to remain in the program" (Jones et al., 2019, p. 362). Researchers at a large public U.S. Southeast university affiliated with the Carnegie Project on the Education Doctorate developed a structured interview process, which included a professional writing sample to illustrate academic writing proficiency, and for prospective students to demonstrate motivation, attitude, and capability to complete the dissertation process (Kimbrel & Varga, 2020). Kimbrel and Varga (2020) investigated websites from 10 CPED member universities and identified 11 traits used to develop interview questions around selected attributes such as purpose,

commitment, collaboration, and coachability; however, did not find a significant relationship between interview scores before admission and the grade point averages of 14 students at the end of the first semester.

The Individual Leadership Self–Assessment Instrument (ILSA), a 360° process and tool, provided leaders with feedback on leadership attributes and dispositions, such as building relationships, communication, and collaboration, "from which leadership growth plans are developed" (Allen et al., 2014, p. 1). Allen et al. (2014) asserted the ILSA, which combined colleagues' and personal acquaintances' evaluations with self–assessment scores, complemented EdD students' transformation into scholar-practitioners. Zenger and Folkman (2002), through the use of a different 360º process and tool than the ILSA, evaluated data from 200,000 people rated by 25,000 leaders to highlight how good leaders became extraordinary leaders (p. vii). Zenger and Folkman (2002) espoused a theory in which leaders focused on strengthening leadership strengths and fixing fatal flaws. Consistent with a Leadership EdD program, Allen et al. (2018) advocated for assessing leadership dispositions in the EdD admissions selection process, arguing, "when used by skilled raters, provides highly valid information that can be used for predictive purposes such as in an admissions process" (p. 2). Faculty raters, using a scale of (1 = *low* to 7 = *high*), evaluated prospective students' dispositions from group interviews, a written essay, and other application materials, combined with disposition ratings from personal acquaintances and professional colleagues, admitting candidates who scored at least five (Allen et al., 2018, p. 6). Lewis et al. (2018) claimed a large U.S. South public CPED–affiliated university implemented an admissions process in which faculty leadership selected [n = 75] EdD applicants to attend a program orientation,

participate in faculty interviews, a group discussion, and a team challenge (p. 8). The faculty evaluated applicants' professional demeanor, interpersonal skills, feedback, and communication skills, which concluded with a reflection exercise, resulting in faculty leadership admitting [n = 50] people (Lewis et al., 2018, p. 9).

Thus, opportunities existed for making data-driven decisions during admissions to identify increased probability for student success, e.g., assessing prospective student disposition data or interview results data, while tracking students who persisted or did not persist (Allen et al., 2014; Kimbrel & Varga, 2020; Lewis et al., 2018). Other pre-admission best practices examples included group interviews, academic writing samples, and team challenges (Jones et al., 2019; Kimbrel & Varga, 2020; Lewis et al., 2020). Also, using a 360^{o} process and tool to assess students' leadership strengths and weaknesses at the program outset provided a baseline to strengthen EdD students' leadership skills (Allen et al., 2014; Zenger & Folkman, 2002).

Faculty Advising

Multiple researchers highlighted the rigors of a doctoral student's journey and the added challenges for students who studied in online programs (Bloom et al., 2014; Deshpande, 2017; Duke & Denicolo, 2017; Fiore et al., 2019). Duke and Denicolo (2017) asserted a need to prepare doctoral researchers for positions outside academia to support national economies, recommending faculty advisors be transparent when communicating to students on the rigor of doctoral studies and helping students integrate within the university research community. Recommendations to students included selecting a dissertation chair with whom the student had a good rapport, similar communication styles, research topic expertise, learning research skills and core competencies, e.g.,

academic writing, and assessing the real-world benefit of the research topic (Duke & Denicolo, 2017). Fiore et al. (2019) conducted a qualitative study of online doctoral students' perspectives about the role of academic advisement during the critical transition period between coursework and independent research. Fiore et al. (2019) conducted a qualitative study of 18 former doctoral students in online programs who persisted and did not persist, and current students and found six themes emerged from the study. The six themes were "faculty advising is paramount, lack of process advisement, inconsistent advisement, peer advising is powerful, persistence comes from within, and doctoral research feels lonely" (p. 111). The most often cited theme emphasized the extent to which faculty advising, especially the dissertation chair, helped students prepare for the transition from the structured coursework phase to the independent research (Fiore et al., 2019). Bloom et al. (2014) claimed applying social constructivist theory to advising could enable an opportunity where both faculty advisors and students could learn together through meaningful discourse and sharing prior experiences. Deshpande (2017) conducted a study of faculty advisor best practices to help doctoral students in cohort-based online programs. Strategies vital for success were advisors setting and clarifying the expectations throughout the program. As a complement to setting expectations, Deshpande (2017) asserted faculty advisors could inspire students by sharing personal stories of the doctoral journey, periodically connecting with students to assess progress, which helped build student-faculty relationships and encouraged students to build relationships with peers. Fernando and Marikar (2017) asserted, "constructivist teaching and learning theory advocates a participatory approach in which students actively participate in the learning process" (p. 110). For students to actively participate in the

learning process required teachers to become facilitators, encouraging students to contribute ideas and multiple explanations or positions on a topic or subject of interest, and stimulating a learning experience for both teacher and student (Fernando & Marikar, 2017). Applying Constructivist Theory to faculty advising, instead of formulating a point–solution to a specific problem, "advisors can work together with students to understand the larger context of student's unique situations, analyze the contextual factors, and help reframe problems into opportunities" (Bloom et al., 2014, p. 1).

Schlossberg's Transition Theory was an event-based theory with three types of transitions applicable to student development (Patten et al., 2016). Patten et al. (2016) identified anticipated, unanticipated, and nonevents as the three transition types. Goodman et al. (2006) claimed the framework "is designed to depict the extraordinary complex reality that accompanies and defines human capacity to cope with change" (p. 55). Beginning a doctoral program is a life-changing yet anticipated event. Table 3 depicted the 4S framework of a prospective EdD student with strategy examples.

Table 3

Schlossberg's 4S's Applied to a Prospective Doctoral Student

S	Description	Examples
Situation	What is happening?	Starting an EdD Program
Self	To whom is it happening	A practitioner with personal, family, and employment obligations; lives a healthy and active lifestyle; motivated to earn an EdD.
Support	What help is available?	Spouse or significant other and employer understand the program time commitment; EdD program designed to transform practitioners into scholar-practitioners; university provides resources, e.g., advising, writing center, library, etc., to achieve student success.
Strategies	How does the person cope?	1. Keep healthy throughout the program; 2. Establish a daily routine to stay on or ahead of schedule on assignments; 3. Build relationships with faculty, faculty advisor, and dissertation chair and committee; 5. Ask for and respond to feedback; 6. Willing to make sacrifices on personal and family obligations, as necessary.

Note. The 4Ss and definitions columns are from Goodman et al. (2006). Springer.

Factors for Quantitative Modeling and Analysis

The following section described the personal and program factors used for quantitative analysis and subsequently incorporated the factors into two survey instruments, Former EdD students (see Appendix A) and Current EdD students (see Appendix B).

Personal Factors – Age, Gender, Ethnicity, Marital Status, and Dependent Children

The doctoral process is rigorous, whether male, female, or transgender, regardless of age and ethnicity. Gittings et al. (2018) conducted a study of 275 doctoral students

from two research Midwest universities to determine persistence factors. The results of a multistep logistic regression model, which included age, gender, ethnicity, marital status, and children, indicated only age as statistically significant. Rockinson-Szapkiw et al. (2019) conducted a study of 232 EdD students to predict program integration, which consisted of three components—faculty integration, student integration, and curriculum integration. Using a hierarchical regression model, Rockinson-Szapkiw et al. (2019) found gender and race statistically significant. Nettles and Millett (2006) found a positive relationship between older age and the rate of doctoral degree progress while being married was correlated with persistence to degree completion and less likely to stop out than students not being in a committed relationship. Nettles and Millett (2006) asserted, "having children under the age of eighteen is the enemy of a speedy time to degree" (p. 220), however, the researchers were unable to support the claim with data.

Gnanadass and Sanders (2019) asserted women's preferences differed from men's choices in e-learning environments. Women wanted increased interactions with instructors through more face-to-face communications and timely feedback on assignments (Gnanadass & Sanders, 2019). In contrast, Patterson (2012) claimed women preferred to email instructors than talk on the phone. Rockinson-Szapkiw et al. (2017) conducted a qualitative study with 15 of 17 participants, who were female, either married or divorced, with ages ranging between 20–29 and 60–69, who worked part-time or full-time, and most had dependent children living in the home. Rockinson-Szapkiw et al. (2017) found female doctoral students' confidence to persist through a doctoral program came from a support system of family and friends, who provided encouragement and

moral support to help navigate the multiple identities of a mother and working professional, in addition to graduate studies.

With the growing emphasis on promoting social justice, equity, and inclusion in higher education (Thelin, 2017), an opportunity existed for researchers to capture gender fluidity information, whether performing quantitative research or for use in college admission applications. Rankin and Garvey (2015) asserted the need for researchers conducting assessments to consider gender fluidity, specifically the queer–spectrum and the trans–spectrum population segments. Given the range of social identities, Rankin and Garvey (2015) asserted quantitative researchers be inclusive with survey instruments providing a plethora of options in which participants could best identify the group or groups they best fit. According to R. Nasser (personal communication, October 9, 2020), "limiting choice options to males and females (the binary) may alienate participants who identify outside the binary." Therefore, transgender as a gender choice was added into the survey instruments (see Appendix A & Appendix B). In summary, age, gender, ethnicity, marital status, and the number of children were dependent variables in the research design (Gittings et al., 2018; Rankin & Garvey, 2015; Rockinson-Szapkiw et al., 2017; Rockinson-Szapkiw et al., 2019).

Personal Factors–Work-Life-Study Balance

Many researchers cited work-life balance, a challenge by many adults with families and employment responsibilities, and further complicated by doctoral degree studies, were factors contributing to degree persistence (Ayaduri, 2018; Castelló et al., 2017; Holmes et al., 2019). Castelló et al. (2017) conducted a study and found doctoral students enrolled in 56 Spanish universities stated reasons for dropping out attributable to

challenges of balancing family, professional career, and doctoral studies. Ayadurai (2018) conducted a quantitative analysis to examine gender differences in relationships between the work-life-study balance of 80 online PhD students with "perceived stress and satisfaction with life" (p. 7). The study results, summarized in Table 4, indicated evidence work-life and work-study balance were gender-dependent factors contributing to doctoral student persistence.

Table 4

Work-Life Balance and Work-Study Balance v. Perceived Stress and Satisfaction with Life

Independent Variable	Dependent Variable	Result
Work-Life Balance	Perceived Stress	Women reported higher stress
Work-Study Interface	Perceived Stress	Women reported higher stress
Work-Life Balance	Satisfaction with Life	No difference
Work-Study Interface	Satisfaction with Life	Women reported lower satisfaction with life

Note. Male-female gender differences. Work-Life and Work-Study balance with Perceived Stress and Satisfaction with Life. Adapted from Ayadauri (2018).

J. Taylor (personal communication, September 2, 2020) granted permission to incorporate three work-life-study balance measures (see Appendix G). The three questions asked respondents to identify the number of hours per week spent working, the number of hours spent on doctoral studies, and, if applicable, the number of hours children spent in daycare.

Program Factor–Program Orientation

Motte (2019) asserted a three-phase scaffolded approach to program orientations supported improved doctoral student persistence throughout the doctoral program. However, the two program stages most essential to conduct the orientations were before the program started, then another crucial time at the candidacy/ dissertation stage (Motte, 2019). Gittings et al. (2018) and Rockinson-Szapkiw et al. (2019) included program orientation in quantitative studies, and neither researcher found the variable statistically significant.

Program Factor–The Community of Inquiry Survey Instrument

Arbaugh et al. (2008) developed the Community of Inquiry (CoI) survey, consisting of 34 questions about social, cognitive, and teaching presence, and subsequently validated the instrument. The Arbaugh et al. (20018) study, which performed a comprehensive quantitative analysis, provided the baseline for comparison against the study's results. Other researchers utilized the 34-question survey for different analyses and purposes (Cleveland-Innes & Campbell, 2012; Ice et al., 2011; Shea and Bidjerano, 2012; Stenbom; 2016). For example, Ice et al. (2011) administered the Community of Inquiry survey to determine if a relationship existed between student satisfaction and course-level retention at a public university system, comparing [n = 21,218] students in the highest disenrollment quartile and [n = 16,732] students in the lowest disenrollment quartile. Ice et al. (2011) asserted the results indicated "the possibility of high disenrollment as a function of structural deficiencies, at the macro level can be largely discounted" (p. 60) and retention "to some extent, may be a student specific problem that is beyond the scope of the university to address" (p. 62). Shea &

Bidjerano (2012) conducted a follow-on study, examining learning outcome differences between a hybrid v. fully online learning environment. While the results indicated a positive relationship between teaching and social presence with cognitive presence, strengthened by increasing progressive levels of self-regulated learning, Shea and Bidjerano (2012) conducted a principal component factor analysis of the 34-question CoI survey.

Cleveland-Innes, one of the original 2008 CoI instrument authors, developed "six additional items written to measure the possibility of emotional presence" (Cleveland-Innes & Campbell, 2012, p. 274). A sample of [n=217] graduate students, representing a cross-section of demographics and courses, responded to the 40-question survey. Cleveland and Campbell (2012) found, "emotion is experienced by online students in areas beyond the expression of social presence" (p. 282) and suggested replicating the study with "larger samples [than $n = 217$] to validate our exploratory statistical analysis" (p. 285). Stenbom et al. (2016) using the Community of Inquiry Framework combined with technology, examined a one-to-one relationship between learner and instructor for mathematics. Stenbom et al. (2016) suggested emotional presence, specifically directed affectiveness, supported meaningful discussion and dialogue between the learner and instructor. Previous studies, such as Rienties and Alden Rivers (2014), had drawn on the additional emotional presence questions for the CoI survey posed by Cleveland-Innes. Therefore, it was sensible to include the six emotional presence questions in the present study as a way to illuminate the researcher's line of inquiry [to evaluate the addition of emotional presence as a fourth interdependent construct] (B. Alden-Rivers, personal communication, August 17, 2020). With permission from Cleveland-Innes (see Appendix

G), the Community of Inquiry survey, which incorporated the six emotional presence questions, was used for quantitative analysis. Also, slight wording modifications, e.g., course to courses and instructor to instructors, were incorporated into the survey questions. These changes enabled both current and former students to rate the EdD program in totality (see Appendix A & Appendix B).

Program Factor–Dissertation-Student Relationship

The relationship between the student and dissertation chair, built on trust, transparency, communication, and mutual respect, was vital to doctoral program persistence (Cockrell & Shelley, 2010; Gittings, 2010, Gittings et al., 2018; Lim et al., 2019; Rademaker et al., 2016; Rockinson-Szapkiw et al., 2016; Sverdlik et al., 2018). Gittings (2010), who developed six questions for survey respondents to rate the student-dissertation chair relationship, provided permission to incorporate the six questions into the surveys (Appendix G). Using a 7-point Likert scale, former and current EdD students identified satisfaction levels with the dissertation chair on (1) the dissertation topic, (2) dissertation committee selection, (3) proposal or prospectus preparation, (4) conducting research, (5) writing feedback and guidance, and (6) accessibility. The former and current student surveys incorporated the six dissertation chair relationship questions (See Appendix A & Appendix B).

Program Factor–Cohort Groups

Doctoral program cohorts were students who enrolled and entered an educational program simultaneously and organized into groups who took the same classes in the same sequence for learning and working together while providing moral and academic support through degree completion (Santicola, 2013). Berry (2017) conducted a qualitative study

with students attending a university in the Western United States and found students felt participating in a cohort group provided a sense of belonging, collective identity, and an encouraging support system. More importantly, students felt the cohort group "added structure and cohesion to the online experience" (Berry, 2017, p. 40), which addressed a critical theme in the researcher's study about students struggling after transitioning into the independent scholarship phase of the doctoral program. Sverdlik et al. (2018) also claimed professional doctorate programs utilized cohort models to help students integrate into the program through to degree completion.

Summary

Thus, doctoral degree persistence could be a significant issue in any field of study, in online, blended online, hybrid, or residential programs, and occur at the beginning of a doctoral program or during the program's dissertation phase (Brown, 2017; Lowery et al., 2018; Rockinson-Szapkiw et al., 2019). The personal factors identified through research were age, gender, ethnicity, children, marital status, and work-life-study balance (Ayadurai, 2018; Gittings et al., 2018; Ploskonka, 1993; Rockinson-Szapkiw et al., 2019). The program factors measured Community of Inquiry (CoI) teaching, social, cognitive, and emotional presence, the student-dissertation relationship, program orientation attendance, and cohort participation (Arbaugh et al., 2008; Berry, 2018; Cleveland-Innes & Campbell, 2012; Gittings, 2010; Lim et al., 2019; Motte, 2019; Rockinson-Szapkiw et al., 2019).

The baseline CoI theoretical framework, introduced by Garrison, Anderson, and Archer (2000), represented processes and procedures within a framework of three interdependent elements — social presence, cognitive presence, and teacher presence —

and guided the structure of course curriculum, design, and delivery for online and distance education learners (Garrison, 2017; Saadatmand et al., 2017; Stavredes & Herder, 2019). The Community of Inquiry for Online Learning, suggested by Rienties and Alden Rivers (2014), added emotional presence, recognizing the importance of instructors maintaining awareness of students' emotions in an online learning environment. The literature review identified reliable and valid instruments, such as the validated 34-question Community of Inquiry (CoI) survey (Arbaugh et al., 2008) and the 40-question CoI survey (Cleveland & Campbell, 2012), adapted to include six emotional presence questions.

In addition to the personal and program factors, numerous scholars highlighted strategies and interventions to help students succeed in a community of inquiry. Examples included strategic synchronous engagements to achieve learning outcomes, increased faculty interaction, the intentional pairing of students with dissertation chairs, and faculty advising (Ames et al., 2018; Deshpande, 2017; Duke & Denicolo, 2017; Fiore et al., 2019; Maul et al., 2018; Tinto, 2017). Also, critical for success required an academically prepared, committed, and motivated student; a research-based curriculum; faculty engaging students in an inclusive environment (Anderman & Wolters, 2006; Deci et al., 2017; Demetriou & Schmitz-Sciborski, 2011; Garrison, 2017; Weiner, 2000). Also, a dissertation chair and committee supported students by providing resources, timely feedback, encouragement, and added structure through the dissertation process (Breitenbach, 2019; Cockrell & Shelley, 2010; Ewing et al., 2012; Lim et al., 2019; Rademaker et al., 2016; Rockinson-Szapkiw et al., 2016; Sverdlik et al., 2018).

Chapter Three described the quantitative methodology used to address the research questions and hypothesis statements and included threats to validity. Chapter Four provided the results of the quantitative analysis. Chapter Five connected the study results with previous studies and provided conclusions and implications.

Chapter Three: Methodology

Restated Purpose and Context of Study

The purpose of the study was twofold; (1) establish the factors of persistence related to attrition and inform a three-year online Leadership EdD program at a private-Midwest university with best practices and lessons learned to meet future scholar-practitioner needs, and (2) to perform a quantitative comparative analysis using researched variables between students who completed the EdD with students currently enrolled in EdD programs to assess the extent to which differences existed between the two populations.

Multiple researchers claimed about half of students who began doctoral programs did not persist (Bowen & Rudenstine, 1992; Tinto, 1993/2012; Ross, 2019; Walker et al., 2008) with varying attrition levels depending on the field of study. The implication of the problem included the potential loss of intellectual capital to society and demoralized students who departed doctoral studies (Lovitts, 2001). The quantitative analysis incorporated moderating variables to preclude misleading associations or determine relationship differences between the independent and dependent variables (Fraenkel, 2012; Mantel, 1959). Also, the methodology examined the Carnegie Project on the Education Doctorate's positive impact within a Community of Inquiry model (Arbaugh et al., 2008; Cleveland-Innes & Campbell, 2014; CPED, 2021; Garrison et al., 2000; Perry, Zambo, & Abruzzo, 2020; Perry, Zambo, & Crow, 2020; Rienties & Alden Rivers, 2014).

Participants

A simple random sample, which "is one in which each and every member of the population has an equal and independent chance of being selected" (Fraenkel et al. 2012, p. 94), was used for the study. The participants consisted of two populations from universities offering online EdD programs; former students who persisted to degree completion or did not finish, and students currently enrolled in EdD programs. The participation criteria defined at least 80% of the program's course content in totality was or is delivered online from a university offering the professional EdD degree, including affiliation with the Carnegie Project on the Education Doctorate (Allen & Seaman, 2015; Rockinson-Szapkiw et al., 2019). The populations' targeted sample sizes were 200–300 former students from online programs who completed and did not complete the EdD degree and 200–300 students currently enrolled in EdD programs. The predominant rationale for a combined sample size of at least 400 responses was to perform a principal component (factor) analysis on the 40-question modified Community of Inquiry survey embedded in former and current student surveys (Warner, 2013). Warner (2013) stated, "in general, N [the sample size for factor analysis] should never be less than 100; it is desirable to have $N > 10p$" (p. 842), where p, the number of variables, represented the 40 survey questions.

The survey was web-based and conducted at the respondents' geographical locations throughout the United States. The surveys for former and current students, whether sent to university Deans of Education for distribution or collected through social media, were voluntary, anonymous, and accessible through a link from the Qualtrics survey platform. A review of survey responses ensured participants studied at universities

meeting the 80% online criteria through correspondences with university Deans or by reviewing the university or related U.S. state websites. Also, former students' survey responses, whose EdD program started before 2007, were not used to remain consistent with the survey instrument validating the Community of Inquiry framework (Arbaugh et al., 2008; Cleveland-Innes & Campbell, 2012; Garrison et al., 2000).

Instrumentation

The Qualtrics survey platform, used for data collection, also generated reports in Excel for quantitative analysis. After receiving permission to use or modify, two survey instruments (see Appendix A & Appendix B) combined questions from three existing sources (see Appendix G), supporting construct-related validity. Fraenkel et al. (2012) defined construct validity as "the degree to which the totality of evidence is consistent with theoretical expectations" (p. 162). The original Community of Inquiry (CoI) survey, developed by Arbaugh et al. (2008), comprised 34 questions aligned with teaching, social, and cognitive presence. Cleveland-Innes and Campbell (2012) developed six additional questions to measure emotional presence, increasing the number of survey questions to 40. With permission from Dr. Cleveland-Innes (see Appendix G), the 40-item CoI survey, initially developed for course evaluations, was modified for survey respondents to answer the questions from a program-level perspective. The course to program-level change was not deemed a threat to validity. Also, the rating scale was changed from a 5-point Likert scale to a 10-point interval scale to increase response fidelity and variation. Gittings et al. (2018) also permitted the use and modification of questions, including demographic information, the relationship with the dissertation chair, and reasons students did not persist (see Appendix G). J. Taylor (personal

communication September 20, 2020) permitted the use of three SoGosurvey questions, addressing work hours per week, study hours per week, and time children spent in daycare (See Appendix G).

Dillman et al. (2014) asserted the importance of properly designing and implementing surveys to maximize responses. User-friendly surveys including progress bars, page breaks, and arrows for students to review previous answers (Dillman et al., 2014). Fraenkel et al. (2012) argued content validity included instrument format and clarity, bias-free language, and domain content information. A pilot survey, conducted for the current student population of EdD students, provided feedback on survey clarity and flow, the Likert and Interval scales, time-to-complete the survey, and other general comments. All students who received the pilot survey had a choice to respond or not. Four of nine students enrolled at the private-Midwest U.S. university's EdD program responded to the pilot survey with feedback from respondents incorporated before deployment to the targeted population. Table 5 summarized guidelines 9.1 through 9.10 and the actions to satisfy the criteria.

Table 5

Guidelines for Designing Web and Mobile Surveys

Guideline	Action
9.1 "Decide how the survey will be programmed and hosted" (p. 349).	A private midwestern university hosted instruments on the Qualtrics system. The researcher organized the survey into four sections, Background, Education, Work-Life-Study Balance, and Program Information. The use of skip-logic helped students easily navigate through the survey.

Continued.

Table 5. Continued.

9.2 “Evaluate the technological capabilities of the survey population” (p. 349).	Current and former doctoral students were the target audience of the survey.
9.3 “Take steps to ensure that question quality display similarly across different devices, platforms, browsers, and user settings” (p. 349).	The survey checked the surveys' preview mode, as Qualtrics was the survey instrument of choice at the private-Midwest university. One student expressed a challenge using a smartphone to answer the survey.
9.4 “Offer a questionnaire optimized for mobile [use]” (p. 349).	Qualtrics built in the capability for smartphone users.
9.5 “Decide the number of questions presented on each web page, including the arrangement of the items” (p. 349).	The strategic use of page-breaks was to optimize the number of questions on the page. As a result of the pilot survey feedback, the researcher broke down the 40-question Community of Inquiry survey instrument into four logical sections.
9.6 “Create interesting and informative welcome and closing screens that will have a wide appeal to respondents” (p. 349).	Used a prescribed template from the university, providing contact information for questions
9.7 “Develop a screen format that emphasizes the respondent rather than the sponsor” (p. 349).	The Qualtrics platform provided the format.
9.8 “Use a consistent page layout across screens and visually emphasize information that is essential to completing the survey while deemphasizing inessential information” (p. 349).	The Qualtrics platform provided a consistent page layout.
9.9 “Allow respondents to back-up in the survey” (p. 349).	The back-up feature within Qualtrics provided a back-up button activated from pilot survey feedback.
9.10 “Do not require responses to questions unless absolutely necessary of the survey” (p. 349).	Utilized “response requested” for each question. The researcher did not use “forced response” for any question, so participants could choose not to answer a specific item or group of questions, enabling through to the end of the survey.

Note. Adapted from Dillman et al. (2014). The Guideline column summarized the researcher’s actions taken from the pilot study feedback.

Variables

The independent variables, identified through research from the literature review, comprised personal and program factors. The personal factors included age, gender, ethnicity, marital status, children, program stage, and work-life-school balance measures (Ayadurai, 2018; Castelló et al., 2017; Gnanadass & Sanders, 2019; Harvey et al., 2017; Holmes et al., 2019; Nettles & Millett, 2006; Patterson, 2012; Rankin & Garvey, 2015; Rockinson-Szapkiw et al., 2017). The program factors measured Community of Inquiry (CoI) teaching, social, cognitive, and emotional presence, student-dissertation relationship questions, program orientation attendance, and cohort participation (Ames et al., 2018, Berry, 2017; Cornér et al., 2017; Lim et al., 2019; Maul et al., 2018; Santicola, 2013; Sverdlik et al., 2018). The study objectives were to identify statistically significant differences between former EdD students and current EdD students for each researched variable.

Methodology

The intended approach was a quantitative methodology, specifically logistic regression, to address the research questions and hypotheses. Crucial to conducting logistic regression was collecting enough responses from former students who did not complete the EdD survey. Peduzzi et al. (1996) conducted a logistic regression sensitivity analysis, where researchers varied the number of events per variable (EPV). The study consisted of 673 cardiac patients, of which 252 patients died. The number of events, defined by the methodology, was 252, and the number of independent variables was seven; thus, the EPV for the study was (252/7) = 36. Peduzzi et al. (1996) found EPV values of 10 or greater resulted in no significant validity problems. The estimated number

of variables from the survey instruments to perform logistic regression analysis was approximately 20, which assumed the 40-question Community of Inquiry model loaded on five factors (Cleveland-Innes & Campbell, 2012). Therefore, to accomplish logistic regression, the approximate number of respondents who did not complete the EdD survey was approximately 200. Only nine former students initially responded, which required a different approach. An alternate methodology performed a comparative analysis between two populations, former and current EdD students, for each dependent variable. The latter approach did not rely on an unreachable sample size from former students who did not complete the EdD program. A separate analysis compared former students who completed the EdD with former students not persisting.

Research Questions

The five research questions were:

Research Question 1: To what extent do the personal factors differ between former and current students?

Research Question 2: To what extent do the program factors differ between former and current students?

Research Question 3: To what extent do the program factors differ between former and current students with regard to attending a university affiliated with the Carnegie Project on the Education Doctorate?

Research Question 4: To what extent do the Community of Inquiry presences differ between former and current students with regard to participation in a cohort group?

Research Question 5: To what extent does Time-to-Degree differ between former students who attended a CPED affiliated program and a non-CPED affiliated program?

Originally, Research Question 3, before deciding to perform a comparative analysis between former and current student populations, stated: To what extent does an integrated set of personal and program factors differ between former and current students? However, the original research question only made sense if logistic regression, to predict persistence, was performed. Instead, the modified third research question examined the relationship between former and current students with each program factor using a moderating variable. The moderating variable, supported by research, tested for differences between former and current students attending an EdD program affiliated with the CPED or with no affiliation to CPED. The added fourth research question also examined the relationship between former and current students with the Community of Inquiry presences, using a different moderating variable. The moderating variable, also supported by research, tested for the effect of participation in cohort groups or not participating in a cohort group as the moderating variable. The fifth research question addressed time-to-degree completion between former students attending an EdD program affiliated with CPED and former students attending an EdD program with no affiliation to CPED.

Hypothesis Statements

The 16 statements of hypothesis were:

Null Hypothesis 1: There is no difference between the population of former and current EdD students' age during doctorate program studies.

Null Hypothesis 2: There is no difference between the population of former and current EdD students' gender during doctorate program studies.

Null Hypothesis 3: There is no difference between the population of former and current EdD students' ethnicity during doctorate program studies.

Null Hypothesis 4: There is no difference between the population of former and current EdD students' marital status during doctorate program studies.

Null Hypothesis 5: There is no difference between the population of former and current EdD students' number of children/ dependents during doctorate program studies.

Null Hypothesis 6: There is no difference between the population of former and current EdD students' work-life-study balance during doctorate program studies.

Null Hypothesis 7: There is no difference between the population of former and current EdD students' who attended a program orientation during doctorate program studies.

Null Hypothesis 8: There is no difference between the population of former and current EdD students' level of social presence, cognitive presence, teaching presence, and emotional presence during doctoral program studies.

Null Hypothesis 9: There is no difference between the population of former and current EdD students' relationship with the dissertation chair during doctoral program studies.

Null Hypothesis 10: There is no difference between the population of former and current EdD students' participating in a cohort group during doctoral program studies.

Null Hypothesis 11: The relationship between the population of former and current students who attended a program orientation during doctorate program studies is independent of students who attended an EdD program affiliated with the Carnegie

Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 12: The relationship between the population of former and current students' level of teaching presence, social presence, cognitive presence, and emotional presence during doctoral program studies were independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 13: The relationship between the population of former and current students' relationship with the dissertation chair during doctoral program studies was independent of who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 14: The relationship between the population of former and current students participating in a cohort group during doctoral program studies is independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 15: The relationship between the population of former and current students' level of teaching presence, social presence, cognitive presence, and emotional presence during doctoral program studies were independent of EdD programs whose students participated in a cohort group.

Null Hypothesis 16: There is no difference in time-to-degree between former students who attended an EdD program affiliated with the Carnegie Project on the

Education Doctorate and former students who attended an EdD program with no affiliation with CPED.

Data Collection

Obtaining survey feedback entailed contacting Deans of Education for permission to survey former and current students. The survey, conducted anonymously through Qualtrics, allowed participants to elect to respond or not respond. The initial IRB approved the correspondence with 36 universities on September 21, 2020, requesting student email addresses from Deans of Education. Due to a low number of survey responses from the 36 universities, two additional modifications were processed on September 22, 2020 and then another on September 28, 2020, increasing the number of universities from 36 to 44. The university Deans who agreed to participate stated a requirement to distribute surveys directly to students to address privacy concerns, requiring a third IRB modification, approved on October 21, providing the universities with the appropriate information to distribute the surveys. In addition to giving the survey links, a Survey Research Information Sheet was provided, which described informed consent. The Survey Research Information Sheet was the first survey question to ensure students read and consented to the survey. Deans distributed the surveys through course management systems, internal websites, or email. From the 44 universities, the School of Education Deans from eight universities agreed to support the research study; however, only seven universities responded, despite a dean's reminder. Former students from five of the eight universities responded. Deans from several other universities stated willingness to participate. However, the online programs had yet to graduate students and chose not to allow students to participate.

The number of former and current students responding to the anonymous survey, distributed through the university Deans, was 174 and 119, respectively, for 293 respondents. The population of students who received access to the combined former and current student surveys was 1446, resulting in a 20.3% response rate. Also, to conduct logistic regression analysis to predict degree completion, statistical methods required feedback from former doctoral students who did not complete the EdD program, a population found hard to reach. Only one former student, who did not complete the EdD program, responded to the survey distributed by the university deans.

One of the deans, who declined permission to survey students, suggested using social media to obtain responses. Dusek et al. (2015) claimed social media provided an innovative and cost-effective approach to data collection, however, maintaining robust research methods was crucial to ensure data integrity and validity. Dusek et al. (2015) also claimed LinkedIn was the more appropriate social media platform to target a population for data collection, given it connected professionals from multiple professions with identified credentials. Two IRB modifications, processed on November 2 and November 4, 2020, were sent to survey former and current students on two social media sites, LinkedIn and Facebook.

Through searching on LinkedIn and Facebook for EdD groups, the researcher identified three EdD groups on Facebook, one with 4180 members, and the other with 206 members. One group's administrator did not provide the number of members. Social media responses received from 432 former and current students from the Facebook groups combined with the 293 responses from university Deans resulted in 725 respondents. Whether sent through the university Deans or social media, all surveys

opened in October and November, respectively, and closed on December 31, 2020, and January 31, 2021.

Data Analysis Procedures

The 14-step data analysis procedure was:

1) Performed an initial data cleaning to remove incomplete surveys, responses from students enrolled in and attending university programs not meeting the 80% online content criteria, and to realign a small number of former students who responded to the current student survey in the dataset. The process, which started with 725 responses, resulted in a sample size of 511, of which 228 were former students who completed the EdD and 283 current EdD students. The difference between 725 and 511 included survey responses from 40 former students who did not persist to completion and was addressed as a separate population segment due to the relatively small sample (see Step 11).
2) Created frequency and relative frequency charts of all variables for visual assessment.
3) Implemented multiple imputation using Statistical Package for Social Sciences (SPSS) Version 27 to replace 146 missing data points for Teaching Presence question 13 within the 40-question Community of Inquiry survey. The question was inadvertently left out of the former students' survey sent to Deans of Education but incorporated into the social media survey. A pooled dataset from 20 iterations, created by the multiple implementation process, replaced the missing data. The process included conducting a best and worst-case dataset of higher and lower means and standard deviations (Donders et

al., 2006; Pedersen et al., 2017; Van Buuren, 2012; Van Ginkel et al., 2020; Warner 2013). The multiple imputation process replaced 11 additional missing values from the 40-question CoI survey.

4) Validated the multiple imputation pooled dataset through analyzing descriptive statistics' comparative data before and after imputation. A principal component (factor) analysis using a direct oblimin rotation of the Community of Inquiry constructs with imputed values compared multiple parameters against the validated 34-question Community of Inquiry survey (Arbaugh et al., 2008; Cleveland-Innes & Campbell, 2012, Shea & Bidjerano, 2012). Using SPSS, the parameters calculated and compared were the Kaiser-Meyer-Olkin (KMO) statistic, Bartlett's test of sphericity, percentage of variance explained, Cronbach's alpha, and variable cross-loadings (Bandolas & Gerstner, 2016; Kaiser, 1974; Mvududu & Sink, 2013; Warner, 2013; Watson, 2017).
5) Further reduced the dataset size from 511 to 475, removing survey respondent data before 2007 to align with Arbaugh et al.'s (2008) study, explained further in Chapter Four.
6) Used the auto-code feature in SPSS to convert all categorical and ordinal variables within SPSS Version 27 into numeric values to accomplish quantitative analysis. The process included treating blank string values as user-missing data (Grande, 2015b).
7) Conducted hypothesis tests using chi-square tests of independence between former and current student populations for all categorical and ordinal

variables. Checked expected cell count underlying assumptions for both 2 x 2 tables and those larger than 2 x 2 (Bewick et al., 2004; Field, 2018; McClave & Sincich, 2017; McHugh, 2013; Yates, 1999). The level of significance used was 0.05. All rejected null hypotheses included a Cramer V effect size calculation (Ferguson, 2009).

8) Performed a principal component (factor) analysis using SPSS Version 27 on the Community of Inquiry (CoI) 40-question interval scale survey. The outcome of parallel analysis (Howard, 2016; Math Guy Zero (2000), Myududu & Sink, 2013; O'Connor, 2000a; O'Connor; 2000b, Watkins, 2018; Watson, 2013) resulted in a four-factor solution for ease of interpretation and analysis and consistent with the CoI theoretical framework. Calculated means for each survey respondent using SPSS for teaching, social, cognitive, and emotional presence (TP, SP, CP, EP) constructs for hypothesis testing (Eager, 2018). After performing normality testing for TP, SP, CP, and EP means (Grande, 2016), the researcher conducted two-independent sample Mann Whitney U tests to determine if statistical significance existed between former students who completed the EdD and current EdD students. The level of significance used for all analyses was $\alpha = .05$.

9) Added a data field to indicate if survey respondents attended a university whose EdD program affiliated with the Carnegie Project on the Education Doctorate (CPED, 2021), then aligning each survey respondent's EdD program *Start Date* with the CPED affiliation year.

10) Conducted Cochran-Mantel-Haenszel tests between the independent variable (current and former students) with selected dependent variables (program orientation and participation in a cohort group) using a moderating variable. The moderating variable, defined as students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED, tested for odds ratios in each strata and for a Common Odds ratio. All rejected null hypotheses included a Common Odds Ratio effect size calculation, or confidence interval (Denham, 2017).
11) Conducted Two-Way Analysis of Variance (ANOVA) testing (using the Univariate function in SSPS) for the Program Dissertation Chair relationship using a moderating variable. The moderating variable was a university whose EdD program affiliated with the Carnegie Project on the Education Doctorate (CPED). The ordinal variables, automatically recoded into discrete values, accomplished the ANOVA in SPSS. A principal component (factor) analysis, conducted using a direct oblimin rotation on the six-question dissertation chair survey, found all six variables loaded onto one factor. The process required calculating the mean values of the six questions for each survey respondent (Eager, 2018). A procedure, defined by Gignac (2019), and using SPSS balanced the number of data points for each of the four factor-level combinations: Former students-CPED, Former Students-No CPED, Current Students-CPED, and Current Students-No CPED. In addition to a balanced design, additional underlying assumptions were normality, homogeneity of

variance, and outliers (Grande, 2014, McClave & Sincich, 2017). All rejected null hypotheses included a partial η^2 effect size calculation.

12) Conducted Two-Way Analysis of Variance (ANOVA) testing for the Community of Inquiry presences using a moderating variable. The moderating variable examined whether a university whose EdD programs were affiliated with the Carnegie Project on the Education Doctorate (CPED). The CoI means, previously calculated for Hypothesis Test 8, were used to balance the number of data points for each of the four factor-level combinations (Gignac, 2019; McClave & Sincich, 2017): Former students-CPED, Former Students-No CPED, Current Students-CPED, and Current Students-No CPED. Additional underlying assumptions checked were normality, homogeneity of variance, and outliers (Grande, 2014, McClave & Sincich, 2017). All rejected null hypotheses included a partial η^2 effect size calculation.
13) Step 13 replicated Step 12, only using cohort participation or not as the moderating variable.
14) Removed 10 of the 40 former students whose EdD program did not meet the 80% online program content criteria. Only 11 of the 30 students finished all survey sections. Descriptive statistics for former students who completed the EdD and did not complete the Ed.D, due to the small sample size of the latter, were compared.

Initial Data Cleaning

The data from [*n* = 725] survey responses, collected through the Qualtrics survey platform, addressed the four research questions and 15 hypotheses statements. The respondents were anonymous and consistent with research ethics, protecting student information and privacy. Participants recruited came either from a school of education dean or through social media groups. The data cleaning process reduced the sample size from [*n* = 725 to *n* = 511]. Respondents either failed to complete the surveys or attended universities whose EdD programs did not meet the 80% criteria of content delivered online. Also, seven students reported having earned an EdD but answered the current student survey, subsequently recoded as former students. Thirty former students, who started the EdD program but did not persist to completion, were compared in a separate analysis with the former students who earned the EdD.

Social Media Data Integrity

For social media responses, the surveys included an explicit statement within the post to former and current EdD students, which defined “Online” as 80% or more of your coursework in totality was or is delivered online (See Appendix E & Appendix F). After data collection, the verification process evaluated two sources of information; the university website identified by the respondent and websites for each state offering online EdD programs, e.g., https://www.onlineeddprograms.com/states/virginia. In some cases, universities offering online EdD programs identified a finite number of weekend residencies for instruction, networking, or group projects and, therefore, included those in the data analysis. The number of social media responses not meeting the criteria was 32 students. A few cases existed where universities offered multiple delivery options for

students, e.g., online or hybrid. In those cases, because the instructions specifically defined the 80% online requirement, the responses from the respondents were trusted and included.

Threat to Validity

Missing Data

During the data collection process, one of 13 Teaching Presence (TP) questions, TP13, embodied within the former students' 40-question Community of Inquiry survey, was accidentally omitted. The *Age* question, within the current students' survey, also inadvertently omitted, resulted in missing data. In both cases, the surveys were immediately corrected and redeployed for data collection. For the age question, a methodology did not exist to replace the data. After remedying the surveys, 56 students responded, sufficient to test the age hypothesis statement. For the omitted Community of Inquiry survey TP13 question, to conduct research hypotheses statements required a process to address the missing data. The missing data amount for TP13 was 146, all within the former students' survey.

Scholars described three types of missing data: (1) data completely missing at random (MCAR), (2) data missing at random (MAR), and (3) data not missing at random (NMAR). Van Buuren (2012) claimed if the probability of missing data was the same for all subjects, the data category was missing completely at random (MCAR). Van Buuren (2012) also claimed missing data at random (MAR) as conditional or dependent on some known property of the observed data, and data classified as not missing at random (NMAR) meant the cause of the omitted data was unknown. The scenario of a survey question left out aligned closer with missing at random (MAR) category. Pedersen et al.

(2017), however, claimed multiple imputation, a process in which replaced data, provided "unbiased and valid estimates of association based on information from available data" (p. 157), and capable of replacing values whether classified as MAR, MCAR, or MNAR. Other missing data options, such as listwise deletion, discarded the entire dataset case if missing information existed or replacing the missing values with the mean of the remaining values, which could result in bias results (Donders et al., 2006; Pedersen et al., 2017; Van Ginkel et al., 2020; Warner 2013). Furthermore, multiple imputation prevented wastefulness while increasing statistical power by not discarding the data (Van Ginkel et al., 2020). Van Buuren (2012) claimed multiple imputation was the accepted method to replace missing data with algorithms integrated into statistical software packages, such as Statistical Package for Social Sciences (SPSS). Li et al. (1991) claimed 20% of missing data were a modest level of missing data, 30% moderately large, and 50% extreme, stating "4 or 5 imputations resulted in well-calibrated procedures with relatively modest power losses" (p. 1072). Similarly, White et al. (2010) suggested a range for imputation between 30% to 50% missing data. A combined survey sample size of 511 and 146 missing values for TP 13 resulted in 28.57% missing data, well within the criteria.

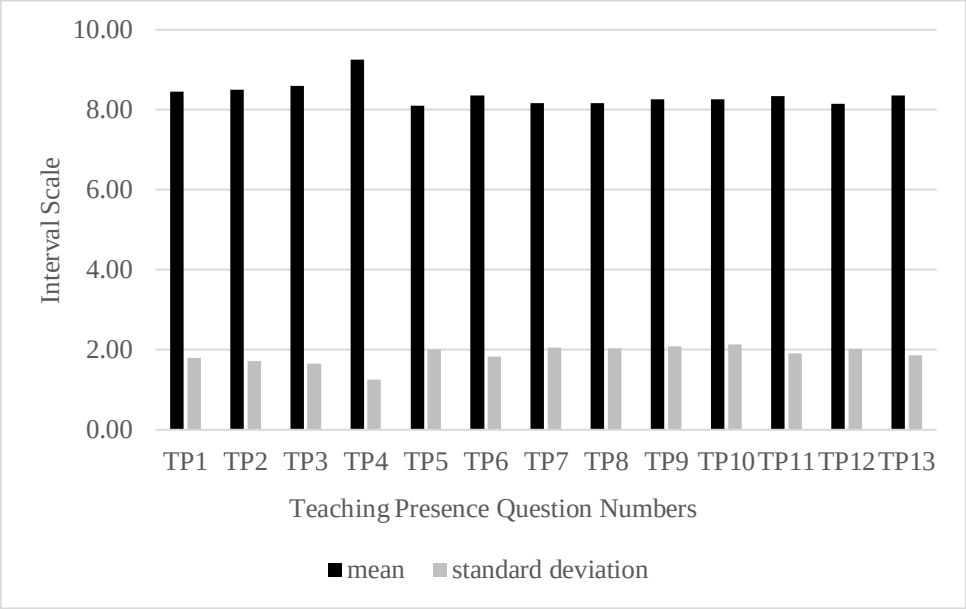
Multiple Imputation

Many researchers discussed the multiple imputation process to replace missing data, with most referencing and building on original works by Rubin (1987). Rubin (1987) stated, "multiple imputation is a statistical technique designed to take advantage of the flexibility in modern computing to handle missing data" (p. vii). Before calculating imputed values, the first step of a three-step process was understanding survey responses'

patterns to select the data for inclusion (Pedersen et al., 2017). Because the study defined the two populations, former and current students as both simple random samples, a systematic approach to assessing the feasibility of using a combined dataset for multiple imputation, was used. Figure 2 and Figure 3 depicted a comparative summary of the means and standard deviations for all 13 Teaching Presence questions for both former and current EdD student samples, which were visually very similar.

Figure 2

Descriptive Statistics for Former Students Teaching Presence Questions



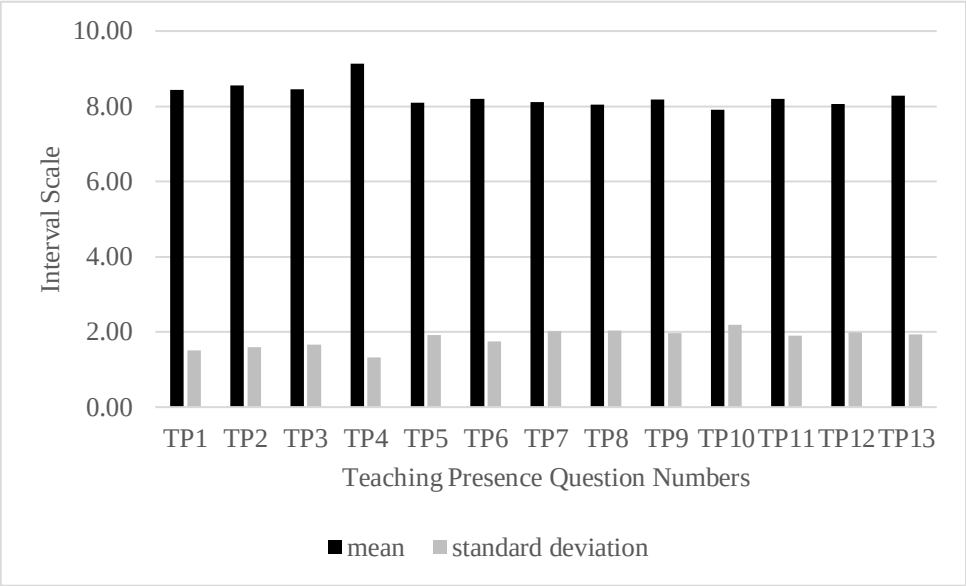
Note. N = 228 for TP1-TP12 survey questions. N = 82 for survey question TP13.

Observation of the two Figures reflected very similar patterns for all Teaching Presence questions. Using an interval scale of 1-10 in the surveys, former and current students' mean responses for Teaching Presence question 13 (TP13) were 8.28 and 8.35, respectively. Corresponding Former and Current students' standard deviation responses were between 1.862 and 1.941, respectively. Skewness calculations for former and

current students were -1.452 and -1.592, respectively, and kurtosis values for the two sampled populations were 2.143 and 2.45.

Figure 3

Descriptive Statistics for Current Students Teaching Presence Questions



Note. N = 283 for TP1-TP13 survey questions.

Arbaugh et al. (2008) developed the initial 34-question Community of Inquiry survey. The survey design aligned with the three theoretical constructs established by Garrison, Anderson, and Archer (2000), teaching, social, and cognitive presence. Therefore, since the question missing was within the teaching presence construct of 13 survey questions, internal consistency reliability calculations (e.g., Cronbach's alpha) for both former and current student populations were .97 and .96, respectively. The analysis confirmed a highly consistent response pattern between the two populations for the teaching presence variable, both with highly skewed data. A two-sample non-parametric Mann-Whitney U test determined if a statistical difference existed between the 82 former

students and 283 current students teaching presence question 13 survey ratings. Results indicated $U = .754$, $p = .754$, which failed to reject the null hypothesis. Thus, through visual inspection of the frequency charts, descriptive statistics comparative analysis, internal consistency reliability calculations, and a two-sample Mann-Whitney test of survey ratings, the use of multiple imputation, with a combined current and former student database sample size of [$n = 511$], provided unbiased estimates to replace missing data for TP13.

Von Buuren (2012) asserted historical research suggested using "between 3 and 5 imputations for moderate amounts of missing information," with emerging studies recommending "between 20–100" (p. 49). Von Hippel (2009) conducted a study using 40 imputations for 40% missing values (p. 278), which aligned with one imputation for every one percent of missing data. Rubin (1987) quantified a "large-sample variation" ratio between a finite number of m imputations, $\bar{Q}_m$ relative to infinite imputations, $\bar{Q}_\infty$, using the following equation (p. 114).

$$= \left(1 + \frac{\gamma_0}{m}\right)$$

Applying the study parameters of γ_0 =28.57%, the percentage of missing data, with m = 20 imputation iterations, resulted in a multiplier of 1.014. Interpreting, the calculated variance was 1.014% higher than if computing m =∞ imputation iterations. Thus, for Step Two, the researcher, using SPSS version 27, estimated 20 imputations and a pooled multiple imputed dataset (Baranzini, 2018; Pedersen et al., 2017, p. 163). An increased number of imputations provided diminishing returns. Step three created a "pooled

multiple imputed estimate" (Pedersen et al., 2017, p. 162) and summarized descriptive statistics in Table 6

Table 6

TP13 Imputation Descriptive Statistics

Imputation	Mean	SD	Imputation	Mean	SD
1	8.25	1.796	11	8.27	1.775
2	8.24	1.818	12	8.24	1.820
3	8.24	1.829	13	8.20	1.830
4	8.27	1.806	14	8.24	1.815
5	8.18	1.819	15	8.25	1.817
6	8.28	1.796	16	8.24	1.834
7	8.20	1.833	17	8.31	1.784
8	8.21	1.817	18	8.23	1.798
9	8.22	1.803	19	8.29	1.802
10	8.25	1.817	20	8.28	1.827
			Pooled	8.244	1.729

Note. The table summarized the descriptive statistics for the 20 imputations.

The multiple imputation estimates were validated by bounding higher and lower means and standard deviations using Imputation 5 and Imputation 11 (Pedersen et al., 2017) and conducting principal component analysis, which did not change the factor loadings and constructs. The pooled imputation dataset resulted in a slightly lower standard deviation (Donders et al., 2006).

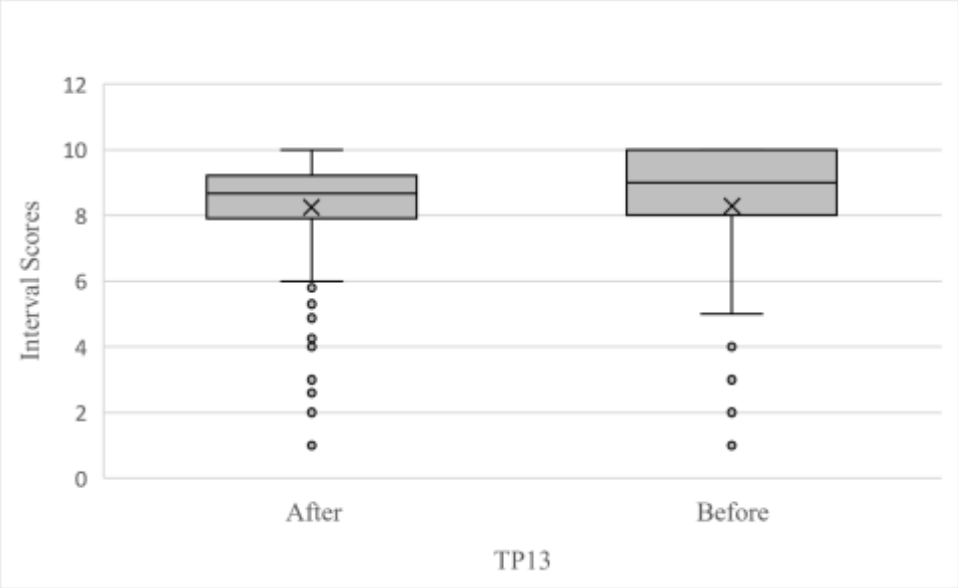
Factor Analysis Validation

A principal component (factor) analysis compared multiple parameters with the Arbaugh et al. (2008) study, such as Kaiser-Meyer-Olkin, Bartlett's Test of Sphericity, percentage of variance explained by eigenvalues greater than one, and Cronbach's alpha calculations. Warner (2013) asserted factor analysis evaluated many variables, *p,* such as a survey question instrument, reduced to a smaller number of *latent* variables or constructs. Factor analysis collapsed variables into smaller sets of underlying constructs by accounting for collinearity patterns, revealing meaningful clusters used for analysis (Mvududu & Sink, 2013; Watson, 2017). Before performing factor analyses, multiple researchers cited specific criteria to be satisfied. For factor analysis, Warner (2013) asserted a minimum sample size of 100 and a ratio between sample size (n) and the number of variables (p) be at least 10 (p. 842), of which the combined dataset met both criteria given a sample size of 511. Bandolas and Gerstner (2016) argued distributions not meeting normality might exhibit problems when univariate skewness and kurtosis values were equal to or greater than 2.0 and 7.0, respectively (p. 31). Demirtas et al. (2008) claimed for large samples, defined as greater than 400, skewness and kurtosis did not adversely affect multiple imputation performance (p. 10). Skewness and Kurtosis calculations of all 34-Community of Inquiry Teaching, Social, and Cognitive presence questions were within the threshold with two exceptions. Teaching Presence Question 4 skewness = -2.138, and Social Presence Question 5 = -2.082, were slightly over the |2.0| threshold (See Appendix H). Watkins (2018) argued excessive skew could influence exploratory factor analysis and suggested using box and whisker plots to detect outliers for retaining or deleting outliers based on circumstances. Figures 4 and 5 depict box plots

and histograms, respectively, for Teaching Presence question 13. The “after imputation” values were pooled data from 20 iterations.

Figure 4

Boxplot of Teaching Presence; Question 13 Scores

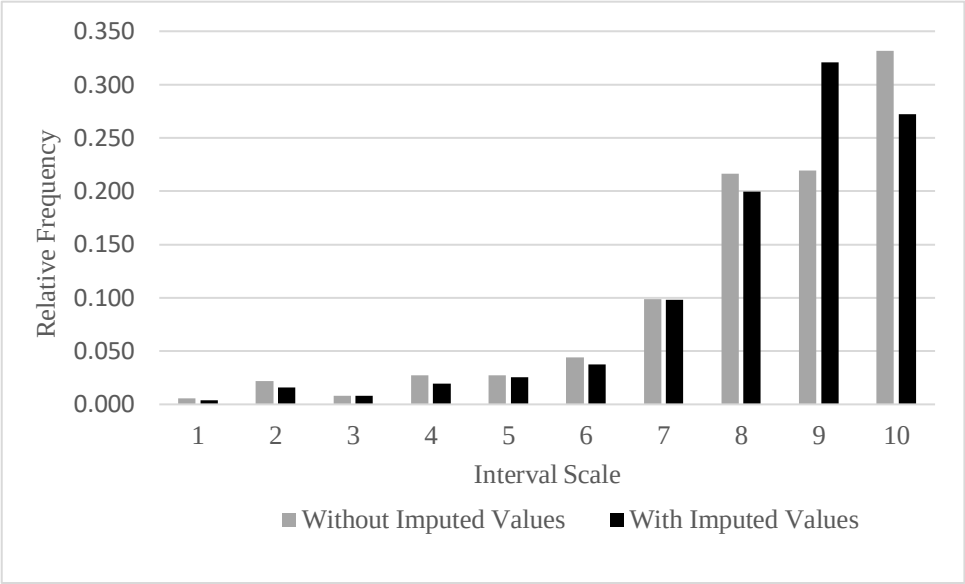


Note. $N = 511$ for the dataset with imputed values. $N = 365$ for the dataset without imputed values. The chart provides a comparative analysis of quartiles, means, medians, and outliers before and after imputation.

The outlier data examined did not exhibit a pattern or quantity to justify discarding data. While most students responded with high scores, a smaller percentage consistently scored the questions low. Also, because the survey was anonymous, follow-up discussions with survey respondents to identify the reasons or root causes for low scores were not possible.

Figure 5

Teaching Presence Question (TP13) Comparison Before and After Imputation



Note. $N = 511$ includes imputed values. $N = 365$ prior to imputation.
The chart intends to show the relative frequency distribution similarity between before and after multiple imputation.

Watson (2017) outlined a five-step process to conducting a factor analysis: "(a) evaluating the factorability of the intercorrelation matrix, (b) determining how many factors to extract, (c) determining how many factors to retain, (d) determining the appropriate factor rotation method, and (e) interpreting factor structure and naming factors" (p. 232).

Evaluating the factorability of the intercorrelation matrix. Mvududu and Sink (2013) claimed most correlations between factors should fall in a range from .20 to 0.80 (p. 82). Multicollinearity became a potential issue between factors with correlations of 0.85 or larger (Mvududu & Sink, 2013). Watkins (2018) asserted Bartlett's test of sphericity examined the correlations matrix values for factorability, ease of interpretation,

and parsimony. Watson (2017) stated Bartlett's test of sphericity formulated a null hypothesis, which stated the intercorrelation matrix was an *identity matrix*, meaning values of one were on the diagonals and values of zeros off the diagonals. A rejection of the null hypothesis meant "individual variables are sufficiently correlated for a factor analysis to be performed" (Watson, 2017, p. 233). Kaiser-Meyer-Olkin (KMO) parameter, ranging between 0 and 1.0, measured sampling adequacy with desired values $\geq .70$, "suggesting factor analysis yielded distinct and reliable factors given the data utilized" (Arbaugh et al., 2008, p. 134). Kaiser (1974) categorized KMO values with the following descriptors: "values between .90 to 1.0 (marvelous), .80 to .89 (meritorious), .70 to .79 (middling), .60 to .69 (mediocre), .50 to .59 (miserable), and below .50 (unacceptable)" (p. 35).

Determining how many factors to extract. Warner (2013) claimed Principal Components Analysis (PCA) and Principal Analysis Factoring (PAF) were factor extraction methods. Statistics Package for Social Sciences provided the capability of both methodologies. Watson (2017) argued PAF was the preferred approach when normality was an issue. Bandalos and Gerstner (2016) claimed the importance of setting a factor loading threshold to delineate the most critical factors, claiming through literature a range of values between .32 and .78 with a median cutoff of .40 (p. 38). Despite theoretical differences in factor extractions and calculations of variances and correlations, "for some datasets, PCA and PAF may yield similar results about the nature of components and factors" (Warner, 2013, p. 860). Appendix I compared a factor analysis using both PCA and PAF methods, which yielded similar results.

Determining how many factors to retain. Software packages, such as SPSS, calculated a default factor solution or provided researchers the capability to specify the number of factors extracted based on theory or knowledge (Bandolas & Gerstner, 2016; Warner, 2013). Bandalos and Gerstner (2016) also claimed an interpretable factor solution aligned with the theoretical constructs and had "at least four items per factor greater than .30" (p. 41). Calculated *eigenvalues* for each factor indicated "the amount of variance accounted for by that factor independent of all other factors" (Watkins, 2018, p. 229). Warner (2013) asserted researchers who did not specify the number of factors for retention retained eigenvalues greater than one. For example, Arbaugh et al. (2008) conducting factor analysis using principal components analysis and extracted four factors with eigenvalues larger than one. However, "when specifying a three-factor solution within SPSS, factor loadings for the 34 items supported the validity of the CoI's conceptual framework of Teaching, Social, and Cognitive presences" (Arbaugh et al., 2008, p. 135). Researchers advocated for using a Scree Plot, which depicted eigenvalues on the vertical axis v. factors in descending order on the horizontal axis, using the curve's break or knee to determine the number of factors to retain (Warner, 2013; Watson, 2017).

Determining the appropriate factor rotation method. Conceptually, the objective of factor rotation was to simplify and ease interpretation of the factor constructs (Watkins, 2018). Watkins (2018) claimed two types of rotations existed, orthogonal and oblique. Watson (2017) asserted orthogonal rotations meant factors were uncorrelated, and minor to moderate correlations existed between factors for oblique rotations. Garrison (2017) claimed the Community of Inquiry theoretical framework represented "three interdependent elements – social presence, cognitive presence[,] and teaching

presence" (pp. 24–25). Translating theory to analysis, Arbaugh et al. (2008) used an oblique rotation, *direct oblimin* within SPSS Version 15, and "found the results of this study suggest there was overlap, as evidenced by the correlation among factors" (p. 136).

Evaluating and interpreting factors. In addition to the criteria mentioned above, criteria set forth by Bandolas and Gerstner (2016) established the final factor analysis construct:

> (a) Interpretability relative to the theory on which the scale was based, (b) degree to which the items had strong loadings on a factor, (c) degree to which items cross-loaded, and (d) whether each factor had at least four saliently loading items. (p. 41)

To remain consistent with Arbaugh et al. (2008), a principal components analysis, using SPSS Version 27 with a direct oblimin rotation, was conducted using a cutoff value of .40 (Bandolas & Gerstner, 2016). Using the combined dataset of 511 survey respondents, the teaching, social, and cognitive presence responses, consistent with the original study by Arbaugh et al. (2008), were used. The factor analysis results indicated five factors with eigenvalues exceeding one; however, only two variables loaded on one factor. The second step specified a four-factor solution and found three items cross-loading between two factors, two of which left only three items loading on one factor. The third step established a three-factor solution. All 13 teaching presence questions loaded on Factor 1, seven of nine social presence plus on cognitive presence question loading on Factor 2, and the remaining 11 of 12 cognitive presence loading on Factor 3. Two social presence questions cutoff below the .40 threshold thus did not load on any factor. For completeness, a three-factor eigenvalue solution, using principal axis factoring instead of

principal component analysis, was specified with similar results (see Appendix I). Addressing interpretability relative to the theory (Arbaugh et al. 2008; Bandolas & Gerstner, 2016), the one difference in the factor loadings was the researcher's factor loading had cognitive presence question CP 6 loaded with the social presence construct. In addition to Arbaugh et al.'s (2008) principal component analysis, Shea and Bidjerano (2012) surveyed over 2000 college students (p. 316) in the calendar year 2010 from 38 universities within one state university system inclusive of undergraduate and graduate students, with 26% of the sample enrolled in blended or hybrid courses (p. 318). Shea and Bidjerano's survey utilized a 5-point Likert scale, used principal axis factoring instead of principal component analysis, explaining 68.33% of the variation with Cronbach's Alpha measurements of .97, .93, and .96 for teaching, social, and cognitive presences, respectively (p. 319), consistent with the researcher's analysis. The most interesting finding from Shea and Bidjerano's (2012) study was a predominant loading of Cognitive Presence question six (CP6) onto the social presence factor, consistent with the researcher's analysis. Question CP6, together with social presence questions, SP3, SP4, and SP9, included specific references to "online discussions" or "online medium" (See Appendix A and Appendix B). Table 7 depicts a Community of Inquiry comparative factor analysis for the Arbaugh et al. (2008) study, the Shea and Bidjerano (2012) study, and the researcher's study.

Table 7

Community of Inquiry Survey Comparative Analysis

	Arbaugh et al. (2008)	Shea & Bidjerano (2012)	Study (2021)
Sample Size	287	>2000	511
Survey Scale	5-point Likert	5-point Likert	10-point Interval
Factor Analysis Method	PCA	PAF	PCA
Factors	3	3	3
Kaiser-Meyer-Olkin (KMO)	0.95	N/A	0.963
Percent of Variance	61.20%	68.33%	68.28%
Cronbach's Alpha (TP, SP, CP)	.94, .91, .95	.97, .93, .96	.96, .91, .96

Note. $N = 511$. The researcher's study showed alignment with Arbaugh et al.'s (2008) study, also validated by Shea and Bidjerano (2012). PCA = Principal Component Analysis. PAF = Principal Axis Factoring. TP = Teaching Presence, SP =Social Presence, and CP = Cognitive Presence. Twenty-six percent of the students in the Shea and Bidjerano (2012) study were enrolled in blended/ hybrid courses.

Consistent with the criteria, Table 7 reflected comparable data between the initial study by Arbaugh et al. (2008) with Shea and Bidjerano (2012), and the researcher's study. The analysis provided sufficient evidence of the imputed missing data pooled values' accuracy and integrity. Furthermore, using the combined former and current dataset addressed the research questions and hypothesis tests associated with the four-presence Community of Inquiry model. See Appendix J for Imputation 1, Imputation 5, and Pooled-Imputation comparative data.

Other Internal and External Threats to Validity

If not mitigated or understood, internal threats to validity could alter the ability to draw correct inferences. In contrast, external validity threats "arise when experimenters draw incorrect inferences from the sample data to other persons, other settings, and past or future situations" (Creswell, 2009, p. 162). Johnson and Christensen (2017) asserted the necessity to evaluate internal threats to validity before drawing causal relationships between variables. Table 8 and Table 9 depict internal and external threats to validity.

Table 8

Internal Threats to Validity

Threat Category	Threat Description	Threat Evaluation
History	Impact of time passing during the experiment	Not Applicable: A high percentage of participants completed the survey in under 10 minutes: The survey design allowed participants the opportunity to start, stop, and return at a later time to complete the survey (w/in seven days).
Maturation	Participants age during the experiment	Participating students were former and current Ed.D. students.
Regression	Participants selected have extreme scores	The researcher addressed outliers in Chapter Three.
Selection	Participants selected have characteristics that predispose an outcome	The researcher directed surveys to a targeted population of students, inclusive of all universities and to students who met a specified criteria.

Continued.

Table 8. Continued.

Mortality	Participants can dropout out of an experiment once starting	Approximately 30% of participants who started the survey did not complete the survey. Incomplete surveys were eliminated. The researcher processed five IRB modifications to increase sample sizes to compensate for survey participants' incomplete responses.
Diffusion of Treatment	Participants in the control and experimental groups can communicate, thus influencing scores	Survey distribution to current and former students through university Deans of Schools of Education and social media.
Compensatory/ resentful demoralization	Benefits between control and experimental groups	Not Applicable. No benefits as surveys were voluntary and anonymous.
Compensatory rivalry	Different groups receiving different treatment	Not Applicable: No difference in experience as surveys were voluntary and anonymous.
Testing	Participants become familiar with testing questions	Not Applicable: This was not a pre-test, post-test longitudinal survey
Instrumentation	Changes b/t pre-post test	There were no content changes to the survey instrument throughout the process other than to correct surveys for two missing questions and the addition of transgender as a gender choice, of which none responded to the latter item.

Note: The internal validity threat category matrix and threat descriptions are from Creswell, (2009, pp. 162-165). The researcher developed the threat evaluations.

The internal and external threats to validity did not threaten the study conclusions or inferences. The study conducted was not a longitudinal study. Also, most respondents completed the survey in under 10 minutes. A robust process ensured students who responded met the criteria or 80% of course content in totality delivered online.

Table 9

External Validity Threats

Threat Category	Threat Description	Threat Evaluation
Interaction of selection and treatment.	"The researcher cannot generalize to individuals who do not have the characteristics of participants" (p. 165).	A comprehensive process verified students attended universities meeting specific criteria. Chapter One noted one limitation associated with population characteristics.
Interaction of setting and treatment.	"The researcher cannot generalize to individuals to other settings" (p. 165).	The analysis focused on former and current EdD students who met specified criteria of 80% of course learning through the EdD program.
Interaction of history and treatment.	"A researcher cannot generalize the results to past or future situations" (p. 165).	The study focused on former and current EdD students only.

Note: The external validity threat category matrix and threat descriptions are from Creswell (2009, pp. 162-165).

Summary

To address the five research questions and 16 hypotheses statements, after initial data cleaning, 228 and 283 usable survey responses were collected from former and current students, respectively. Survey responses, collected using Qualtrics as the survey platform, were anonymous and consistent with research ethics, protecting student information and privacy. Participants recruited came either from the schools of education university deans or through social media groups. Survey participants responded from public, private, and for-profit universities throughout the United States. One student responded from a university in the United Kingdom. The initial analysis planned to use logistic regression to identify statistically significant factors. Despite the collection of 511 total usable responses, the number of respondents from

the population of former EdD students who did not persist to degree completion was too small. Instead, personal and program factors, identified through research, compared differences between former students who completed the EdD with the current students using appropriate statistical methods consistent with the dependent variables. For missing data requiring replacement, multiple imputation, a proven process consistent with research best practices and statistical software, validated results by conducting a principal component (factor) analysis of two previous studies for analysis (Arbaugh et al., 2008; Shea & Bidjerano, 2012). Internal and external validity threats, defined by Creswell (2009), were addressed.

A second data cleaning to accomplish the quantitative analysis, explained further in Chapter Four, was required. Chapter Four addressed all statements of hypothesis and the research questions consistent with the data analysis procedures. A separate analysis, which compared the former students who completed the EdD with those students who did not persist to completion, was also conducted and summarized in Chapter Four. Chapter Five discussed the results with implications for future research.

Chapter Four: Results

Restated Purpose and Context of this Study

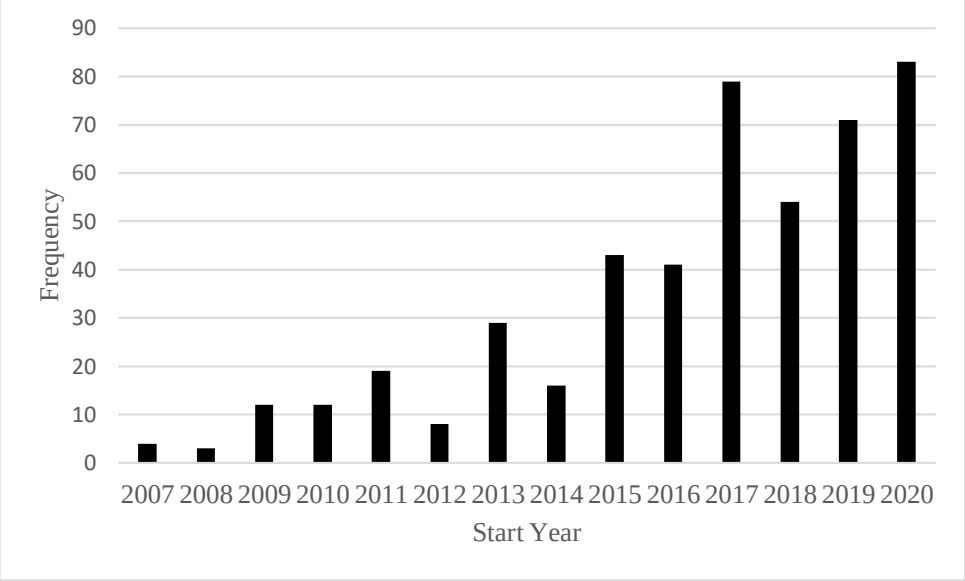
The purpose of the study was twofold; (1) establish the factors of persistence related to attrition and inform a three-year online Leadership EdD program at a private-Midwest university with best practices and lessons learned to meet future scholar-practitioner needs, and (2) to perform a quantitative comparative analysis using researched variables between students who have completed the EdD with students currently enrolled in EdD programs to assess the extent to which differences existed between the two populations.

Additional Data Cleaning Step

To remain consistent with Arbaugh et al.'s (2008) Community of Inquiry study, which collected data from students in 2007 and 2008, required the elimination of 36 survey responses from former students whose EdD programs started before 2007, reducing the sample size from 511 to 475. The breakdown between former and current students for analysis was 196 and 279, respectively. Furthermore, to test the moderating variables required identifying if survey respondents attended universities whose EdD programs were affiliated or not with Carnegie Project on the Education Doctorate. The survey instruments captured survey respondents' university and program start year. An analysis of member universities affiliated with CPED (CPED, 2021), including affiliation year, resulted in 230 students participating in EdD programs affiliating with CPED, compared with 245 students whose programs were not affiliated. Figure 6 depicts a frequency distribution representing the EdD program start year for the 196 former students and 279 current students.

Figure 6

EdD Start Year Frequency Chart



Note. N = 475. The data represents the start dates of 196 former students who completed the EdD and 279 current EdD students.

To conduct a Principal Component (factor) Analysis (PCA), Warner (2013) asserted a sample size (N) to variable ratio (p) threshold exceed N/p > 10 (p. 842). The dataset's sample size, slightly reduced from 511 survey respondents to 475, combined with p = 40, representing the 40-question CoI survey, met the requirement for conducting a PCA to determine a smaller number of constructs for analysis. The justification for not repeating multiple imputation for Teaching Presence question 13 was the imputed values was validated using the larger sample size.

Review of Methodology

Chapter Four detailed the quantitative analysis for each hypothesis question based on research variables categorized as personal and program factors. The former and

current students' surveys comprised 42 and 28 questions, respectively, divided into four sections: demographics, educational background, work-life-study balance, and program information. The first question in each survey was the students' consent to take the anonymous survey. The additional former students' survey questions consisted of 12 seven-point Likert scale questions, which requested feedback on reasons for not persisting. Also, two questions captured degree completion or not, and the time-to-degree measured in months.

The independent variable for all 15 hypothesis tests was former students who earned the EdD and current students. Hypothesis test 16 compared time-to-degree between former students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED. The dependent variables were the personal and program factors. Personal factors were age, gender, ethnicity, marital status, number of dependent children, number of hours per week a student worked, and number of hours dependent children spent in daycare (Ayaduri, 2018; Castelló et al., 2017; Gittings et al., 2018; Nettles & Millett, 2006; Ploskonka, 1993; Rankin & Garvey, 2015; Rockinson-Szapkiw et al., 2019). The program factors were if students attended a program orientation or not, teaching, social, cognitive, and emotional presence, students' relationship with the dissertation chair, and participating in a cohort group (Arbaugh et al., 2018; Berry, 2017; Cleveland-Innes & Campbell, 2012, Gittings et al., 2018; Lim et al., 2019; Motte, 2019; Rockinson-Szapkiw et al., 2019; Santicola, 2013; Sverdlik et al., 2018). Hypothesis tests' one through four, six, seven, nine, and 10 used the two-way chi-square test of independence. The chi-square statistic tested for differences between two nominal

variables to determine if the variables were independent or if sufficient evidence existed to claim the two nominal variables were dependent on each other (McClave & Sincich, 2017). McHugh (2013) asserted the chi-square test was robust for skewed data distributions and homogeneity of variance violations. McClave and Sincich (2017) claimed an underlying assumption collected data represented a random sample. For a 2 x 2 contingency table, such as using population (former and current students) versus gender (male and female), Field (2018) claimed all expected frequencies needed to be greater than 5 to use the chi-square distribution. For tables larger than 2 x 2, the critical underlying assumptions required "no cell in the table should have an expected frequency less than one, and no more than 20% of the cells should have an expected frequency of less than five" (Bewick et al., 2004, p. 52). Any null hypothesis rejected using the chi-square test included a Cramer's V effect size calculation and interpretation for practical significance (Ferguson, 2009). The limitation section in Chapter Five noted any violations of the underlying assumptions. Null Hypothesis 5 tested a difference between the former and current student populations and the number of dependent children, a quantitative discrete or scale variable. A rejection of the Shapiro-Wilk test for normality required the non-parametric Mann-Whitney test to compare the two means (Grande, 2015a).

Null Hypothesis 8

Null Hypothesis 8 was stated as, There is no difference between the population of former and current EdD students' level of social presence, cognitive presence, teaching presence, and emotional presence during doctoral program studies. Null Hypothesis 8, as outlined in Data Procedures steps 8 through 10, tested for statistically significant

differences between former and current students' teaching presence, social presence, cognitive presence, and emotional presence during doctoral program studies. To accomplish the tests required a principal component analysis (PCA) of the 40-question Community of Inquiry (CoI) survey. The modified CoI survey comprised the original 34-question survey (Arbaugh et al., 2008) and six additional questions addressing emotional presence (Cleveland-Innes & Campbell, 2012). The six emotional presence questions aligned with the CoI theoretical framework, adapted by Rienties & Alden Rivers (2014). Tabachnick and Fidell (2014) asserted, "PCA [Principal component analysis] is the solution of choice for the researcher who is primarily interested in reducing a large number of variables down to a smaller number of components" (p. 688). Applying principal component analysis (PCA) collapsed the 40 variables into smaller sets of underlying constructs by accounting for collinearity patterns, revealing meaningful clusters used for analysis (Mvududu & Sink, 2013; Watson, 2017). To make statistical inferences between current students required calculating mean values for each survey respondent, using the smaller set of constructs determined by PCA for teaching, social, cognitive, and emotional presences (Eager, 2018).

Factor Analysis Methodology

Principal Component Analysis with a direct oblimin rotation, consistent with Arbaugh et al.'s (2008) study, reduced the 40-question survey responses into four meaningful constructs by following a five-step process: "(a) evaluating the factorability of the intercorrelation matrix, (b) determining how many factors to extract, (c) determining how many factors to retain, (d) determining the appropriate factor rotation method, and (e) interpreting factor structure and naming factors" (Watson, 2017, p. 232).

Two pairs of variables, Teaching Presence (TP) question TP1 and TP2, and TP7 and TP8 had correlation values of .854 and .882, slightly exceeding the recommended threshold of .85 (Mvududu & Sink, 2013). Mvududu and Sink (2013) claimed many "correlations between variables exceeding .85 multicollinearity becomes a concern" (p. 82). Bartlett's test of sphericity, rejected for the 40-question CoI principal component analysis, meant sufficient correlations existed between variables, in which a factor analysis defined a smaller number of underlying constructs for ease of interpretation (Watson, 2017). The Kaiser-Meyer-Olkin value was .964 and fell into the *marvelous* category (Kaiser, 1974, p. 35). Skewness and kurtosis values for the teaching, social, cognitive, and emotional presence questions (see Appendix K) were within the 2.0 and 7.0 suggested guidelines (Bandolas & Gerstner, 2016, p. 30) except for TP4 and SP5. Teaching Presence question 4 and Social Presence question 5's skewness values were |2.143| and |2.068|. Cronbach's alpha calculated values for teaching, social, cognitive, and emotional presence constructs were .96, .92, .96, and .92. These values significantly exceeded a rule of thumb recommending internal reliability consistency thresholds of at least .70 (Johnson & Christensen, 2016, p. 168).

Cleveland-Innes & Campbell (2012) also used a Principal Component Analysis with a Likert scale (1 = *strongly disagree* to 5 = *strongly agree*) compared with the 1-10 interval scale (1 = low, 10 = high) used in the study. The reasoning behind using a 1-10 interval scale was to obtain more fidelity in student ratings. However, unlike Arbaugh et al. (2008), Cleveland-Innes and Campbell (2012) presented an initial set of nine factors. The analysis neither specified a factor number solution, a Kaiser-Meyer-Olkin (KMO) value, a *p*-value for Bartlett's test of sphericity, nor measures of internal reliability

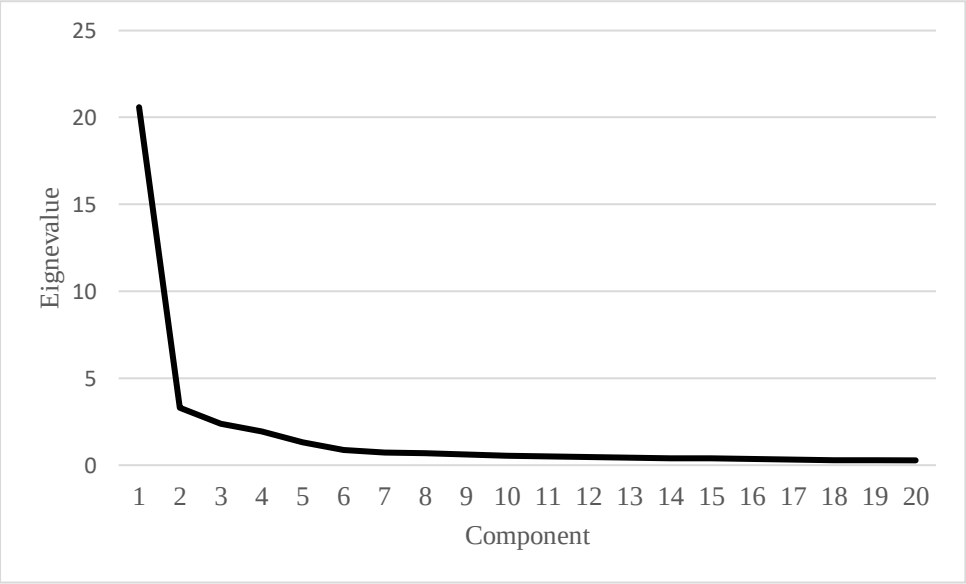
consistency (Arbaugh et al., 2008; Bandolas & Gerstner, 2016). Thus, there was not enough information provided for comparative analysis. In addition to the criteria mentioned above, Bandolas and Gerstner (2016) established criteria to determine the final factor analysis construct:

> (a) Interpretability relative to the theory on which the scale was based, (b) degree to which the items had strong loadings on a factor, (c) degree to which items cross-loaded, and (d) whether each factor had at least four saliently loading items. (p. 41)

The initial Principal Component Analysis of the 40-question CoI survey responses, using SPSS Version 27, found five factors with eigenvalues exceeded one. Myududu and Sink (2013) asserted a Visual Scree Plot (VSP) was one approach to determine the number of components to retain by finding where "the line begins to show a clear bend" (p. 87), retaining those components at the elbow or bend in the curve, depicted in Figure 7. O'Connor (2000a), however, asserted parallel analysis removed researcher subjectivity, dependent on visually finding sharp demarcations on the Scree Plot (Figure 7), defining those eigenvalues to retain or not retain.

Figure 7

Visual Scree Plot for the 40-Question CoI Survey

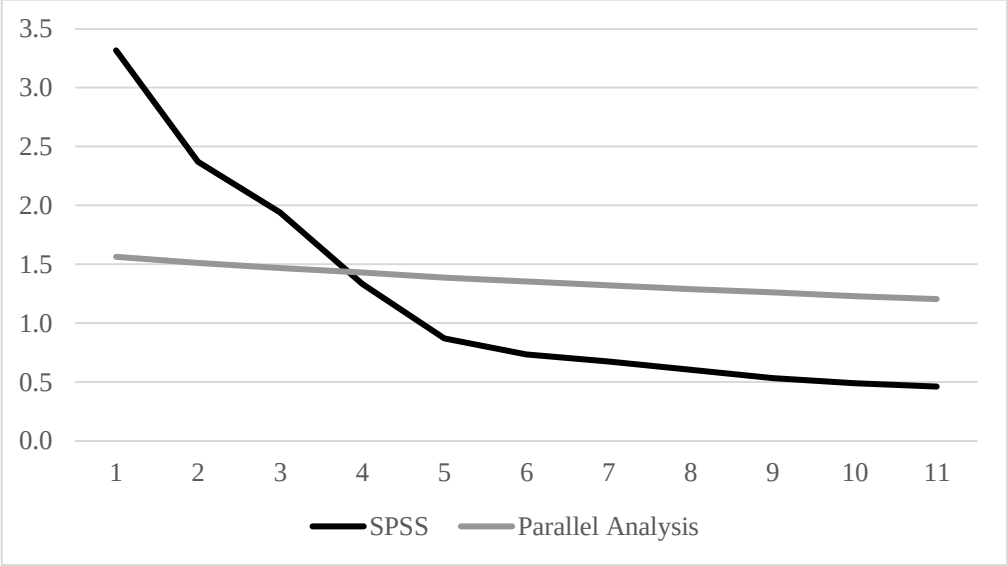


Note. The Visual Scree Plot depicts the eigenvalues for the first 20 components.

In addition to O'Connor (2000a), multiple researchers suggested using parallel analysis to determine the number of eigenvalues to retain (Howard, 2016; Myududu & Sink, 2013; Watson, 2013). O'Connor (2000b) developed syntax for conducting parallel analysis (see Appendix L), titled SPSS parallel.sps (para. 3). The parallel analysis process calculated a "resulting set of eigenvalues averaged and compared with the components extracted from the real data" (Watkins, 2018, p. 230). Watkins (2018) asserted the retained components from parallel analysis had eigenvalues exceeding the calculated values, which averaged simulated data (see Appendix L). Figure 8 reflected the comparative analysis of the actual data with the simulated data.

Figure 8

Eigenvalue Comparative Analysis: SPSS Values vs. Parallel Analysis (PA)



Note. The chart depicts Eigenvalues for component's 2 through 11 for readability. The retained eigenvalues are those whose components' actual values are higher than those calculated by parallel analysis. The parallel analysis values represented 95th percentile values from the 100 iterations.

The researcher implemented the parallel analysis method and found the crossover point between components four and five (Math Guy Zero, 2020). The actual and parallel analysis component eigenvalues were 1.94 v. 1.47 for component four and 1.33 v. 1.43 for component five. Thus, a four-factor solution, consistent with the theoretical framework, was specified and analyzed using Principal Component Analysis to address Null Hypothesis 8. Finalizing the variable loadings on each component required examining the criteria for variables cross-loading on different factors. Bandalos and Gerstner (2016) claimed factor cross-loadings “simply indicate that items share variance with more than one factor” (p. 36) and not considered incorrect. Howard (2016), through

a meta-analysis, recommended satisfactory "variables (a) load onto their primary factor above 0.40, (b) load onto alternative factors below 0.30, and (c) demonstrate a difference of 0.20 between their primary and alternative factor loadings" (p. 55), or the .40–.30–.20 rule. Applying Howard's (2016) methodology, Arbaugh et al.'s (2008) study's primary factors aligned with variable values greater than .40; secondary factors loaded at values as high as .374, and differences between all the primary and secondary factors exceeded .20 (p. 135). Following the intent of Howard's approach but using values from the Arbaugh et al. (2008) resulted in variable values greater than .40 loading on a component with differences between primary and secondary approximately equal to or greater than .20. All but one secondary loaded variable, Emotional Presence (EP) question EP2 exceeded .374, depicted in Table 10.

Table 10

Principal Component Analysis of the Community of Inquiry Survey

CoI Item	Component Loading			
	1	2	3	4
Component 1: Teaching Presence				
TP8. The instructors helped keep the course participants on task in a way that helped me to learn.	**0.881**	-0.039	0.033	-0.142
TP9. The instructors encouraged course participants to explore new concepts in this course.	**0.841**	-0.032	0.048	-0.157
TP6. The instructors were helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.	**0.837**	0.014	-0.059	-0.075
TP1. The instructors clearly communicated important course topics.	**0.833**	0.007	-0.108	0.079
TP5. The instructors were helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.	**0.818**	0.004	-0.100	0.091
TP2. The instructors clearly communicated important course goals.	**0.817**	0.076	0.048	-0.054

Continued.

Table 10. Continued.

CoI Item	Component Loading			
	1	2	3	4
TP7. The instructors helped to keep course participants engaged and participating in productive dialogue.	**0.811**	-0.018	0.026	-0.201
TP3. The instructors provided clear instructions on how to participate in course learning activities.	**0.802**	0.083	-0.023	0.120
TP11. The instructors helped me to focus discussion on relevant issues in a way that helped me to learn.	**0.785**	0.026	-0.057	-0.146
TP4. The instructors clearly communicated important due dates/ time frames for learning activities.	**0.751**	0.070	0.014	0.156
TP12. The instructors provided feedback that helped me understand my strengths and weaknesses relative to the courses' goals and objectives.	**0.739**	0.049	-0.132	0.043
TP10. Instructors' actions reinforced the development of a sense of community among course participants.	**0.663**	-0.066	-0.032	-0.354
TP13. The instructors provided feedback in a timely fashion.	**0.577**	0.045	-0.268	0.146
Component 2: Social Presence				
SP4. I felt comfortable conversing through the online medium.	0.010	**0.953**	0.048	0.114
SP3. Online or web-based communication is an excellent medium for social interaction.	0.123	**0.770**	0.043	0.009
SP9. Online discussions help me to develop a sense of collaboration.	0.081	**0.769**	-0.047	-0.052
CP6. Online discussions were valuable in helping me appreciate different perspectives.	0.013	**0.701**	-0.215	0.087
EP2. I felt comfortable expressing emotion through the online medium.	-0.078	**0.668**	0.049	**-0.413**
SP5. I felt comfortable participating in the course discussions.	0.127	**0.565**	-0.182	-0.078
SP6. I felt comfortable interacting with other course participants.	0.013	**0.512**	-0.249	-0.190
SP7. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	-0.004	**0.473**	-0.224	-0.248
SP8. I felt that my point of view was acknowledged by other course participants.	0.070	**0.429**	-0.236	-0.242

Continued.

Table 10. Continued.

CoI Item	Component Loading			
	1	2	3	4
Component 3: Cognitive Presence				
CP4. I utilized a variety of information sources to explore problems posed in the courses.	-0.082	-0.023	**-0.899**	-0.012
CP12. I can apply the knowledge created in the courses to my work to other non-class related activities.	-0.001	0.023	**-0.858**	0.052
CP3. I felt motivated to explore content related questions.	0.067	-0.016	**-0.835**	-0.042
CP11. I have developed solutions to course problems that can be applied in practice.	-0.022	0.053	**-0.833**	<.001
CP10. I can describe ways to test and apply the knowledge created in the courses.	0.040	0.074	**-0.804**	0.009
CP8. Learning activities helped me construct explanations/ solutions.	0.072	0.076	**-0.799**	0.009
CP9. Reflection on course content and discussion helped me understand fundamental concepts in the classes.	0.001	0.067	**-0.780**	-0.059
CP7. Combining new information helped me answer questions raised in course activities.	0.067	0.159	**-0.764**	-0.005
CP5. Brainstorming and finding relevant information helped me resolve content related questions.	0.054	-0.029	**-0.747**	-0.077
CP2. Course activities piqued my curiosity.	0.264	-0.064	**-0.716**	-0.028
CP1. Problems posed increased my interest in course issues.	0.155	0.006	**-0.647**	-0.129
Component 4: Emotional Presence				
EP4. I found myself responding emotionally about ideas or learning activities in the courses.	-0.028	0.108	-0.005	**-0.796**
EP1. Emotion was expressed when connecting with other students.	-0.033	0.100	-0.139	**-0.776**
EP3. Expressing emotion in relation to expressing ideas was acceptable in the courses.	0.074	0.244	-0.025	**-0.682**
SP1. Getting to know each other course participants gave me a sense of belonging in the courses.	0.140	-0.117	-0.190	**-0.671**
EP5. The instructors acknowledged emotion expressed by students.	0.263	0.076	-0.002	**-0.652**
SP2. I was able to form distinct impressions of some course participants.	0.025	-0.103	-0.313	**-0.619**
EP6. The instructors demonstrated emotion in online presentations and/ or discussions.	0.208	0.299	0.093	**-0.564**

Note. The extraction method was principal components analysis with an oblique (direct oblimin with Kaiser normalization) rotation. Component loadings over .40 are in bold (Bandolas & Gerstner, 2016; Howard, 2016).

All 13 teaching presence variables loaded onto Component One, consistent with the theoretical framework. Seven of nine social presence questions loaded onto Component Two. Variables CP6 and EP2 were also loaded onto component two with SP3 through SP9. The loading of CP6 and EP2 on component two made sense because both variables, together with SP3, SP4, and SP9, explicitly referenced online discussions (See Appendix A & Appendix B). Eleven of 12 cognitive presences loaded onto component three, consistent with the theoretical framework with one exception, CP6. Five of the six emotional presence questions loaded on component four, together with SP1 and SP2. Variables SP1 and SP2 aligned with the social presence subconstruct of self-projection/ expressing emotion (Garrison, 2017, p. 28). Thus, the component loadings from more than one presence onto the social presence component, e.g., CP6 and EP2, together with SP3 through SP9, made sense because the Community of Inquiry framework depicted overlaps between the presences.

To test the statements of hypothesis required using the Pattern Matrix Components (see Table 12) to compute the component means (Eagar, 2018, 14:00) for each former and current student. Mean values, calculated for each survey respondent, averaged the survey scores for all 13 teaching presence responses (Eager, 2018), and enabled an independent two-sample test of means for statistical difference between the 196 former students and the 279 current students. The process repeated for social, cognitive, and emotional presences. Conducting a Shapiro-Wilk test using SPSS (Grande, 2015a) found former and current student sample distributions were not normal ($p < .001$). The p-values for normality testing dictated the use of the non-parametric Mann-Whitney U statistic to test for differences in the means for teaching, social, cognitive, and

emotional presence, with results summarized in Table 13. The results were significant for cognitive presence and insignificant for teaching, social, and emotional presence. The effect size for cognitive presence, measured by Cohen's d, was = .244. All tests conducted were at a level of significance of $\alpha = .05$.

Null Hypothesis Test 11 through 15: Testing a Moderating Variable

Research Question 3 stated, To what extent do the program factors differ between former and current students with regard to attending a university affiliated with the Carnegie Project on the Education Doctorate? Null Hypothesis test's 11 through 14, which aligned with the third research question, analyzed for the effect of a moderating variable, defined as students who attended EdD programs affiliated with the CPED or students who attended EdD programs not affiliated with the CPED. The Carnegie Project on the Education Doctorate, a consortium of over 100 universities, focused on curriculum, instruction, and assessment best practices applicable to the EdD professional doctorate (CPED, 2021). CPED has been a driving force in distinguishing the professional education doctorate and clarifying the differences between the EdD and the research-based PhD (CPED, 2021; Perry, Zambo, & Abruzzo, 2020).

Research Question 4 stated, To what extent do the Community of Inquiry presences differ between former and current students with regard to participation in a cohort group? Null Hypothesis test 15, which aligned with the fourth research question, examined the effect of using cohort group participation as a moderating binary variable, yes or no, with former and current students as the independent variables and the four community of inquiry presences as the dependent variables.

Testing a moderating variable required multiple steps, described in Data Procedures step 12 through 16 before conducting hypothesis test 11 through 15. De Vaus (2001) emphasized drawing the correct inferences or conclusions from data analysis, which required critically thinking about causality between dependent and independent variables. Criteria for inferring cause included the correlation between two variables, and a causal relationship makes sense (De Vaus, 2001). Johnson and Christensen (2017) defined a confounding variable as "an extraneous variable, or a competing independent variable, that was not controlled for" (p. 42), which could affect the test's outcome. The independent variable used in the first 10 hypothesis tests, former and current EdD students, remained the same for hypothesis test 11 through 15. The dependent variables selected for testing the moderating variable were program factors, attending a program orientation, participating in a cohort, the four Community of Inquiry presences, and the dissertation chair relationship. Fraenkel et al. (2012) tested for a relationship between instructional approach (independent variable) and student achievement (dependent variable) and found using gender as a moderating variable, suspected either through research or intuition, could reveal if a different outcome existed between each dependent variable subgroup (p. 81). "The possibility of misleading association may be minimized by controlling or matching on factors which could produce associations" (Mantel & Haenszel, 1959, p. 719). Mantel and Haenszel (1959) developed a methodology, which calculated relative-risk, or odds ratios, observed for the subcategories, e.g., strata, for the partial tables within a chi-square test. "The Cochran-Mantel-Haenszel (C-M-H) procedure tests odd ratios for conditional independence" (Denham, 2017, p. 126). The C-M-H test, used in conjunction with the Breslow Day test, applies to 2 x 2 x *k* tables,

where *k* represented a stratification level (Denham, 2017). For example, if testing for a relationship between program orientation (if a student attended or not) and current and former students (independent variable), the stratification defined a student who either attended an EdD program affiliated with the Carnegie Project on the Education Doctorate or attended an EdD program not affiliated with the CPED.

Hypothesis Tests' 12 and 13 required a two-factor Analysis of Variance (ANOVA), which tests one dependent variable with two independent variables. The dependent variable for Hypothesis Test 12 was teaching, social, cognitive, and emotional presence. The dependent variable for Hypothesis Test 13 was the dissertation chair relationship. The two independent variables for both hypothesis tests were former and current students, and if students either attended an EdD program affiliated with the Carnegie Project on the Education Doctorate or attended an EdD program not affiliated with the CPED. The latter independent variable was the moderating variable (Fraenkel et al., 2012). Hypothesis Test 13, before the ANOVA, required a similar process used for Null Hypothesis Test 8. A Principal Component Analysis (PCA), conducted on the six dissertation chair questions initially without a rotation method specified, resulted in the six variables loading onto one factor. Grande (2016) stated if component correlations between variables exceeded .32 (4:30), rerun the PCA using a direct oblimin rotation. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .886 and Bartlett's Test of Sphericity p-value <.001 met acceptable thresholds, and thus the variables were factorable for ease of interpretation (Grande, 2016; Kaiser, 1974; Watson, 2017). The final step required computing mean values for each survey respondent before conducting the ANOVA (Eager, 2018).

McClave and Sincich (2017) claimed for a factorial experiment, testing the effects of two independent variables on a dependent variable required a balanced design, meaning the sample sizes for all factor-level groups were the same. The four factor-level groups were: (1) former students attending EdD programs affiliated with CPED, (2) current students attending EdD programs affiliated with CPED, (3) former students attending EdD programs not affiliated with CPED, and (4) current students not attending EdD programs affiliated with CPED. Grande (2014) and McClave and Sincich (2017) claimed the underlying assumptions also required normality for all factor-level groups and no outlier existed, homogeneity of variance, and the treatments (former and current students) were randomly selected. For each two-way ANOVA, SPSS calculated an F-statistic and *p*-value for three hypothesis tests: (1) H_o: Teaching Presence means between former and current students were equal, (2) H_o: Teaching Presence means between students attending EdD programs affiliated or not affiliated with CPED were equal, and (3) H_o: Former and current students and students attending CPED affiliated programs or not interacting to affect Teaching Presence mean scores.

The four factor-level group sample sizes were not equal for the four Community of Inquiry presences and the dissertation chair relationship. However, Gignac (2015) provided a methodology to create a modified dataset satisfying the balanced design assumption. The first step in the process determined the sample sizes for all four factor-level combinations. For example, using the Community of Inquiry presences, the smallest sample was the factor-level combination of EdD former students not attending a university affiliated with the Carnegie Project on the Education Doctorate (84 respondents). Using “select cases” under the data tab, SPSS provided the capability to

select an exact and random number sample of cases (Gignac, 2015, 01:45) for each of the remaining three factor-level combinations. Repeating the process for former students attending CPED programs, current students attending CPED programs, and current students not attending CPED programs, resulted in a balanced dataset with a sample of 364 students to accomplish two-way ANOVA. Replicating the same process to balance the four factor-level groups for the dissertation chair hypothesis test resulted in a sample of 336 students. The sample size [n = 336] was different from the CoI presences [n = 364] because every current student did not have a dissertation chair.

Hypothesis test 15, conducting a two-way ANOVA, used the same process as hypothesis test's 12 and 13, which required a balanced design. The smallest sample for the four factor-level groups was 37 former students who did not participate in a cohort group. Creating random samples for the remaining three factor-level groups (Gignac, 2015), former students who participated in a cohort group, current students who participated in a cohort group, and current students who did not participate in a cohort group resulted in a dataset of 148 students. Lastly, a separate analysis compared former students who completed the EdD v. students who did not persist to degree completion.

Hypothesis Test Results

The research design defined 16 statements of hypotheses. However, sub-tests used for Null Hypothesis 6 (three statements for work hours, study hours, and childcare daycare hours); Null Hypothesis 8 (four statements for teaching, social, cognitive, and emotional presence); Null Hypothesis 9 (six statements for each dissertation chair relationship question); Null Hypothesis 12 (four statements for teaching, social, cognitive, and emotional presence with a moderating variable); Null Hypothesis 15 (four

statements for teaching, social, cognitive, and emotional presence) resulted in a total of 32 statements of hypothesis.

Null Hypothesis 1: There is no difference between the population of former and current EdD students' age during doctorate program studies. Due to incorrectly drafting the survey question for former students' ages, the researcher failed to analyze the hypothesis statement.

Null Hypothesis 2: There is no difference between the population of former and current EdD students' gender during doctorate program studies. A chi-square test of independence calculated a $\chi^2(1) = 9.403$, $p = .002$, V = .141, which led to a decision to reject the null hypothesis between former and current student populations at a level of significance of $\alpha = .05$. The female-to-male ratios from both samples of the two populations were 68%/ 32% versus 81%/ 19% for former and current students, respectively. The Cramer V effect size value was .141, which was considered a small effect size or low practical significance (Ferguson, 2009).

Null Hypothesis 3: There is no difference between the population of former and current EdD students' ethnicity during doctorate program studies. A chi-square test of independence calculated a $\chi^2(4) = 7.68$, $p = .104$, which led to a decision not to reject the null hypothesis between former and current student populations at a level of significance of $\alpha = .05$. The combined group of Caucasians and African Americans versus all other ethnic groups was larger for former students than current students (94%/6% v. 88%/12%).

Null Hypothesis 4: There is no difference between the population of former and current EdD students' marital status during doctorate program studies. A chi-square test

of independence and calculated a $\chi^2(5) = 1.758$, $p = .881$, which led to a decision not to reject the null hypothesis between former and current student populations at a level of significance of $\alpha = .05$. Approximately 67% of former and current students were married.

Null Hypothesis 5: There is no difference between the population of former and current EdD students' number of children/ dependents during doctorate program studies. After rejecting the Shapiro-Wilk ($p < .001$), a Mann-Whitney non-parametric test between former and current students calculated a $U = 26097.5$, $p = .556$. The p-value led to a decision not to reject the null hypothesis between former and current student populations at a level of significance of $\alpha = .05$. Most former and current EdD students had two children/dependents or less.

Null Hypothesis 6: There is no difference between the population of former and current EdD students' work-life-study balance during doctorate program studies. Using separate chi-square tests of independence for work hours, study hours, and child daycare hours for students with young children resulted in, $\chi^2(3) = 23.625$, $p < .001$, V = .223; $\chi^2(3) = 26.450$, $p < .001$, V = .236, and $\chi^2(3) = 1.546$, $p < .843$. The childcare hours chi-square calculation did not remove those students who did not have children in daycare because the percentage of students answering *Not Applicable* was almost identical, with 70% (former students) and 72% (current students). The analysis led to a decision to reject the null hypothesis between former and current student populations at a level of significance of $\alpha = .05$ for both work hours per week and study hours per week. The Cramer V effect size values were .223 and .236, considered a low-to-moderate effect size or having a low-to-moderate level of practical significance (Ferguson, 2009). Former

EdD students who finished the EdD program, using the median as a measure of central tendency, worked more than 40 hours per week and studied between 20 and 30 hours per week. In comparison, students currently enrolled in EdD programs worked between 31-40 hours per week and studied less than 20 hours per week. Many students representing both populations did not have children in daycare. However, children of students in both samples spent between 31-40 hours in daycare.

Null Hypothesis 7: There is no difference between the population of former and current EdD students' who attended a program orientation during doctorate program studies. A chi-square test of independence calculated a $\chi^2(1) = 16.631$, $p < .001$, V = .187, which led to a decision to reject the null hypothesis between former and current student populations at a level of significance of $\alpha = .05$. The Cramer V effect size value was .187, which is considered a small effect size or having low practical significance (Ferguson, 2009). The percentage of former students versus current students attending a program orientation was 72% versus 54%, respectively.

Null Hypothesis 8: There is no difference between the population of former and current EdD students' level of social presence, cognitive presence, teaching presence, and emotional presence during doctoral program studies. The p-values for normality testing dictated the use of the non-parametric Mann-Whitney non-parametric statistic to test for differences in the means for teaching, social, cognitive, and emotional presence, with results summarized in Table 11. The analysis led to a decision to reject the null hypothesis for cognitive presence and not reject the null hypotheses for teaching, social, and emotional presence. All tests conducted were at a level of significance of $\alpha = .05$.

Table 11

Community of Inquiry Mann-Whitney U Two-Independent Sample Tests

			Mann-Whitney U				Effect Size
		N	Mean Rank	Statistic	*z*	*p*	Cohen's d
Mean Teaching Presence	Former Students	196	242.51	26457.5	-0.601	0.548	N/A
	Current Students	279	234.83				
Mean Social Presence	Former Students	196	233.28	26416	-0.629	0.529	N/A
	Current Students	279	241.32				
Mean Cognitive Presence	Former Students	196	257.84	23453	-2.644	0.008	0.244
	Current Students	279	224.06				
Mean Emotional Presence	Former Students	196	246.44	25688	-1.123	0.261	N/A
	Current Students	279	232.07				

Note. N = 475. The former and current student sample size was 196 and 279, respectively.

The effect size for cognitive presence was calculated from Lenhard & Lenhard (2016).

Thus, insufficient evidence existed at the $\alpha = .05$ level of significance between former and current students for teaching, social, and emotional presence. For cognitive presence, sufficient evidence existed at the $\alpha = .05$ significance level to reject the null hypothesis between former and current students. The Cohen's d effect size value of .244 for cognitive presence (Lenhard & Lenhard, 2016), considered a small effect size, meant a low practical significance (Ferguson, 2009).

Null Hypothesis 9: There is no difference between the population of former and current EdD students' relationship with the dissertation chair during doctoral program

studies. The survey requested student feedback on the level of satisfaction with the dissertation chair by evaluating six questions using a Likert scale (1 = *extremely dissatisfied* to 7 = *extremely satisfied).* A chi-square test of independence led to a decision to reject the null hypothesis between former and current student populations at a level of significance of $\alpha = .05$ for each question, except for Topic Selection. Table 12 summarized the results, including effect size calculations using Cramer's V.

Table 12

Dissertation Chair Relationship

	χ^2	df	p	Cramer's V
Topic Selection	12.254	6	0.057	N/A
Committee Selection	26.960	6	< .001	0.273
Preparation of the Dissertation Proposal	34.954	6	< .001	0.310
Conducting Dissertation Research	46.635	6	< .001	0.359
Providing Feedback	49.324	6	< .001	0.369
Dissertation Chair Accessibility	18.618	6	0.005	0.225

Note. *N* (former students) = 195. *N* (current students) ranged from 167 to 170 students. The difference between the combined dataset of 475 students and the approximate 365 students was attributed to some current students not having a dissertation chair.

The chi-square analysis results indicated five of the six dissertation chair hypothesis statements statistical significance or null hypothesis rejections. Using the median scores as a measure of central tendency, former students rated all dissertation

chair relationship questions extremely satisfied. The median score for current students using the 7-point Likert scale frequency data was moderately satisfied for four of the six dissertation chair relationship questions. Current students rated the dissertation chair's support in conducting research and committee selection, using the median as a measure of central tendency, as slightly satisfied–a significant difference from former students' extremely satisfied ratings. A halo effect could explain the former students' higher scores since some years had passed since program completion.

Null Hypothesis 10: There is no difference between the population of former and current EdD students' participating in a cohort group and doctoral program completion. A chi-square test of independence calculated, $\chi^2(1) = 6.777$, $p = .009$, V = .119, which led to a decision to reject the null hypothesis between former and current student populations at a level of significance of $\alpha = .05$. The Cramer V effect size value = .119, was considered a small effect size or having low practical significance (Ferguson, 2009). The percentage of former students versus current students participating in cohort groups was 81% versus 71%.

Null Hypothesis 11: The relationship between the population of former and current students who attended a program orientation during doctorate program studies was independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

The Cochran-Mantel-Haenszel test rejected the null hypothesis with a Common Odds Ratio (OR) = 2.143, $p < .001$, 95% CI [1.435 and 3.201], which meant "at least one of the [strata] odds ratios is statistically distinct from 1.0" (Denham, 2017, p. 158). For

Hypothesis Test 11, both strata's did not contain 1.0 in the interval. Interpreting the Common Odds Ratio of former students receiving a program orientation was 2.143 times higher than current students. The odds ratio for the CPED strata, students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate, was OR = 2.626, p < .001, 95% CI [1.403, 4.912], which meant the odds of former students receiving a program orientation was 2.626 higher than current students. The odds ratio for the strata of students who did not attend a university not affiliated with CPED was OR = 1.846, p > .001, 95% CI [1.091, 3.122]. Thus, with both strata significant, the hypothesis test confirmed Hypothesis Test 7, in which results indicated significance between former and current EdD students attending a program orientation.

Null Hypothesis 12: The relationship between the population of former and current students' level of teaching presence, social presence, cognitive presence, and emotional presence during doctoral program studies were independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED. Table 13 depicts the ANOVA results.

Table 13

Hypothesis Test Summary for CoI Main Effect: CPED Affiliation

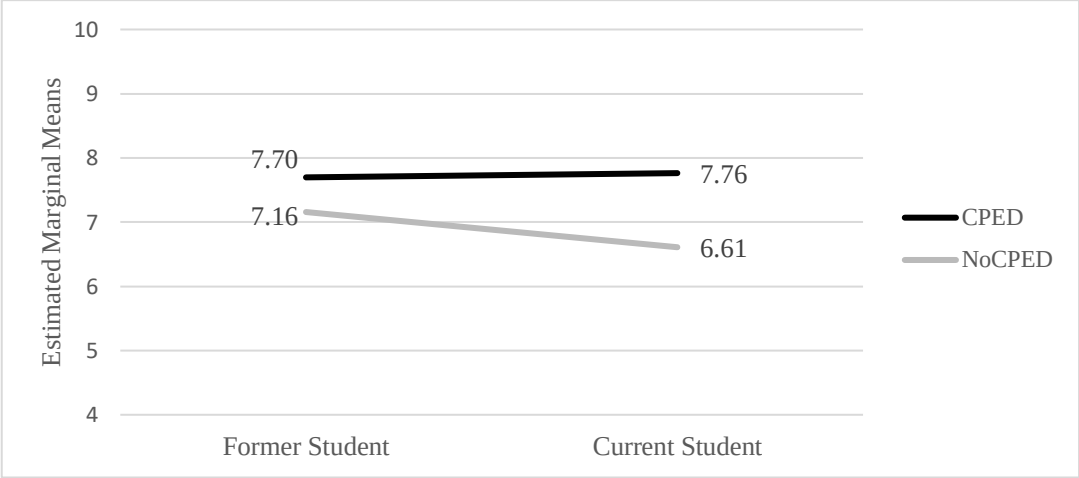
Presence	*F* ratio	df (main effect)	df (error)	p	η^2
Teaching	2.580	1	360	0.109	0.007
Social	8.857	1	360	0.003	0.024
Cognitive	0.556	1	360	0.457	0.002
Emotional	16.759	1	360	0.000	0.044

Note. N = 364. Each factor-level combination has n = 91 data points.

For Null Hypothesis 8, the mean difference between former and current students for emotional and social presence was significant enough to reject the null hypotheses. Figure 9 depicts how the CPED strata moderated the relationship between emotional presence v. former and current students. The moderating variable for teaching presence and cognitive presence revealed evidence students attending CPED-affiliated EdD programs had higher levels of presence but insufficient to reject the null hypotheses.

Figure 9

Emotional Presence Means Comparative Data: CPED Affiliation as a Moderating Variable

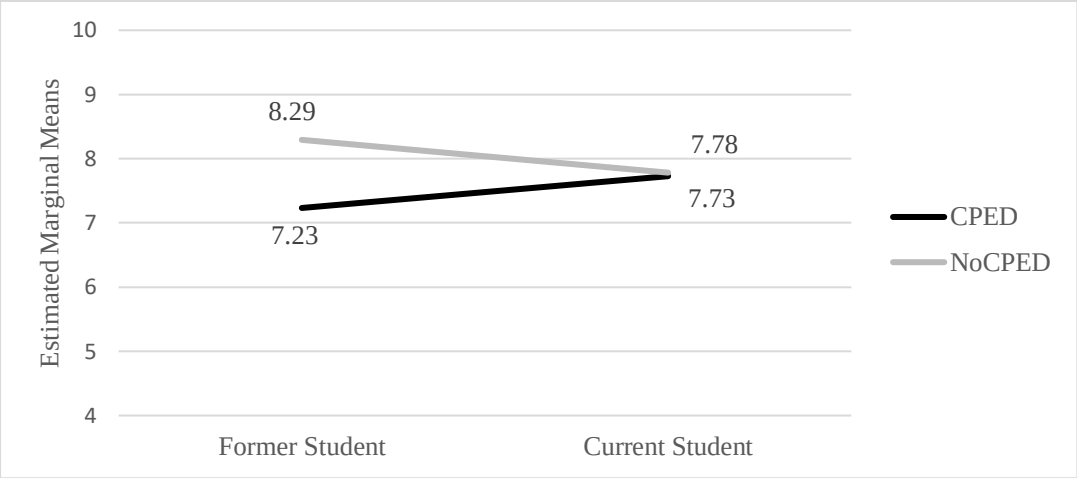


Note. N = 364. Each factor-level combination has n = 91 data points.

The relationship between Social Presence and former/ current student populations, using CPED-affiliation as a moderating variable, and shown in Figure 10, resulted in a null hypothesis rejection, however, additional confounding variables likely existed. The social presence component, comprised seven of the nine social presence questions, included one cognitive presence question and one emotional presence question. Five of six questions containing the word or phrase online or online medium, including question's CP6 and EP2, loaded onto the social presence factor.

Figure 10

Social Presence Means Comparative Data: CPED Affiliation as a Moderating Variable



Note. N = 364. Each factor-level combination has *n* = 91 data points.

Null Hypothesis 13: The relationship between the population of former and current students' relationship with the dissertation chair during doctoral program studies was independent of who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED. Insufficient evidence existed to reject the null hypothesis, $F(1,332) = .146$, $p = .702$, indicating former and current students' relationship with the dissertation chair during doctoral program studies was independent of students whose EdD programs were affiliated or not with CPED.

Null Hypothesis 14: The relationship between the population of former and current students participating in a cohort group during doctoral program studies was independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED. The Cochran-Haenszel-Mantel test rejected the null hypothesis

with a Common Odds ratio (*OR*) = 1.65, p = .049, 95% CI [1.002, 2.716]. Interpreting, the Common Odds ratio of former EdD students participating in a cohort were 1.65 times higher than current students. The p-value of .049, just under p = .05, and the lower bound of the odds ratio confidence interval [1.002, 2.716] just above 1.0 suggested a moderate significance.

A Three-Way Chi-Square test of Independence also examined the relationship between Cohort participation with former and current students for the CPED/ no-CPED affiliation strata, individually. The three-way contingency table depicted 104 of 105 (99%) former students and 117 of 125 (96.4%) current students whose EdD program affiliated with the CPED participated in cohort groups. Results for the CPED-strata indicated 50% of expected cell counts were less than 5, thus using Fischer's Exact test, p = .042, indicated significance between former and current students. In contrast, 55 out of 91 (60.4%) former students and 80 out of 154 (51.9%) current students with no affiliation with the CPED participated in cohort groups. Results for the strata of students attending EdD programs with no affiliation indicated nonsignificance, $\chi^2(1) = 4.504$, p = .197, V = .140.

Null Hypothesis 15: The relationship between the population of former and current students' level of teaching presence, social presence, cognitive presence, and emotional presence during doctoral program studies were independent of EdD programs whose students participated in a cohort group. Table 14 depicts the main effect of ANOVA results for all four presences.

Table 14

Hypothesis Test Summary for Main Effect - Cohort Participation

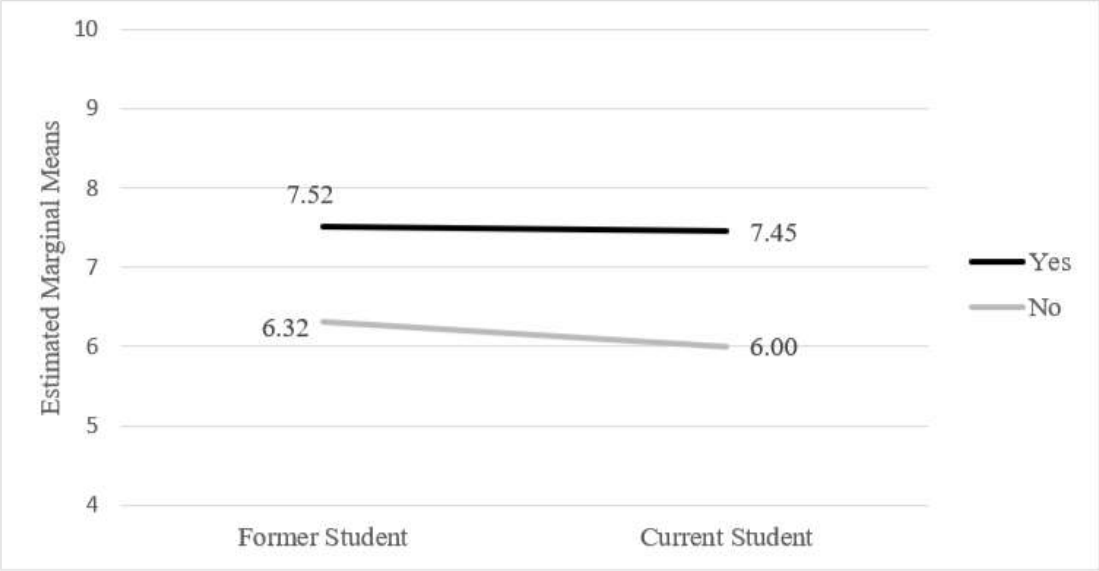
Presence	*F* ratio	df (main effect)	df (error)	*p*	η^2
Teaching	5.222	1	144	0.024	0.035
Social	0.344	1	144	0.558	0.002
Cognitive	5.543	1	144	0.020	0.037
Emotional	13.999	1	144	0.000	0.089

Note. N=148. The sample size for each factor-level group was *n* = 37.

Using cohort participation as a moderating variable yielded the most consistent trends, reflecting statistically significant levels of teaching, cognitive, and emotional presence for students who attended cohort-based EdD programs. Figure 11 depicts the relationship between former and currents students and emotional presence, moderated by cohort participation.

Figure 11

Emotional Presence Means Comparative Data: Cohorts as a Moderating Variable

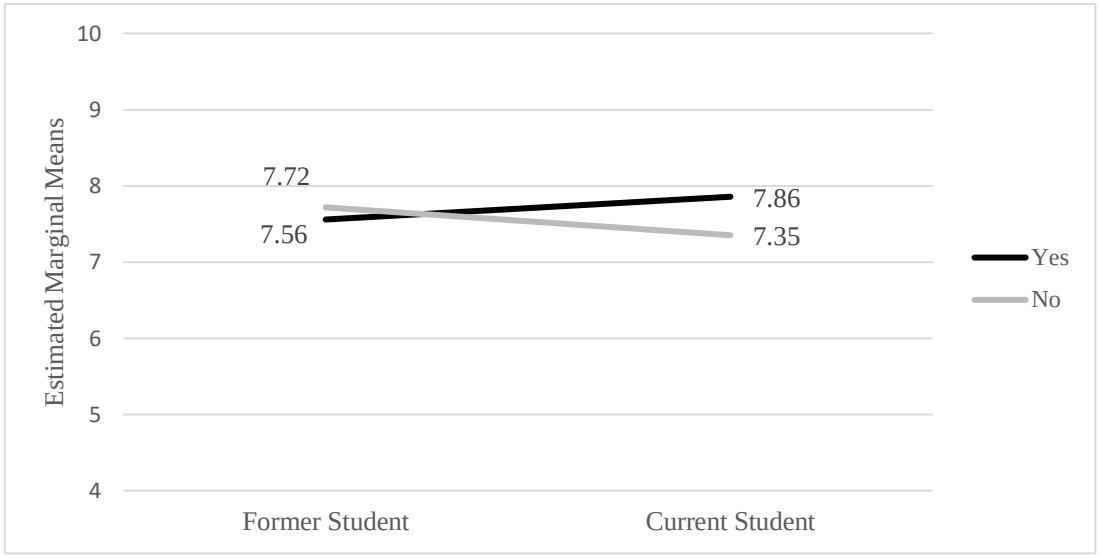


N=148. Each factor-level combination has 37 data points.

Social presence trends for using Cohort group participation (see Figure 12) followed a pattern similar to using a CPED-affiliated EdD program as a moderating variable, which inferred other confounding variables existed.

Figure 12

Social Presence Means Comparative Data: Cohorts as a Moderating Variable



N = 148. Each factor-level combination has *n* = 37 data points.

Null Hypothesis 16: There is no difference in time-to-degree between former students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED. The descriptive statistics for both samples were (*M* = 46.2 months, *Mdn* = 36 months, *SD* = 17.4) and (*M* = 53.4 months, *Mdn* = 48 months, *SD* = 21.5). After rejecting the Shapiro-Wilk test of normality ($p < .001$), a Mann-Whitney non-parametric test calculated a $U = 3515$, $p = .014$. The *p*-value led to a decision to reject the null hypothesis between students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation

with CPED at a level of significance of $\alpha = .05$. The effect size, using a two-sample t-test, $t(187) = -2.507$, $p = 0.013$, $d = .367$, 95% CI [-12.86, -1.52], indicated the approximate time-to-degree population mean difference between students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate was between 1.5 and almost 13 months shorter than students who attended an EdD program with no affiliation with CPED. (See Appendix N for histogram comparisons).

Analysis of Former Students Who Did Not Finish the EdD Program

Forty former students who did not finish the EdD program responded to the survey through the data collection process. Ten former students did not attend universities whose programs did not meet the 80% of program content delivered online, thus reducing the sample size to 30 former students who did not complete the EdD program. While the 30 students started the survey, only eight answered all the questions. Nonetheless, the responses provided some valuable insights. Due to the small sample size of former students who did not complete the EdD, descriptive measures compared the two samples from the two former population segments instead of statistical testing (See Table 15).

Table 15

Comparative Analysis of Former Students Who Finished v. Did Not Finish the EdD Program

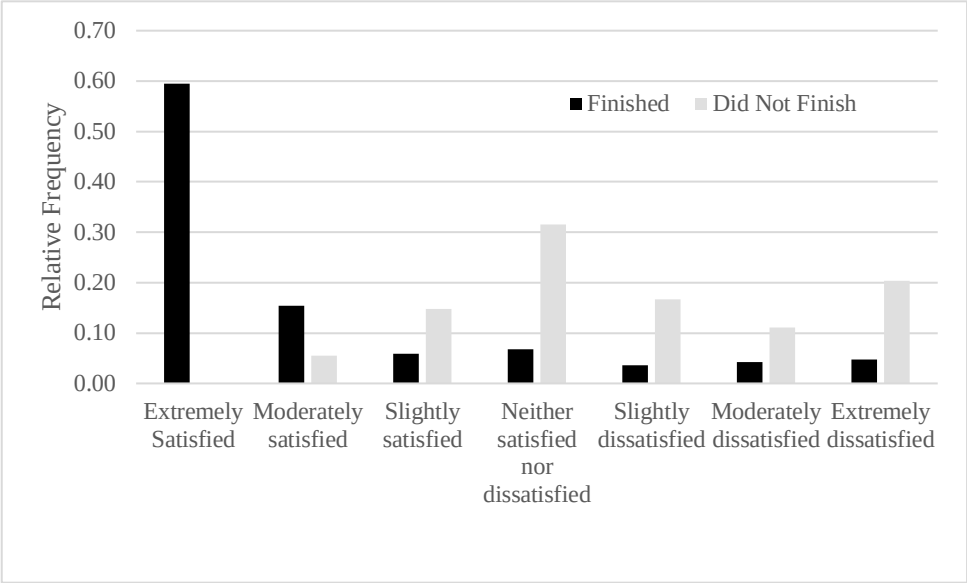
	Former Students Finished EdD	Former Students Not Finishing EdD
Age (median range)	Failed to Analyze	Failed to Analyze
Gender	68% Female, 32% Male	68% Female, 32% Male
Ethnicity	73% White; 21% Black or African American; 6% Other	42% White; 42% Black or African American;16% Other
Marital Status	67% Married; 16% Never married; 16% Other	61% Married; 16% Never married; 23% Other
No. Children	85% (Two or Less)	83% (Two or Less)
Work Hours (Median)	Over 40-hours/ per week	Over 40-hours/ per week
Study Hours (Median)	Between 20-30 hours/ week	Between 20-30 hours/ week

Note. N = 196 for former EdD students who finished the program. The demographic data sample size was [*n* = 31] for former students who did not complete the EdD. The work and study hours per week sample size was [n = 16] for former students who did not finish the EdD.

Due to the limited survey responses from students who did not finish the EdD program, descriptive statistics compared the two samples instead of statistical testing. The demographics between the two samples, other than ethnicity, were similar, including the number of hours per week the students spent working and studying. A completely different picture emerged comparing the dissertation chair relationship. However, only eight students completed the six-question survey measuring the level of satisfaction in selecting the topic and committee, preparing the dissertation proposal, conducting research, providing academic writing feedback, and accessibility. One additional student responded to one of the six questions, for a total of 54 responses. In comparison, 196 former students who completed the EdD provided 1170 responses to the same six questions. Figure 13 depicts relative frequency for comparative purposes.

Figure 13

Dissertation Chair Responses: Comparative Analysis



Note. *N* = 1170 (Former Students who completed the Ed.D.). *N* = 54 (Former Students who did not complete the Ed.D.). Comparative analysis of relative frequencies between the two former student population segments on the dissertation chair relationship.

EdD students completing the program resulted in median scores of extremely satisfied v. students not completing the EdD being significantly lower. Student feedback citing reasons for dropping out of the EdD program included job demands, family demands, did not like the program, expressed disappointment with the program, lack of program resources, program alignment with career objectives, health crises, and issues with professors. One purpose of colleges and universities conducting program orientations in advance of starting a doctoral program was to state expectations, including the time commitment. In a sample size of 31 students, 73% of former students who

finished the EdD program participated in a program orientation compared with 48% of students not completing the EdD.

A Community of Inquiry (CoI) analysis for the four presences compared survey means between the two sampled populations, former students who completed the EdD and those students who did not complete the program. The mean differences for teaching, social, cognitive, and emotional presence were lower for students who did not complete the EdD program than those completing the program. Lower scores for teaching, social, cognitive, and emotional presence ranged from .86 to 2.6 points, .2 to 2.2 points, 1.5 to 3.0 points, and .6 to 2.9, respectively, as measured on the 10-point interval scale (see Appendix M). Universities utilized cohort groups to help students form a support system, increase understanding of course material, and provide each other with social and emotional support. In a sample size of 16 students, 83% of former students who completed the EdD program were assigned to cohort groups, compared to 63% of students whose sample segment did not finish the EdD.

Thus, based on the available responses, the demographics of the two population segments were similar, except for ethnicity. Furthermore, there was no difference between the number of work hours per week or study hours per week, although some students acknowledged difficulties managing the balance between work, life, and school. A measurable increase in the percentage of students who finished the EdD program attended program orientations and assigned cohort groups. Notable differentiators between the two population segments, based on the data, were measured by unproductive relationships between the student and dissertation chair and the inability to develop teaching, social, cognitive, and emotional presence in an online learning environment.

Research Questions' Analysis

There were five research questions for the quantitative study:

Research Question 1: To what extent do the personal factors differ between former and current Students? Table 16 summarized former students who completed the EdD and current EdD student demographic information.

Table 16

Comparative Analysis of EdD Student Demographic Information

	Former EdD Students	Current EdD Students
Age (median range)	Failed to Analyze	40-49 years old
Gender	69% Female/ 31% Male	81% Female/ 19% Male
Ethnicity	74% White; 20% Black or African American; 6% Other	65% White; 24% Black or African American; 11% Other
Marital Status	68% Married; 16% Never Married; 16% Other	68% Married/17% Not Married/ 15% Other
Number of Children (Two or Less)	85%	82%

Note. N = 475. The sample sizes for former and current students were 196 and 279, respectively, except for students' age, which was [n = 56]. For inclusivity, the gender question included transgender as a choice, however, none responded.

Except for gender, none of the personal demographic factors comparing former students who completed the EdD program with current EdD program students were statistically significant. While the proportion of females within both the sample of former students completing the EdD and the sample of current EdD students were higher than males, the latter having a higher proportion of male students. The effect size reflected the

difference as not having practical significance. Furthermore, the comparative analysis of former students who completed the EdD v. those who did not persist to completion showed no difference, except for ethnicity. Work and study hour differences between former and current students were statistically significant. Former students worked more hours per week than current students (over 40 hours per week v. between 31 and 40 hours per week, using the median as a measure of central tendency). Similarly, former students studied more hours than current students (between 21 and 30 hours per week v. less than 20 hours per week using median as a measure of central tendency). There was no difference between former and current students for the number of hours dependent children spent in daycare.

Research Question 2: To what extent do the program factors differ between former and current students?

A statistically significantly higher proportion of former students attended a program orientation than current students and participated in cohort groups. Of the four Community of Inquiry presences, former students demonstrated a statistically significant difference from current students in cognitive presence only. The higher percentage of former students attending a program orientation (Motte, 2019) and participating in a cohort group (Berry, 2017) supported literature review studies. From the results of the CoI tests only cognitive presence was significant with a small effect size, however, using moderating variables revealed different results.

Research Question 3: To what extent do the program factors differ between former and current students with regard to attending a university affiliated with the Carnegie Project on the Education Doctorate?

Using a two-way ANOVA, the moderating variable or second independent variable of CPED affiliation or not, results indicated social presence and emotional presence were statistically significant between the strata. The moderating variable did not find significance for the student-dissertation chair relationship results or teaching and cognitive presence. The Cochran Mantel Haenszel test computed odds ratios for the two dependent categorical variables, attending a program orientation and cohort group participation. The Common Odds Ratio of former students receiving a program orientation was 2.143 times higher than current students. Results also indicated statistical significance at each stratum, between former and current students attending either a university affiliated with the CPED or not affiliated with CEPD. The Common Odds Ratio of former students participating in a cohort group was 1.65 times higher than current students, indicating moderate significance.

Research Question 4: To what extent do the Community of Inquiry presences differ between former and current students, with regard to participation in a cohort group?

Using the moderating variable of Cohort group participation, teaching presence, social presence, and emotional presence were statistically significant across the strata. The use of moderating variables, applied to the Community of Inquiry presences, revealed meaning results except for social presence. Additional confounding variables likely contributed to social presence analysis.

Research Question 5: To what extent does Time-to-Degree differ between former students who attended a CPED affiliated program and a non-CPED affiliated program?

Research Question 5 compared time-to-degree completion (months) between former students whose EdD program affiliated with the CPED with former students who attended an EdD program with no affiliation with the CPED. The descriptive statistics for both samples were (*M* = 46.2 months, *Mdn* = 36 months, *SD* = 17.4) and (*M* = 53.4 months, *Mdn* = 48 months, *SD* = 21.5), respectively. The effect size, a 95% CI inferred the time-to-degree mean difference between students who attended an EdD program affiliated with the CPED, was between 1.5 and about 13 months shorter than students who attended an EdD program with no affiliation to the CPED.

Statistical Analysis Limitations

All statistical methods required testing underlying assumptions, specifically the two-way Analysis of Variance and the Chi-square test of independence. The two-way Analysis of Variance (ANOVA), used to test the effect of a moderating variable, required a balanced design, meaning the sample sizes for all factor-level groups were the same McClave &Sincich, 2017). Using the Carnegie Project on the Education (CPED) as a moderating variable (Null Hypothesis 12), the four factor-level groups existed: (1) Former students attending EdD programs affiliated with CPED, (2) Current students attending EdD programs affiliated with CPED, (3) Former students attending EdD programs not affiliated with CPED, and (4) Current students not attending EdD programs affiliated with CPED. Using SPSS Version 27, all factor-level group sample sizes were balanced. Three additional underlying assumptions require normality for all factor-level groups, no outlier existed, homogeneity of variance, and the random selection of former and current student samples. Tests of normality and homogeneity of variance, conducted for all two-way ANOVAs, indicated violations in some factor-level groups. However,

Grande (2014) and McClave & Sincich (2017) asserted ANOVA was robust against violations for both normality and homogeneity of variance. Boxplots, created for all ANOVA factor-level testing, resulted in some groups with outliers. Outliers required examining cause to determine if the data be included or discarded. Former and current student samples were random. However, because the surveys were anonymous, the researcher could not identify the root causes of the outliers. Thus, all data points remained in the dataset.

The chi-square test of independence was the statistical method used to analyze the categorical or nominal variables. For a 2 x 2 contingency table, such as using population (former and current students) versus gender (male and female), Field (2018) claimed all expected frequencies needed to be greater than 5 to use the chi-square distribution. For tables larger than 2 x 2, the critical underlying assumptions required "no cell in the table should have an expected frequency less than one, and no more than 20% of the cells should have an expected frequency of less than five" (Bewick et al., 2004, p. 52). All categorical variables met the underlying assumptions for frequency percentage with one exception, study hours, having two cells or 25% of the cells instead of the 20% threshold exceeding the underlying assumption criteria. The two cells represent three former students and four former survey respondents claiming to study over 40 hours per week. Comparing, 178 former students and 262 current students reported studying below 20 hours per week or between 20 and 30 hours per week. To alleviate the consequence of the limitation, Bewick et al. (2004) suggested combining categories. Therefore, combining the frequencies *over 40 hours* frequencies with the category, *between 31-40 hours* per

week to one category *31 hours and over*, resulted in 0% of cells whose expected values were less than 5, and a $p = <.001$. Thus, the test was robust against the violation.

The sample size for former students who did not persist to completion was a hard-to-reach population. Only 30 students responded to the demographics section of the survey. The 30 student survey response numbers decreased with each successive survey section. Therefore, only descriptive statistics instead of statistical testing compared the two former student samples.

The process of conducting a principal component (factor) analysis (PCA) of Arbaugh et al.'s (2008) 34-question Community of Inquiry survey and Cleveland-Innes and Campbell's (2012) 40-question Community of Inquiry survey identified two limitations. Bandolas and Gerstner (2016) argued distributions not meeting normality might exhibit problems when univariate skewness and kurtosis values were equal to or greater than 2.0 and 7.0, respectively (p. 31). Skewness and Kurtosis calculations of all 34-Community of Inquiry Teaching, Social, and Cognitive presence questions were within the threshold with two exceptions. Teaching Presence Question 4 skewness = -2.138, and Social Presence Question 5 = -2.082, were slightly over the 2.0 threshold. Also, during the PCA of the 40-question CoI survey, two pairs of variables, Teaching Presence (TP) question TP1 and TP2, and TP7 and TP8 had correlation values of .854 and .882, slightly exceeding the recommended threshold of .85 (Mvududu & Sink, 2013). Mvududu and Sink (2013) claimed many "correlations between variables exceeding .85 multicollinearity becomes a concern" (p. 82).

Comparable studies by Arbaugh et al. (2008) and Bidjerano and Shea (2012) did not report skewness and kurtosis values nor correlations between variables. However, the

comparative analysis and alignment of many other parameters, such as Kaiser-Meyer-Olkin, Bartlett's Test of Sphericity, percentage of variance explained by eigenvalues greater than one, Cronbach's Alpha calculations, and use of parallel analysis for factor or component extraction and retention with Arbaugh et al. (2008) and Shea & Bidjerano (2012) provided confidence in the results and use of the constructs for comparative analysis purposes.

Summary

Before quantitative analysis, a second data cleaning, to align with Arbaugh et al.'s (2008) study, reduced the sample size from 511 to 475. Chapter Four addressed 32 statements of hypothesis (sub-hypothesis) aligned with five research questions. The analysis for each hypothesis statement was consistent with the data analysis procedures outlined in Chapter Three, resulting in the rejection of 19 null hypothesis statements. A study between former students who did not complete the EdD separately showed similar demographic factors, with ethnicity as an exception. Significant differences existed between the two former student segments for all program factors. Chapter Five includes a discussion, a synthesis of the quantitative results, implications of findings, and recommendations for future research.

Chapter Five: Conclusions and Implications

Review of Study

Chapter Five included the findings from the study, integrated the quantitative results, discussed the implications for future practice, and provided recommendations for future research. The purpose of the study was twofold; (1) establish the factors of persistence related to attrition and inform a three-year online Leadership EdD program at a private-Midwest university with best practices and lessons learned to meet future scholar-practitioner needs, and (2) to perform a quantitative comparative analysis using researched variables between students who have completed the EdD with students currently enrolled in EdD programs to assess the extent to which differences existed between the two populations.

The research participants came from two populations: (1) former EdD students, whether students completed the degree requirements or not, and (2) current students from universities offering an online EdD program. Through the survey results, student respondents were demographically diverse and attended small and large public, private, and for-profit colleges and universities. Universities and social media groups selected for surveying included but were not limited to those affiliated with the Carnegie Project on the Education Doctorate (CPED), whose consortium membership included online doctoral programs. At the time of the study, the Carnegie Project on the Education Doctorate (CPED) consisted of a consortium of over 100 universities, some of which were sources of student survey data. The Carnegie Project on the Education Doctorate (CPED) mission provided a venue where participating universities discuss and share best practices and lessons learned about how best to prepare doctoral students to become

scholar-practitioners while consciously promoting social justice, diversity, and inclusion (CPED, 2021). The participation criteria defined at least 80% of the program's course content in totality was delivered online from a university offering the professional EdD degree, including affiliation with the Carnegie Project on the Education Doctorate (Allen & Seaman, 2015; Rockinson-Szapkiw et al., 2019).

The Community of Inquiry for Online Learning theoretical framework, based on a constructivist learning foundation, consists of cognitive, social, emotional, and teaching presence. Within the community are instructors, students, and instructional content. The online modalities encompass either a hybrid model, which is part face-to-face and part online instruction; asynchronous, e.g., text-based or written communication learning; synchronous or spoken communication; blended online learning, a combination of asynchronous and synchronous components. Teaching presence is the integrating presence as instructors are responsible for the design and development of curricula. Students engage in a community of inquiry through cohort groups and build social presence through communication and collaboration with instructors and colleagues to achieve cognitive presence. Cognitive presence is about students making meaning of new knowledge and skill development through discourse, reflexivity, and critical thinking. Instructors maintain situational awareness of students' emotions, addressing concerns in real-time to mitigate issues.

A total of 725 responses, collected from School of Education Deans and through social media, resulted in 475 usable responses after a rigorous data cleaning process, which occurred in two steps. The breakdown between former students who earned the degree and current students was 196 and 279, respectively. Former students who did not

complete the EdD were a hard-to-reach population, with 40 students responding, with 30 students attending universities whose EdD program met the 80% online criteria. Only 11 of the 30 students completed the survey. The population consisted of former and current EdD doctoral students who attended or who had currently attended at the time of the research study a public, private, and for-profit universities throughout the United States. In addition, about 10 international students from the United Kingdom, the Philippines, and African countries responded to the survey. However, one UK student attended an EdD program meeting the 80% course content online criteria. Through the review and synthesis of over 180 sources, the researcher did not find evidence of an EdD study of comparable sample size nor a study similarly analyzing the data. Approximately half the survey respondents attended universities whose EdD programs affiliated with the Carnegie Project on the Education Doctorate (CPED). The Carnegie Project on the Education Doctorate, a consortium of over 100 colleges and universities offering the EdD, focused on curriculum, instruction, and assessment practices to develop scholar-practitioners in the education field, providing the knowledge and tools to solve the most critical issues facing education in the 21st century. Some universities had religious affiliations. Also, a few students attended Historical Black Colleges and Universities (HBCUs). Approximately 80% of both former and current students sampled populations had two children or less.

The research design consisted of five research questions and 16 hypothesis statements which required multiple statistical methods to compare the populations of former students completing the EdD and current EdD students. In addition, some of the hypothesis statements had sub-hypotheses, raising the total number of tests to 32, of

which 19 were significant using a level of significance, $\alpha = .05$. All significant tests included effect size calculations. Also, descriptive statistics compared former students who completed the EdD and former students not persisting due to the small sample size of the latter hard-to-reach sampled population.

Summary of Null Hypothesis Statements

Null Hypothesis 1: There is no difference between the population of former and current EdD students' age during doctorate program studies.

Null Hypothesis 2: There is no difference between the population of former and current EdD students' gender during doctorate program studies.

Null Hypothesis 3: There is no difference between the population of former and current EdD students' ethnicity during doctorate program studies.

Null Hypothesis 4: There is no difference between the population of former and current EdD students' marital status during doctorate program studies.

Null Hypothesis 5: There is no difference between the population of former and current EdD students' number of children/ dependents during doctorate program studies.

Null Hypothesis 6: There is no difference between the population of former and current EdD students' work-life-study balance during doctorate program studies.

Null Hypothesis 7: There is no difference between the population of former and current EdD students' who attended a program orientation during doctorate program studies.

Null Hypothesis 8: There is no difference between the population of former and current EdD students' level of social presence, cognitive presence, teaching presence, and emotional presence during doctoral program studies.

Null Hypothesis 9: There is no difference between the population of former and current EdD students' relationship with the dissertation chair during doctoral program studies.

Null Hypothesis 10: There is no difference between the population of former and current EdD students' participating in a cohort group during doctoral program studies.

Null Hypothesis 11: The relationship between the population of former and current students who attended a program orientation during doctorate program studies is independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 12: The relationship between the population of former and current students' level of teaching presence, social presence, cognitive presence, and emotional presence during doctoral program studies were independent of students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 13: The relationship between the population of former and current students' relationship with the dissertation chair during doctoral program studies was independent of who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 14: The relationship between the population of former and current students participating in a cohort group during doctoral program studies is independent of students who attended an EdD program affiliated with the Carnegie

Project on the Education Doctorate and students who attended an EdD program with no affiliation with CPED.

Null Hypothesis 15: The relationship between the population of former and current students' level of teaching presence, social presence, cognitive presence, and emotional presence during doctoral program studies were independent of EdD programs whose students participated in a cohort group.

Null Hypothesis 16: There is no difference in time-to-degree between former students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and former students who attended an EdD program with no affiliation with CPED.

Summary of Research Questions

*Research Question 1***:** To what extent do the personal factors differ between former and current Students?

The study found gender as the only statistically significant demographic factor. Ethnicity, marital status, and the number of children were nonsignificant. Due to incorrectly drafting the question, the researcher failed to analyze age during doctoral studies. Using descriptive statistics for comparative purposes, the demographics of 30 former students who did not persist—a hard-to-reach population—were similar to former students who did persist, except for ethnicity. Seventy-three percent (73%) of 196 students persisting were White, compared with 42% of the 30 students who did not persist. The comparative numbers for Black or African American students were 21% and 42%, respectively.

In comparison with prior research, Gittings et al. (2018) conducted a study of 275 PhD students from two research Midwest universities to determine doctoral student persistence factors. Using logistic regression, Gittings et al. (2018) found age as the only statistically significant demographic factor, citing an average age of students in the study of 43 years old (p. 15). Rockinson-Szapkiw et al. (2019) conducted a study of 232 EdD students to predict program integration, which consisted of three components—faculty integration, student integration, and curriculum integration—and found gender and race significant. Survey participation criteria, similar to the researcher's study, was "1) participation in a CPED or professional-focused EdD program and 2) participating in a program delivering 80% of course work is taken online" (Rockinson-Szapkiw et al., 2019, p. 318).

Prior education differences between former, including those students who did not persist, and current student populations, based on visual examination of the data, were similar. Gittings (2010) claimed doctoral students, "demonstrated the academic aptitude" (p. 1) and motivation, having earned bachelor's degrees and master's degrees within and outside the field of education, including the education specialist degree. Attribution theory states, short of unforeseen circumstances or crises, those students with the academic aptitude combined with a program structure providing the support and necessary interventions can help students with the intrinsic motivation and grit to persist to degree completion (Deci et al., 2017; Demetriou & Schmitz-Sciborski, 2011; Smith, 2016; Weiner, 1972; Weiner, 2000). Students demonstrating self-regulation traits needed to ask for help from instructors and peer colleagues, as one example (Schnuck-Zimmerman, 2006; Wong et al., 2019).

The study found significant differences between former and current students, with former EdD students working and studying more hours per week than current EdD students. Ayadurai (2018) studied work-life balance, work-study interface, gender, stress, and satisfaction of 80 online students, of which 54 were doctoral students. While not a direct comparison, results indicated women reported higher stress levels than men for managing work-life balance and work-study balance with perceived stress (Ayadurai, 2018). Results indicated the number of hours dependent children spent in daycare in all studies was nonsignificant for persistence.

Research Question 2: To what extent do the program factors differ between former and current Students? Hypotheses statements seven through 10 addressed the research question.

Results indicate a statistically significant higher percentage of former students attended a program orientation, which sets the expectation for students, such as time commitments required to be successful in the program. Neither Gittings et al. (2018) nor Rockinson-Szapkiw et al. (2019) found program orientation significant in the respective studies. In comparison, Motte (2019) conducted a qualitative study of 47 EdD students and proposed a three-phase scaffolded program orientation for distance education students pursuing an EdD; at program entry during the coursework phase, followed by the candidacy stage. The researcher's study found participation in program orientations between former EdD students and current EdD students significant, with a higher percentage of former students participating.

A higher percentage of former students participated in cohort groups than current students, also statistically significant. Levels of Community of Inquiry teaching, social,

and emotional presence were nonsignificant between former and current students. Cognitive presence was significant but low effect size (Cohen's d), meaning low practical significance. The researcher found Cleveland-Innes and Campbell (2012) conducted the only study including the additional six emotional presence questions. However, a comparative analysis was not possible because the study lacked crucial diagnostic information. Ice et al. (2011) conducted a study using the 34-question Community of Inquiry (CoI) survey to determine if a relationship existed between primarily undergraduate student satisfaction and online course-level retention at a public university system, comparing [*n* = 21,218] students in the highest disenrollment quartile and [*n* = 16,732] students in the lowest disenrollment quartile (p. 50). With high CoI mean scores for both the higher and lower quartiles scores, over a 12-semester period between 2007 and 2010, Ice et al. (2011) asserted the results indicated "the possibility of high disenrollment as a function of structural deficiencies, at the macro level can be largely discounted" (p. 60) and retention "to some extent, may be a student-specific problem that is beyond the scope of the university to address" (p. 62). Multiple researchers incorporated other surveys with the Community of Inquiry framework to justify adding other presences (Shea & Bidjerano, 2010; Shea & Bidjerano; 2012, Stenbom, 2016). Principal component analysis with previous studies resulted in comparable component loadings and other parameters, such as Kaiser-Meyer-Olkin (KMO), Bartlett's test of sphericity, and Cronbach's alpha for the teaching, social, and cognitive presence constructs.

Gittings et al. (2018) used a six-question survey in a logistic regression model and found the dissertation chair satisfaction variable significant. Using a Likert scale (1 =

extremely dissatisfied to 7 = extremely satisfied) ratings, combined with the chi-square test of independence for each of the same six dissertation chair questions, results between former and current students indicated significance except for Topic Selection. Results indicated former students' ratings of satisfaction higher than for current students. Through both quantitative and qualitative studies, multiple researchers found the dissertation chair-student relationship critical to persistence. These findings were consistent with many sources in the literature (Cockrell & Shelley, 2010; Lim et al., 2019; Rademaker et al., 2016; Rockinson-Szapkiw et al., 2016; Sverdlik et al., 2018). Sverdlik et al. (2018) also highlighted the transition to independent research as a critical juncture for doctoral student progression.

Results indicated significance for cohort group participation. Rockinson-Szapkiw et al.'s (2019) study of 232 EdD also found cohort group participation as significant in predicting program integration. Other researchers conducted qualitative studies and meta-analysis, finding benefits of cohort groups in doctoral programs (Berry, 2017; Santicola, 2013; Sverdlik et al., 2018).

Research Question 3: To what extent do the program factors differ between former and current students with regard to attending a university affiliated with the Carnegie Project on the Education Doctorate?

Research Question 3 evaluated the program orientation, the four Community of Inquiry presences, the dissertation chair relationship, and cohort group participation dependent variables. Like other hypotheses tests, the independent variable was former and current students but incorporated a moderating variable. The moderating variable, analyzed as a second independent variable, tested for differences between former and

current students who attended an EdD program affiliated with the Carnegie Project on the Education Doctorate and students who participated at an EdD program with no affiliation with CPED. Results indicated the common odds ratio significant of former students receiving a program orientation higher than current students, confirming Null Hypothesis Test 7 results. Comparative data from the literature review, using the moderating variable, did not exist.

Applying a two-way Analysis of Variance (ANOVA) methodology, the moderating variable tested the four Community of Inquiry presences for differences between former and current students. Results evaluating found emotional presence significant, with higher levels observed for students whose EdD programs affiliated with the CPED. In contrast, results indicated higher teaching and cognitive presence levels for former and current students whose EdD program affiliated with the Carnegie Project on the Education Doctorate (CPED). However, the mean differences were not high enough to reject the null hypothesis. Social presence results indicated nonsignificance. Like the Community of Inquiry presences, a two-way ANOVA found the dissertation chair relationship, moderated by the CPED affiliation variable, nonsignificant between the strata. Comparative data from the literature review, using the moderating variable, did not exist.

Results indicated the odds of a former student participating in a cohort group v. current students with moderate significance ($p = .049$). Using Fischer's Exact test, the relationship between cohort group participation within the CEPD strata was significant, with a higher percentage of former students participating in cohort groups higher than current students. The strata of students whose EdD programs with no affiliation to the

CPED was nonsignificant. Comparative data from the literature review, testing for differences between the moderating variable strata, did not exist.

Research Question 4: To what extent do the Community of Inquiry presences differ between former and current students with regard to participation in a cohort group?

The research question evaluated the Community of Inquiry presences using cohort group participation as a moderating variable. The literature review identified how students participating in cohort groups supported each other, both academically and emotionally, during the rigors of doctoral studies (Berry, 2017; Santicola, 2013; Sverdlik et al., 2018). A two-way ANOVA tested the relationship between former and current students, moderated for cohort group participation. Results indicated increased teaching presence, cognitive presence, and emotional presence significant when both former and current students participated in cohort groups compared to students not participating in cohort groups. Moderated by cohort groups, results for social presence were nonsignificant, likely due to other confounding factors. Comparative studies in the literature, using cohort groups as a moderating variable, were not found.

Research Question 5: To what extent does Time-to-Degree differ between former students who attended a CPED affiliated program and a non-CPED affiliated program?

Research Question 5 compared time-to-degree completion (months) between former students whose EdD program affiliated with the CPED with former students who attended an EdD program with no affiliation with the CPED. The descriptive statistics for both samples were (M = 46.2 months, Mdn = 36 months, SD = 17.4) and (M = 53.4 months, Mdn = 48 months, SD = 21.5), respectively. The effect size, a 95% CI inferred the time-to-degree mean difference between students who attended an EdD program

affiliated with the CPED was between 1.5 and about 13 months shorter than students who attended an EdD program with no affiliation to the CPED.

In comparison, the CPED (2020) found in [n = 22] member institutions, 64% of the institutions designed the EdD degree to be completed in three years, followed by 32% in 4 years, and the remaining institutions' students intended to complete the degree in more than four years or 48 months (p. 5). Of 49 CPED member institutions offering hybrid programs, 65% were designed for students to complete the degree in 3 years or 36 months (CPED, 2020, p. 5). In comparison, the researcher's study found 43% of 189 students attending colleges and universities attending EdD programs affiliated with CPED finished the degree in three years, followed by an additional 23% in four years. Other researchers collected time to degree data for a PhD in education and the EdD and found ranges between 4.1 years (J. Kintzel, personal communication, June 12, 2020) and 5.8 years (National Science Foundation, 2019).

Thus, the study compared 196 former students, all persisting to completion, with 279 current students. Historical performance estimated about half of the current students will persist to completion (Bown & Rudenstine, 1992; Lovitt, 2001; Tinto, 2012). The study's premise suggested, through the research questions and hypothesis tests, former students' results would reflect differences with current students. Regardless of demographic factors being significant or nonsignificant, the researcher firmly believed the program factors drove persistence.

Former students worked more hours per week and studied more hours per week. These results indicated former students likely had better time management skills, strategies to balance work, family, school commitments, and higher motivation levels to

persist to completion. Former students had more robust relationships with the dissertation chair, which was crucial given the amount of literature claiming the challenges doctoral students faced when transitioning to independent scholarship. A halo effect from former students could have contributed to the higher dissertation chair ratings. A higher percentage of former students attended a program orientation than current students. Also, results indicated a higher rate of former students participated in cohort groups. Results indicated higher levels of teaching, cognitive, and emotional presence when moderated for cohort groups. The time-to-degree analysis also provided evidence a three-year EdD is not only achievable but predictable, given the median and mode depicted in the histogram for CPED-affiliated programs, which was 36 months.

Implications for Practice

Implement a Community of Inquiry for Online Learning with faculty able to provide high levels of teaching presence, where students have meaningful discourse, reflection, and think critically to make meaning about new learnings for applicability and implementation into practice (Chen et al., 2017; Fernando & Marikar, 2017; Garrison et al., 2000; Garrison, 2017; Kennette & Reed, 2015; Stavredes & Herder, 2019; Whiteside et al., 2017). Instructors and peer colleagues detected, moderated, and provided social, cognitive, and emotional support to students through either asynchronous or blended online environments (Cleveland-Innes & Campbell, 2012; Majeski et al., 2018; Mortiboys, 2012; Rienties & Alden Rivers, 2014). The implementation of cohort groups for peer-colleagues was to provide social and emotional support and increase cognitive presence (Berry, 2017; Franco & De Luca, 2019; Santicola, 2013). Results from the study reflected significant differences between teaching, cognitive, and emotional presence for

both former and current students when moderated for students participating in cohort groups versus students not participating in cohort groups.

Leverage the Carnegie Project on the Education Doctorate practices developing scholar-practitioners to solve the problems of practice facing education (CPED, 2021b). Also, program leaders should continue distinguishing the professional doctorate from the research-based PhD through curricula, such as signature pedagogies and applicable learning outcomes (Costly & Lester, 2011; CPED, 2021a, CPED, 2021b, Friel, 2019; Shulman, 2005; Toma, 2002). Becoming CPED members provided EdD program faculty with a venue to share best practices and learn from other universities offering the professional doctorate.

The Dissertation Chair-Student Relationship was vital for persistence in doctoral programs (Cockrell & Shelley, 2010; Gittings, 2010, Gittings et al., 2018; Lim et al., 2019; Rademaker et al., 2016; Rockinson-Szapkiw et al., 2016; Sverdlik et al., 2018). Given the breadth and depth of a doctoral dissertation, a successful formula for a cohesive relationship consisted of students and the chair having similar communication and collaboration styles, interest and expertise in the topic, mutual trust, and respect for one another. The study showed significance between former and current students on five of the six questions, providing sufficient evidence of the relationship's importance in doctoral program persistence.

Add structure throughout the program. Multiple researchers highlighted the challenges doctoral students in a three-phase, serial program structure of coursework, developing research skills and completing the comprehensive examination, then writing and defending the dissertation, citing feeling isolated and lacking research competencies

(Ames et al., 2018; Lowery et al., 2018; Rockinson-Szapkiw et al., 2019; Tinto, 1993/2012). Perry, Zambo and Crow (2020) asserted the dissertation in practice (DiP) was integrated throughout EdD programs affiliated with CPED, a process starting as early "in the first semester with the definition of a problem of practice" (p. 32). The Carnegie Project on the Education Doctorate (2020) claimed 30% of EdD programs began their dissertation or dissertation in practice (DiP) inquiry and research in the first year of the EdD program and 35% in the program's second year (CPED, 2020, p. 20). Other researchers cited examples of adding structure to EdD programs with success in persistence (Breitenbach, 2019; Butcher & Sieminski, 2006; Ewing et al., 2012; Smith et al., 2016). Some EdD programs aligned assignments with the dissertation, while one university created leader-scholar communities to keep students connected to the program. As another example, the private U.S. Midwest University's online Leadership EdD program director stated "by the first year the students will submit their literature review" (L. Leavitt, personal communication, July 26, 2021).

Implement a Robust Admissions Process. A robust admissions selection process is vital for persistence. However, the process will not predict persistence to degree completion. Admissions process best practices included structured interviews aligned with CPED-aligned traits for scholar-practitioners and team challenges to evaluate prospective students' demeanor, interpersonal skills, and communication skills, and incorporating professional writing samples (Allen et al., 2018; Lewis et al., 2020). A 360º survey instrument process and tool combined a prospective students' self-assessment on dispositions, such as building relationships, collaboration, and communication with those of faculty raters, personal acquaintances, and professional colleagues, identified EdD

candidates' opportunities to strengthen leadership strengths and correct fatal flaws (Allen et al., 2018; Lewis et al., 2020; Zenger & Folkman, 2002). If program faculty leaders desired an increased level of data-driven decision-making, data collection of disposition and persistence data over time would enable either a correlation or regression analysis to establish threshold scores to support the admissions process (Allen et al., 2018). As a study goal to inform a three-year, online EdD Leadership program, the 360^{o} process and tool results provide a baseline from which doctoral program leadership can use to create development plans to strengthen leadership skills.

Academic Writing. Using American Psychological Association (APA) guidelines, academic writing is a core competency for doctoral students to persist through the program. The literature review cited doctoral programs using different venues to help students learn or improve writing (Bailey, 2019; Holmes et al., 2019; Inouye & McAlpine, 2019; Klocko et al., 2015; Smith et al., 2016). While some programs incorporated writing samples as a requirement in the admissions process, the researcher believed programs should prepare and plan for interventions to help strengthen writing proficiency and conduct research, organize, and synthesize sources. One recommendation is to run a remedial course before starting the program to refresh practitioners' writing skills and familiarity with the latest APA guidelines.

Motivation. Three motivation theories, applicable to student behaviors, provided significant learning. One key takeaway was students attributed success and failure to either effort or ability and the implication on persistence (Anderman & Wolters, 2006; Demetriou &Schmitz-Sciborski, 2011; Weiner, 1972; Weiner 2000; Schnuck & Zimmerman, 2006). Students who attributed failure to effort and had high intrinsic

motivation would apply more effort to be successful. Students who believed lack of ability or aptitude drove loss will either require intervention or choose to depart the program. Through research and the study's data collection process, students entering doctoral programs have earned master's degrees, thus demonstrated previously the aptitude to complete graduate studies. Self-regulation theory required students to ask for help, demonstrate time management skills, and make sacrifices during doctoral program studies. The motivation factor, critically important, was interdependent with social and emotional presence, cohorts, and faculty advising. Multiple researchers asserted the challenges with transitioning from coursework to independent research (Lowery et al., 2018; Rockinson-Szapkiw et al., 2019; Tinto, 1993/2012). Other researchers mitigated the transition challenge by adding more structure throughout the entire program (Breitenbach, 2019; Buss, 2018b; Ewing et al., 2012).

Faculty Advising. Faculty and staff advising can be an asset to doctoral students navigating multiple priorities, family, work, and school (Bloom et al., 2014; Deshpande, 2017; Fiore et al., 2019). Schlossberg's Transition Theory is an event-based theory with three types of transitions applicable to student development (Goodman et al., 2006; Patten et al., 2016). Thus, inspired by Schlossberg's Transition Theory, faculty advising was critical to doctoral student persistence. In addition, faculty advisors or student affairs professionals integrated into EdD programs could be an asset to online doctoral programs, helping students navigate the rigors and challenges of a life-changing transition to doctoral studies.

Program Assessment. The 40-question Community of Inquiry (CoI) survey aligned with the study's theoretical framework. If administered to each cohort at the end

of each semester or academic year, the survey could provide valuable insight into students' level of teaching, social, cognitive, and emotional presence. Also, the six questions used in the study to evaluate the dissertation chair relationship could provide a leading indicator of persistence, as seen in the study results. Collecting and analyzing data could inform program leaders on necessary adjustments to program structure and curricula.

Adding Emotional Presence to the CoI Theoretical Framework

Multiple researchers claimed emotional presence was a unique and distinct presence worthy of incorporation into the Community of Inquiry model (Cleveland-Innes & Campbell, 2012; Jiang & Koo, 2020; Kim et al., 2014; Mayer, 2000; Majeski et al., 2018; Rienties & Alden Rivers, 2014; Stenbom, 2016). Garrison (2017), one of three scholars who developed the original CoI framework, claimed emotional presence added unnecessary complexity. Also, the social presence construct encompassed emotional presence, and "care must be taken to preserve its [the CoI's] integrity and parsimony" (Garrison, 2017, p. 31).

Cleveland-Innes and Campbell (2012) conducted a qualitative study capturing 23 emotions experienced by students in online environments, which led to the addition of six emotional presence questions to the original 34-question survey. Majeski et al. (2018) asserted emotional presence went beyond emotional expression, suggesting emotional presence was about emotional intelligence. Mortiboys (2012) claimed emotional intelligence in a community of inquiry was about recognizing students' feelings, acknowledging those feelings, and creating a psychologically safe environment for students to express themselves. Rienties and Alden Rivers (2014), the researchers who

incorporated emotional presence into the CoI model, found approximately 100 emotions, which extended beyond affective expression, from more than 100 studies. Rienties and Alden Rivers (2014) described how a discussion on a topic of global importance and or awareness could trigger a wide range of emotions between a diverse group of students, which were difficult to detect in an asynchronous environment. Jiang and Koo (2020) conducted a quantitative study using the 40-question CoI survey (Arbaugh et al., 2008; Cleveland-Innes & Campbell, 2012) and found emotional responses "[statistically] significantly lower [and with a higher spread] than cognitive, teaching, and social presence ratings" (p. 93) in an e-learning environment.

From a quantitative standpoint, the justification to support the conclusion of emotional presence as a unique and separate presence construct included (1) a factor analysis verified alignment with the Arbaugh et al. (2008) study, which validated the three-presence framework, (2) the use of the same principal component (factor) analysis revealed emotional presence (Arbaugh et al., 2008; Bandolas & Gerstner, 2016; Kaiser, 1974; Myududu & Sink, 2013), (3) using parallel analysis to determine the number of factors to extract and retain (O'Connor, 2000a; Math Guy Zero, 2020; Watkins, 2018); and (4) a robust methodology to establish factor loadings (Howard, 2016). "Factor analysis rests on the logic that it is possible to assess patterns in relative variances of measured items such that underlying, hypothesized theoretical constructs will emerge" (Cleveland-Innes & Campbell, 2012, p. 277).

Thus, prior research combined with the quantitative analysis in the study provided sufficient evidence to conclude emotional presence as a fourth and distinct construct of the Community of Inquiry model for online learning. Instructors teaching in a community

of inquiry should consider applying emotional intelligence best practices, especially in asynchronous environments, where emotions are challenging to detect. A community of inquiry, consisting of students having high levels of emotional presence, would increase persistence.

Implications for Future Research

For context, the topic of doctoral student persistence is very complicated, driven by multiple factors, whether individually or through interdependencies between factors. One focus area for future research is to replicate portions of the study on the EdD population. Recommended variables include work hours per week, study hours per week, the Community of Inquiry 40-question survey presences, the dissertation chair relationship, and the use of similar or different moderating variables. To further address additional confounding variable effects would be to analyze former v. current students from the same university. The purpose of replication could also identify if different samples provided the same or different results. The second potential opportunity is to determine if there is a significant difference between blended, blended online, or hybrid programs and online programs, using the definitions stated by Allen & Seaman (2015). Third, more research conducted on students who did not persist is vital to curb the approximately 50% attrition of doctoral students. For example, future studies could incorporate validated surveys about motivation during doctoral studies as a function of program progression, measured by how many courses each student completed (Williams et al., 2019). Finally, to gain further clarity requires more survey responses from students who did not persist than collected during the study. Also, a mixed methods approach might add more insight to the reasons for deciding to depart the program.

Limitations

During data collection, the researcher received correspondence from a survey respondent in which implied the university's curriculum did not meet the 80% online curriculum. See Chapter One for additional information. Chapter Four contains limitations for underlying assumptions associated with statistical testing.

Conclusions

The Community of Inquiry for Online Learning theoretical framework, based on a constructivist learning foundation, consists of cognitive, social, emotional, and teaching presence. Within the community existed instructors, students, and instructional content. The online modalities encompassed either a hybrid model, which is part face-to-face and part online instruction; asynchronous, e.g., text-based or written communication learning; synchronous or spoken communication; blended online learning, a combination of asynchronous and synchronous components. Teaching presence was the integrating presence as instructors were responsible for the design and development of curricula. Students engaged in a community of inquiry through cohort groups and built social presence through communication and collaboration with instructors and colleagues to achieve cognitive presence. Cognitive presence was about students making meaning of new knowledge and skill development through discourse, reflexivity, and critical thinking; while instructors maintained situational awareness of students' emotions, addressing concerns in real-time to mitigate issues.

The Carnegie Project on the Education Doctorate, a consortium of universities offering the EdD, will continue to equip scholar-practitioners with problem-solving skills and leadership skills to lead transformational change. A 360^{o} process, highly

recommended for EdD students, could strengthen leadership skills. With credit to the CPED and the university affiliates, over time, the consortium will continue making a difference by providing best practices and lessons learned, from admissions to the dissertation defense, creating transformation leaders who have the capability and leadership abilities to solve wicked problems of practice.

One significant role of higher education is about developing a global citizenry capable of solving the big problems facing society, such as climate change, diversity, equity, and inclusion, and prevent future pandemics, to name a few. Tomorrow's leaders must think critically, exercise sound judgment and ethical decision-making while maintaining the highest level of integrity. With every doctoral student loss, regardless of profession, society loses human capital, not to mention demoralized students, many of whom likely had feelings of failure.

Approximately half the people who started doctoral degrees did not persist for multiple reasons. Lovitts (2001) claimed, "doctoral student attrition is one of academe's best-kept secret would be to speak a fallacy, the situation is worse than that, and the problem is largely invisible" (p. 1). Leaders and scholars asserted the field of education needed people who could problem-solve. The researcher argued embracing the vision, mission, guiding principles, and signature pedagogies of the Carnegie Project on the Education Doctorate combined with the Community of Inquiry for Online Learning framework provided the structure, processes, and visibility of the professional education doctorate. In the researcher's opinion, the CPED, combined with the CoI for Online Learning framework, will develop scholar-practitioners with exceptional leadership skills

to execute transformational change and a higher proportion of students persisting to degree completion.

References

Allen, I. E., & Seaman (2015). Grade level: Tracking online education in the United States. *Babson Survey Research Group and Quahog Research Group, LLC.* https://files.eric.ed.gov/fulltext/ED572778.pdf

Allen, J. G., Wasicsko, M. M., & Chirichello, M. (2014). The missing link: Teaching the dispositions to lead. *NCPEA International Journal of Educational Leadership Preparation, 9*(1), 1–13.

Allen, J. G., Wasicsko, M., & Wirtz, P. J. (2018). Using dispositions in the EdD admissions process: A perceptual approach. *Impacting Education: Journal on Transforming Professional Practice, 3*(2), 1–10. https://doi.org/10.5195/ie.2018.69

Allen, M., Kikuko, O., Cole, W., & Burrell, N. (2019). Distance learning and student satisfaction. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education (*4th ed., pp. 122–131*).* Routledge.

Ames, C., Berman, R., & Casteel, A. (2018). A preliminary examination of doctoral student retention factors in private online workspaces. *International Journal of Doctoral Studies, 13,* 79–107.

Anderman, E. M., & Wolters, C. A. (2006). Goals, values, and affect: Influences on student motivation. In P. A. Alexander & P. H. Winnie, P.H. (Eds.), *Handbook of educational psychology*, 2nd ed., pp. 369–389). Lawrence Erlbaum Associates.

Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy. *International Review of Research in Open and Distributed Learning, 12*(3), 80–97. https://doi.org/10.19173/irrodl.v12i3.890

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, R. D., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry framework using a multi-institutional sample. *Internet and Higher Education, 11*, 133–136. https:/doi.org/10.1016/j.iheduc.2008.06.003

Ayadurai, V. K. (2018). *Work-life balance, work-study balance, gender, stress, and satisfaction.* [Doctoral Dissertation, Walden University]. https://scholarworks.waldenu.edu/dissertations/5445/

Bailey, D. (2019). The doctoral journey engaged: Elements to persist. In B. Holmes & D. Parker (Eds.), *Doctoral student perspectives on motivation and persistence,* pp. (5–10). OpenRiver. https://openriver.winona.edu/educationeddbooks/1

Bandalos, D. L., & Gerstner, J. J. (2016). Using factor analysis in test construction. In K. Schweizer & C. DiStefano (Eds.), *Principles and Methods of Test Construction*, pp. 26–51). Hogrefe.

Baranzini, D. (2018, November 12). *Multiple imputation in SPSS via OMS procedure: Get a final data set!* https://www.youtube.com/watch?v=zftIxv532hE

Berry, S. (2017). Student support networks in online doctoral programs: Exploring nested communities. *International Journal of Doctoral Studies, 12*, 33–48.

Bewick, V., Cheek, L., & Ball, J. (2004). Statistics review 8: Qualitative data - tests of association. *Critical Care, 8,* 46-53. https:/doi.org.10.1186/cc2428

Blau, I., Shamir-Inbal, T., Avdiel, O. (2020). How does the pedagogical design of a technology-enhanced collaborative academic course promote digital literacies,

self-regulation, and perceived learning of students? *The Internet and Higher Education, 45,* 1–11. https://doi.org/10.5430/jct.v6n1p110

Bloom, J. L., Hitson, B. L., He, Y, & Konkle (2014). *The appreciative revolution training workbook: Translating theory to practice.* Stipes.

Bowen, W.G., & Rudenstine, N. L. (1992) *In pursuit of the Ph.D.* Princeton University Press.

Breitenbach, E. (2019). Evaluating a model to increase doctorate program completion rates: A focus on social connectedness and structure. *International Journal of Doctoral Studies, 14,* 218–236.

Brown, C. G. (2017). The persistence and attrition of online learners. *School Leadership Review, 12*(1), 47–58. https://scholarworks.sfasu.edu/slr/vol12/iss1/7

Buss, R. R. (2018a). Using action research as a signature pedagogy to develop EdD students' inquiry as practice abilities. *Impacting Education: Journal on Transforming Professional Practice, 3,* 23–3. https://doi.org/10.5195/ie.2018.46

Buss, R. R. (2018b). How CPED guiding principles and design concepts influenced the development and implementation of an EdD program. *Impacting Education: Journal on Transforming Professional Practice, 3*(2), 40–47. https://doi.org/10.5195/ie.2018.57

Butcher, J., & Sieminski, S. (2006). The challenge of a distance learning professional doctorate in education, *Open Learning: The Journal of Open, Distance and e-Learning, 21*(1), 59–69. https://doi.org/10.1080/02680510500472239

Carnegie Project on the Education Doctorate (2020). *2020 Member Report.* http://cpedinitiative.org

Carnegie Project on the Education Doctorate (2021a). *The Knowledge Forum on EdD.* Retrieved July 28, 2021, from https://cped.memberclicks.net

Carnegie Project on the Education Doctorate (2021b). *The CPED Framework.* Retrieved July 28, 202,1 from https://cped.memberclicks.net/the-framework

Castelló, M., Pardo, M., Sala-Bubare, A., & Suñe-Soler, N. (2017). Why do students consider dropping out of doctoral degrees? Institutional and personal factors. *Higher Education, 74,* 1053–1068. https://doi.org/10.1007/s10734-016-0106-9

Chen, B., deNoyelles, A., Patton, K., & Zydney, J. (2017). Creating a community of inquiry in large-enrollment online courses: An exploratory study on the effect of protocols within online discussions, *Online Learning 21*(1), 165–188. https://doi.org/10.24059/ olj.v21i1.816

Cleveland-Innes, M., & Campbell, P. (2012). Emotional presence, learning, and the environment. *The International Review of Research in Open and Distance Learning, 13*(4), 269–292.

Cleveland-Innes, M., Garrison, R. D., & Vaughn, N. (2019). The community of inquiry framework: Implications for distance education and beyond. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education* (4th ed., pp. 67–77). Routledge.

Cockrell, C. N., & Shelley, K. (2010). The relationship between academic support systems and intended persistence in doctoral education. *Journal of College Student Retention, 12*(4), 469–484.

Consortium for Research on Emotional Intelligence in Organizations (2021). *The Genos emotional intelligence inventory (Genos EI).* http://www.eiconsortium.org/measures/genos.html

Cornér, S., Löfström, E., & Pyhältö, K. (2017). The relationships between doctoral students' perceptions of supervision and burnout. *International Journal of Doctoral Studies, 12,* 91–106. http://www.informingscience.org/Publications/3754

Costley, C., & Lester, B. S. (2011). Work-based doctorates: professional extension at the highest levels. *Studies in Higher Education, 37*(3), 1–14. http://eprints.mdx.ac.uk

Cremin, L. A. (1978). The education of educating professions. The 19th Charles W. Hunt Lecture. Presented at the 30th Annual Meeting of the American Association of Colleges for Teacher Education (February 21, 1978). Chicago, Illinois

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Sage.

De La Fosse, D. (2019). The doctoral journey engaged: Elements to persist. In B. Holmes & D. Parker (Eds.), *Doctoral student perspectives on motivation and persistence,* pp. 33–38). OpenRiver. https://openriver.winona.edu/educationeddbooks/1

De Vaus (2001). *Research design in social research.* Sage.

Deci, E.L., Olafsen, A. H., & Ryan, R.M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior, 4,*19–43.

Demetriou, C., & Schmitz-Sciborski, A. (2011, Oct 30 – Nov 02). Integration, motivation, strengths and optimism: Retention theories past, present and future. In

R. Hayes (Chair), *Reaching for higher levels of student success* [Symposium]. The 7th National Symposium on Student Retention, Norman, OK, United States.

Demirtas, H., Freels, S. A., & Yucel, R. M. (2006, February 17). *The Plausibility of multivariate normality assumptions when multiply imputing non-gaussian continuous outcomes: A simulation assessment* [Technical Report No. 2006-001]. University of Illinois at Chicago School of Public Health Division of Epidemiology and Biostatistics. https://www.researchgate.net/profile/Recai_Yucel/publication/237442440_Plausibility_of_multivariate_normality_assumption_when_multiply_imputing_non-Gaussian_continuous_outcomes_A_simulation_assessment/links/0deec5345c0d89a11a000000.pdf

Denham, B. E. (2017). *Categorical statistics for communication research.* Wiley Blackwell.

Deshpande, A. (2017). Faculty best practices to support students in the 'virtual doctoral land.' *Higher Education for the Future, 4*(1), 12-30. https://doi.org/10.1177/2347631116681211

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed.). Wiley.

Donders, A. R. T., van der Heijden, G. J. M. G., Stijnen, T. & Moons, K. G. M. (2006). Review: A gentle introduction to introduction of missing values. *Journal of Clinical Epidemiology, 59*, 1087–1091.

Dron, J. (2019). Independent learning. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education* (4th ed., pp. 47–66). Routledge.

Duke, D. C., & Denicolo, P. M. (2017). *FEMS microbiology letters, 364*, 1-7. https://doi.org/ 10.1093/femsle/fnx090

Dusek, G. A., Yurova, Y. V., & Ruppel, C. P. (2015). Using social media and targeted snowball sampling to survey a hard-to-reach population: A case study. *International Journal of Doctoral Studies, 10,* 279–299.

Eagar, T. (2018, September 28). *Lecture 10: Factor analysis (and with regression)* [Video]. YouTube. https://youtu.be/n50SSl98xqw

Ewing, H., Mathieson, K., Alexander, J. L., & Leafman, J. (2012). Enhancing the acquisition of research skills in online doctoral programs: The Ewing Model ©. *MERLOT Journal of Online Learning and Teaching, 8*(1), 34–44.

Ferguson, C. J. (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice, 40*(5), 532–538.

Fernando, S. Y., & Marikar, F. M. (2017). Constructivist teaching/learning theory and participatory teaching methods. *Journal of Curriculum and Teaching, 6*(1), 110–122. https://doi.org/10.5430/jct.v6n1p110

Field, A. (2018). *Discovering statistics using IBM SPSS Statistics.* Sage.

Fiore, T. D., Heitner, K. L., & Shaw, M. E. (2019, June 23–26). *Academic advising and online doctoral student persistence from coursework to independent research* [Conference session]. Proceedings of the DLA2019 Conference, Jekyll Island, GA. United States. https://www.westga.edu/~distance/dla/pdf/2019-dla-proceedings.pdf#page=111

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in Education* (8th ed.). McGraw-Hill.

Franco, P. F., & DeLuca, D. A. (2019). Learning through action: Creating and implementing a strategy game to foster innovative thinking in higher education. *Simulation & Gamin, 50*(1), 23-43. https://doi.org/10.1177/1046878118820892

Friel, W. (2019). *Theory and practice in doctoral dissertation research, 2007–2017: A content analysis by degree type*. (Dissertations. 2688) [Doctoral dissertation, Seton Hall University]. eRepository@Seton Hall.

Fuller, J. S., Risner, M. E., Lowder, L., Hart, M., & Bachenheimer, B. (2014). Graduates' reflections on an online doctorate in educational technology. *Tech Trends, 58*(4), 73–80. http://doi.org/10.1007/s11528-014-0771-4

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education 2*(2/3), 87–105.

Garrison, D. R. (2017). *E-learning in the 21st century: A community of inquiry framework for research and practice* (3rd ed.). Routledge.

Gignac, G.E. (2019, February 25). *2x2 Factorial ANOVA: Dealing with unequal variance and sample sizes* [Video]. YouTube. www.youtube.com/watch?v=kt34vfiSIxQ&t=29s

Ginder, S. A., & Kelly-Reid, J. E. (2013). *2012-13 Integrated Postsecondary Education Data System (IPEDS) Methodology Report* (NCES 2013-293). https://files.eric.ed.gov/fulltext/ED544186.pdf

Gittings, G. A. (2010). *The effect of student attributes and program characteristics on doctoral degree completion* (Paper 502) [Doctoral Dissertation, University of Louisville]. Electronic Theses and Dissertations.

Gittings, G., Bergman, M., Shuck, B., & Rose, K. (2018). The impact of student attributes and program characteristics on doctoral degree completion. *New Horizons in Adult Education & Human Resource Development, 30*(3), 3–22.

Gnanadass, E., & Sanders, A. Y. (2019). Gender Still Matters in Distance education. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education* (4th ed., pp. 79–91). Routledge.

Goodman, J., Schlossberg, N. K., & Anderson, M. L. (2006). *Counseling adults in transition: Linking practice with theory* (3rd ed.). Springer.

Gordon (2017). Creating social cues through self-disclosure, stories, and paralanguage. In A. L. Whiteside, A. G. Dikkers, & K. Swan (Eds.), *Social Presence in Online Learning: Multiple perspectives on practice and research* (pp. 99–129). Stylus Publishing.

Grande, T. L. (2014, September 15). *Testing the assumptions for two-way ANOVA using SPSS.* [Video]. YouTube. https://www.youtube.com/watch?v=49eIr-gIqRo&t=2s

Grande, T. L. (2015a, May 9). *Conducting a Shapiro-Wilk normality test in SPSS* [Video]. YouTube. https://www.youtube.com/watch?v=9KKAX5av7S4

Grande, T. L. (2015b, November 3). *Using the auto recode function in SPSS.* [Video]. YouTube. https://www.youtube.com/watch?v=jEzaDoNDMIE

Grande, T. L. (2016, March 17). *Interpreting SPSS Output for Factor Analysis* [Video]. YouTube. *https://www.youtube.com/watch?v=g_3kaSnq-DY*

Gurley, L. E. (2018). Educators' preparation to teach, perceived teaching presence, and perceived teaching presence behaviors in blended and online learning

environments. *Online Learning, 22*(2), 197-220. https:/doi.org/10.24059/olj.v22i2.1255

Harnett, M. (2019). The community of inquiry framework. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education (*4th ed., pp. 145–157*)*. Routledge.

Hillaire, G. (2016). Pedagogically grounded emotional design for learning analytics. https://www.researchgate.net/profile/Garron_Hillaire/publication/319037836_Pedagogically_Grounded_Emotional_Design_for_Learning_Analytics/links/598c3ef5458515c333a77ac6/Pedagogically-Grounded-Emotional-Design-for-Learning-Analytics.pdf

Holbeck, R., & Hartman (2018). Efficient strategies for maximizing online student satisfaction: Applying technologies to increase cognitive presence, social presence, and teaching presence. *Journal of Educators Online, 15*(3), 91–95.

Holmes, B., Parker, D., & Willis, K. (2019). Introduction. In B. Holmes & D. Parker (Eds.), *Doctoral student perspectives on motivation and persistence* (pp. 1–4). OpenRiver. https://openriver.winona.edu/educationeddbooks/1

Howard, M. C. (2016). A review of exploratory factor analysis decisions and overview of current practices: What we are doing and how can we improve? *International Journal of Human-Computer Interaction, 32*(1), 51-62. http://doi.org/10.1080/10447318.2015.1087664

Ice, P., Gibson, A. M., Boston, W., & Becher, D. (2011). An exploration of differences between community of inquiry indicators in low and high disenrollment online courses. *Journal of Asynchronous Learning Networks, 15*(2), 44-69.

Inouye, K., & McAlpine, L. (2019). Developing academic identity: A Review of the literature on doctoral writing and feedback. *International Journal of Doctoral Studies, 14,* 1–31. https://doi.org/10.28945/4168

Isaac, P. D. (1993). Measuring graduate student retention. In L. L. Baird (Ed.), *Increasing Graduate Student Retention and Degree Attainment (*pp. 13–25*).* Jossey-Bass.

Jiang, M. & Koo, K. (2020). Emotional presence in building an online learning community among non-traditional graduate students. *Online Learning, 24*(2), 93-111. https://doi.org/10.24059/olj.v24i4.2307

Johnson, R. B., & Christensen, L. (2017). *Educational research: Quantitative, qualitative, and mixed approaches* (6th ed.). Sage.

Jones, B. D. (2014, December 16). *Self-regulation and motivation* [Video]. YouTube. https://youtu.be/CaTSevGeBVk

Jones, B. E., Combs, J. P., & Skidmore, S. T. (2019). Admission criteria for educational leadership doctoral students in one U.S. doctoral program. *International Journal of Doctoral Studies, 14,* 351–365. https://doi.org/10.28945/4251

Jones, S. (2019). Reflecting on the path ahead. In B. Holmes & D. Parker (Eds.), *Doctoral student perspectives on motivation and persistence,* pp. (5–10). OpenRiver. https://openriver.winona.edu/educationeddbooks/1

Kaiser, P. T. (1974). An index of factorial simplicity. *Psychometrika, 39*(1), 31–36.

Kennette, L. N., & Redd, B. R. (2015). Instructor presence helps bridge the gap between online and on-campus learning. *College Quarterly, 18*(4), 1-10. https://files.eric.ed.gov/fulltext/EJ1095942.pdf

Kim, C., Park, S. P., Cozart, J. (2014). Affective and motivational factors of learning in online mathematics courses. *British Journal of Educational Technology, 45*(1), 171–185. https://doi.org/10.1111/j.1467-8535.2012.01382.x

Kimbrel, L. A., & Varga, M. A. (2020). Predicting EdD applicant potential using structured behavioral interviews during the application process. *Impacting Education: Journal on Transforming Professional Practice, 5*, 27–32. https://doi.org/10.5195/ie.2020.109

Klocko, B. A., Marshall, S. M., & Davidson, J. F. (2015). Developing practitioner-scholar doctoral candidates as critical writers. *Journal of Higher Education Theory and Practice, 15*(4), 21–31.

Kochhar-Bryant, C. (2016). Transforming doctoral leadership program design through cross-national dialog. In V. A. Storey (Ed.*), International perspectives on designing professional practice doctorates: Applying the critical friends approach to the EdD and beyond* (pp. 184–200). Palgrave Macmillan.

Lee, D., Spear, R., & Kero, P. (2017, April). *Perceptions of social presence among public university graduate students enrolled in synchronous and asynchronous coursework* [Paper Presentation]. American Educational Research Association, San Antonio, TX, United States.

Lenhard W., & Lenhard, A. (2016). *Computation of effect sizes.* Retrieved 22, March 2021 from https://www.psychometrica.de/effect_size.html. Psychometrica [15. Computation of the effect sizes, d, r, and η^2 from χ^2 – and z test statistics.] https:/doi.org/10.13140/RG.2.2.17823.92329

Lewis, T., Puckett, H., & Ringler, M. (2020). Changing the mindset from practitioner to scholarly practitioner: Admission through the first two semesters of an EdD program. *International Journal of Educational Leadership Preparation, 15*(1), 1–16.

Li, K. H., Raghunathan, T. E., & Rubin, D.B. (1991). Large-sample significance level from multiply imputed data using moment-based statistics and an F reference distribution. *Journal of the American Statistical Association, 86*(416), 1065–1073.

Lim, J., Covrig, D., Freed, S., De Oliveira, B., Ongo, M., & Newman, I. (2019). Strategies to assist distance doctoral students in completing their dissertation. *International Review of Research in Open and Distributed Learning, 20*(5), 192–210. https://doi.org/10.19173/irrodl.v20i5.4532

Lindsay, H., Kerawalla, L. & Floyd, A. (2018). Supporting researching professionals: EdD students' perceptions of their development needs. *Studies in Higher Education, 43*(12), 2321–2335. https://doi.org/10.1080/03075079.2017.1326025

Lovitts, B. E. (2001). *Leaving the ivory tower.* Rowman & Littlefield.

Lowenthal, P., & Mulder, D. (2017). Social presence and communication technologies. In A. L. Whiteside, A. G. Dikkers, & K. Swan (Eds.), *Social Presence in Online Learning: Multiple perspectives on practice and research* (pp. 32–44). Stylus Publishing.

Lowenthal, P. R., & Dunlap, J. C. (2010). From pixel on a screen to real person in your students' lives: Establishing social presence using digital storytelling. *Internet and Higher Education, 13,* 70-72. https://doi.org/10.1016/j.iheduc.2009.10.004

Lowenthal, P. R., Dunlap, J. C., & Snelson, C. (2017). Live synchronous web meetings in asynchronous online courses: Reconceptualizing virtual office hours. *Online Learning 21*(4), 177–194. https://doi.org/10.24059/olj.v21i4.1285

Lowenthal, P. R. & Snelson, C. (2017). *In search of a better understanding of social presence: An investigation into how researchers define social presence* [Manuscript submitted for publication]. Department of Educational Technology. Boise State University

Lowery, K., Geesa, R., & McConnell, K. (2018). Designing a peer-mentoring program for education doctorate (EdD) students: A literature review. *Higher Learning Research Communications, 8*(1), 30–50. https://doi.org/10.18870/hlrc.v8i1.408

Lynch, M. F., Salikhova, N. R., & Salikhova, A. B. (2018). Internal motivations among doctoral students: Contributors from the student and from the student's environment. *International Journal of Doctoral Studies, 13,* 252–272. https://doi.org/10.28945/4091.

Majeski, R. A., Stover, M., & Valais, T. (2018). The community of inquiry and emotional presence. *Adult Learning, 29*(2), 53-61.

Mansfield, K. C., & Stacy, J. (2017). Preparing practitioners to conduct educational research and evaluation: What the research says and what our experience taught us. *Journal of Research on Leadership Education, 12*(3), 302–334.

Mantel, N., & Haenszel, W. (1959). Statistical aspects of the analysis of data from retrospective studies of disease. *Journal of the National Cancer Institute, 22*(4), 719–748.

Math Guy Zero (2020, February 4). *Parallel analysis with SPSS and syntax* [Video]. YouTube. https://www.youtube.com/watch?v=nVV0IylRmb0

Maul, J., Berman, R., & Ames, C. (2018). An emerging technology to coach and retain doctoral learners. *International Journal of Doctoral Studies, 13,* 79–107.

Mayer, J. D., Caruso, D. R., Salovey, P. (2000). Emotional intelligence meets traditional standards for an intelligence. *Intelligence, 27*(4), 267–298.

McClave, J., & Sincich, T. (2017). *Statistics* (13th ed.). Pearson.

McHugh, M. L. (2013). Lessons in biostatistics: The Chi-square test of independence. *Biochemia Medica, 23*(2), 43–49. https:/doi.org/10.11613/BM.2013.018

Moore, M. G. (2019). The theory of transactional distance. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education* (4th ed., pp. 32–46*)*. Routledge.

Mortiboys, A. (2012). *Teaching with emotional intelligence* (2nd ed.). Routledge.

Motte, K. A. (2019). A grounded theory study of the ideal components of an orientation for a distance education Doctor of Education program. [Unpublished doctoral dissertation]. Liberty University.

Mvududu, N. H., & Sink, C. A. (2013). Factor analysis in counseling research and practice. *Counseling Outcome Research and Evaluation, 4*(2), 75–98. https://doi.org/ 10.1177/2150137813494766

National Student Clearinghouse (2020). *About the clearinghouse.* https://www.studentclearinghouse.org/about/

National Science Foundation (2017). *Science and engineering doctorates: Technical notes.* https://www.nsf.gov/statistics/2018/nsf18304/technical-notes.cfm

National Science Foundation (2019). *Survey of earned doctorates: Data tables.* [Statistical profile of doctorate recipients, by sex and broad field of study: 2018]. https://ncses.nsf.gov/pubs/nsf21308/data-tables

National Science Foundation (2020). *Survey of Earned Doctorates.* https://www.nsf.gov/statistics/srvydoctorates/

Nettles, M. T., & Millett, C. M. (2006). *Three magic letters: Getting to Ph.D.* The Johns Hopkins University Press.

O'Connor, B. P. (2000a). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research. Methods, Instruments, & Computers, 32*(2), 396-402.

O'Connor, B. P. (2000b). *SPSS, SAS, MATLAB, and R Programs for determining the number of components and factors using parallel analysis and Velicer's MAP test.* https://people.ok.ubc.ca/brioconn/nfactors/nfactors.html

Palvia, S., Aeron, P., Gupta, P., Mahapatra, D., Parida, R., Rosner, R., & Sindhi, S. (2018). Online education: Worldwide status, challenges, trends, and implications. *Journal of Global Information Technology Management*, *21*(4), 233–241.

Patton, L. D., Renn, K. A., Guido, F. M., & Quaye, S. J. (2016). *Student development in college: Theory, research, and practice* (3rd ed.). Jossey-Bass.

Patterson, N. (2012). Distance education: A perspective from women's studies. International *Women Online Journal of Distance Education*, *1*(2), 1–14.

Pedersen, A. B., Mikklesen, E. M., Cronin-Fenton, D., Kristensen, N. R., Pham, T. M., Pedersen, L., & Petersen, I. (2017). Missing data and multiple epidemiological

research. *Clinical Epidemiology*, *9*, 157–166. https://doi.org/10.2147/CLEP.S129785.

Peduzzi, P., Concato, J., Kemper, E. Holford, T. R., & Feinstein, A.R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology 49*(12), 1373–1379.

Perry, J. A. (2012). What history reveals about the Education Doctorate. In M. M. Latta & S. Wunder (Eds.), *Placing practitioner knowledge at the center of teacher education: Rethinking the policy and practice of the Education Doctorate*, pp. 1–32). https://www.researchgate.net/profile/Jill_Perry2/publication/306153640_What_history_reveals_about_the_education_doctorate/links/57e2914c08ae427e2959e02c/What-history-reveals-about-the-education-doctorate.pdf

Perry, J. A., & Abruzzo, E. (2020). Preparing the scholarly practitioner: The importance of socialization in CPED-influenced EdD programs. In J. C. Weidman & L. DeAngelo (Eds.), *Socialization in higher education and the early career* (pp. 129–146). https://doi.org/10.1007/978-3-030-33350-8

Perry, J. A., Zambo, D., & Abruzzo, E. (2020). Faculty leaders challenges and strategies in redesigning EdD programs. *Impacting Education: Journal on Transforming Professional Practice, 5*, 1–10. https://doi.org/10.5195/ie.2020.143

Perry, J. A., Zambo, D., & Crow, R. (2020). *The improvement science dissertation in practice: A guide for faculty, committee members, and their students.* Myers Education Press.

Phillips, J. C., Geller, K. D., Mawritz, K. J., (2018). Program innovation and design in an era of accountability: EdD faculty work as a community of practice. *Impacting*

Education: Journal on Transforming Professional Practice, 3(2), 30–39. https://doi.org/10.5195/ie.2018.64

Ploskonka, J. (1993). The use of retrospective national data for institutional evaluation. In L. L. Baird (Ed.), *Increasing graduate student retention and degree attainment (*pp. 59–68*).* Jossey-Bass.

Pool, J., Reitsma, G., & van den Berg, D. (2017). Revised community of inquiry framework: Examining learning presence in a blended mode of delivery. *Online Learning, 21*(3), 153–165 https://doi.org/10.24059/olj.v%vi%i.866

Power, M., & Vaughan, N. (2010). Redesigning online learning for international graduate seminar delivery. *Journal of Distance Education, 24*(2), 19–38.

Rademaker, L. L., Duffy, J. O., Wetzler, E., & Zaikina-Montgomery, H. (2016). Chair perceptions of trust between mentor and mentee in online doctoral dissertation mentoring. *Online Learning, 20*(1), 57–69.

Rankin, S., & Garvey, J. C. (2015). Identifying, quantifying, and operationalizing queer-spectrum and trans-spectrum students: Assessment and research in student affairs. *New Directions for Student Services, 152*, 73–84. https://doi.org/ 10.1002/ss

Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks, 7*(1), 66-88.

Rienties, B., & Alden Rivers, B. (2014). Measuring and understanding learner emotions: Evidence and prospects. *Learning Analytics Community Exchange, Review 1,* 1–14. Milton Keynes: LACE

Roberts, A., & Friedman, D. (2013). The impact of teacher immediacy on student participation: An objective cross-disciplinary examination. *International Journal of Teaching and Learning in Higher Education, 25*(1), 38-46.

Rockinson-Szapkiw, A. J., Holmes, J., & Stephen, J. S. (2019). Identifying significant personal and program factors that predict online EdD students' program integration. *Online Learning Journal, 23*(4), 313–335.

Rockinson-Szapkiw, A. J., Spaulding, L. S., & Lunde, R. (2017). Women in distance doctoral programs: How they negotiate their identities as mothers, professionals, and academics in order to persist. *International Journal of Doctoral Studies, 12,* 49–71.

Rockinson-Szapkiw, A. J., Wendt, J., Wighting, M., & Nisbet, D. (2016). The predictive relationship among the community of inquiry framework, perceived learning and online, and graduate students' course grades in online synchronous and asynchronous courses. *International Review of Research in Open and Distributed Learning, 17*(3) 18–35.

Rogers-Shaw, C., & Carr-Chellman, D. (2018). Developing care and socio-emotional learning in first year doctoral students: Building capacity for success. *International Journal of Doctoral Studies, 13,* 233–252. https://doi.org/10.28945/4064

Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conference context. *Journal of Asynchronous Learning Networks, 5(*2), 1–17.

Ross, E. A. (2009) *Toward a better understanding of doctoral degree completion: A 17-year view of an executive leadership doctoral program* (Publication No. 3368946) [Doctoral dissertation, George Washington University]. ProQuest Dissertations Publishing.

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys*. Wiley & Sons.

Russo, T., & Benson, S. (2005). Learning with invisible others: Perceptions of online presence and their relationship to cognitive and affective learning, *Educational Technology & Society, 8*(1), 54-62.

Saadatmand, M., Uhlin, L., Hedberg, M, Åbjörnsson, L., & Kvarnström, M. (2017). Examining learners' interaction in an open online course through the community of inquiry framework. *European Journal of Open, Distance and e-Learning, 20*(1), 61–79.

Santicola, L. (2013). Pressing-on: Persistence through a doctoral cohort program in education. *Contemporary Issues in Educational Research – Second Quarter 6*(2), 253-264.

Schnuck, D. H., & Zimmerman, B. J. (2006). Competence and control beliefs: Distinguishing the means and the ends. In P. A. Alexander & P. H. Winnie (Eds.), *Handbook of Educational Psychology*, (2nd ed., pp. 349–367). Lawrence Erlbaum Associates.

Shea, P. & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers & Education, 55*, 1721–1731. https://doi.org/ 10.1016/j.compedu.2010.07.017

Shea, P. & Bidjerano, T. (2012). Learning presence as a moderator in the community of inquiry model. *Computers & Education, 59,* 316–326. https/doi.org/10.1016/j.compedu.2012.01.011

Shulman (2005). Signature pedagogies in the professions. *Daedalus, 134*(3), 52–59.

Shulman, L. S. (2010, April 4). *Doctoral education should not be a marathon.* The Chronicle of Higher Education. https://www.chronicle.com/article/doctoral-education-shouldnt-be-a-marathon/?cid_sign_in

Smith, M. (2016, September 11). Psychology in education: *Applying attribution theory to the classroom.* https://psychologyineducation.wordpress.com/2016/09/11/applying-attribution-theory-to-the-classroom/

Smith, J., Wood, P., Lewis, G., & Burgess, H. (2016). Critical friendship as a pedagogical strategy. In V. A. Storey (Ed.), *International perspectives on designing professional practice doctorates: Applying the critical friend's approach to the EdD and beyond* (pp. 233–248). Palgrave Macmillan.

Sowell, R., Allum, J., & Okahana, H. (2015). *Doctoral initiative on minority attrition and completion*. Council of Graduate Schools. https://cgsnet.org/data-sources-highlights-doctoral-initiative-minority-attrition-and-completion

Spronken-Smith, R. (2018). Reforming doctoral education: There is a better way. *University of Otago, 9*(18), 1–16. https://escholarship.org/content/qt4s08b4jx/qt4s08b4jx.pdf

Stark, J. B. (2019). The value in pursuing the EdD. *Journal of School Administration Research and Development, 4*(1), 39–41.

Stavredes, T. M., & Herder, T. M. (2019). The community of inquiry framework. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education* (4th ed., pp. 135–144*).* Routledge.

Stenbom, S., Jansson, M., & Hulkko, A. (2016). Revising the community of inquiry framework for the analysis of one-to-one online learning relationships. International Review of Research in Open and Distributed Learning, *17*(3), 36–53. https://doi.org/10.19173/irrodl.v17i3.2068

Storey, V. A., Caskey, M. M., Hesbol, K. A., Marshall, J. E., Maughan, B., & Dolan, A. W. (2015). Examining EdD dissertations in practice: The Carnegie Project on the Education Doctorate. *International HETL Review, 5*(2), 1–24. https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1097&context=edu_fac

Storey, V. A., & Maughan, B. D. (2016). Dissertation in practice: Reconceptualizing the nature and role of the practitioner-scholar. In V. A. Storey (Ed.*), International perspectives on designing professional practice doctorates: Applying the critical friends approach to the EdD and beyond* (pp. 213–232). Palgrave Macmillan.

Swan, K., & Richardson, J. C. (2017). Social presence and The Community of Inquiry Framework. In A. L. Whiteside, A. G. Dikkers, & K. Swan (Eds.), *Social Presence in Online Learning: Multiple perspectives on practice and research* (pp. 64–76). Stylus Publishing.

Sverdlik, A., Hall, N. C., McAlpine, L., & Hubbard, K. (2018). The PhD experience: A review of the factors influencing doctoral students' completion, achievement, and

well-being. *International Journal of Doctoral Studies, 13*, 361–388. https://doi.org/10.28945/4113.

Sverdlik, A., & Hall, N. C. (2020). Not just the phase: Exploring the role of program stage on well-being and motivation in doctoral students. *Journal of Adult and Continuing Education, 26*(1), 97–124. https://doi.org/10.1177/1477971419842887

Tabachnick, B. G. & Fidell, L. S. (2014). *Using multivariate statistics* (6th Ed.) Pearson.

Terrell, S. R., Lohle, M. F., & Kennedy, D. (2016). Student-identified requirements for persistence in a limited-residency information PhD program. *Online Journal of Applied Knowledge Management, 4*(1), 150–164.

Thelin, J. R. (2017). *American higher education.* Routledge.

Toma, D. J. (2002). *Legitimacy, differentiation, and the promise of the Ed.D. in higher education.* Annual Meeting of the Association for the Study of Higher Education, Sacramento, CA (November 21–24, 2002).

Thompson, P., Vogler, J. S., & Xiu, Y. (2017). Strategic tooling: Technology for constructing a community of inquiry. *Journal of Educators Online, 14*(2), 1–8.

Tinto, V. (1993/2012). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). University of Chicago Press. (Original work published 1993)

Tinto, V. (2017). Through the eyes of students. *Journal of College Student Retention: Research, Theory & Practice*, 1–16. https:/doi.org/10.1177/1521025115621917

Trejo, A. (2016). Project outcomes improved by emotional intelligence. *Business Perspectives and Research, 4*(1), 67-76.

Ulibarri, N., Cravens, A. E., Cornelius, M., Royalty, A., & Nabergoj, A. S. (2014). Research as design: Developing creative confidence in doctoral students through design thinking. *International Journal of Doctoral Studies, 9,* 249-270.

Van Buuren, S. (2012). *Flexible imputation of missing data.* Chapman & Hall/ CRC.

Van Ginkel, J. R., Linting, M., Rippe, R. C. A., & van der Voort, A. (2020). Rebutting existing misconceptions about multiple imputation as a method for handling missing data. *Journal of Personality Assessment, 102*(3), 297–308. https://doi.org/10.1080/00223891.2018.1530680

Walker, G. E., Golde, C. M., Jones, L., Bueschel, A. C., & Hutchings, P. (2008). *The formation of scholars: Rethinking doctoral education for the twenty-first century*. Josey Bass.

Warner, R.M. (2013). *Applied statistics: From bivariate through multivariate techniques.* Sage.

Watkins, M. W. (2018). Exploratory factor analysis: A guide to best practice. *Journal of Black Psychology, 44*(3), 219–246. https://doi.org/10.1177/0095798418771807

Watson, J. C. (2017). Establishing Evidence for Internal Structure Using Exploratory Factor Analysis. *Measurement and Evaluation in Counseling and Development, 50*(4), 232–238. http://doi.org/10.1080/07481756.2017.1336931

Watts, L. S. (2015). Democratizing higher education in the United States. In P. Blessinger & J. P. Anchan (Eds.), *Democratizing higher education: International comparative perspectives* (pp. 15–29). New York: Routledge

Weiner, B. (1972). Attribution theory, achievement motivation, and the educational process. *Review of Educational Research, 42*(2), 203–215.

Weiner, B. (2000). Intrapersonal and interpersonal theories of motivation from an attributional perspective. *Educational Psychology Review, 12*(1), 1–14.

Western Cooperative Educational Telecommunications (2015). *Questions and answers: Definition of an online program.* https://wcet.wiche.edu/sites/default /files/Definition-Online-Program_April-2014.pdf

White, I. R., Royston, P., & Wood, A. M. (2010). *Multiple imputation using chained equations: Issues and guidance for practice.* Wiley Online Library. https://doi.org/10.1002/sim.4067

Whiteside, A. L., Dikkers, A. G., & Lewis, S. (2017). Overcoming isolation online. In A. L. Whiteside, A. G. Dikkers, & K. Swan (Eds.), *Social Presence in Online Learning: Multiple perspectives on practice and research* (pp. 180–187). Stylus Publishing.

Williams, P., Wall, N., & Fish, W. (2019). Mid-career adult learners in an online doctoral program and the drivers of their academic self-regulation: The importance of social support and parent education level. *International Review of Research in Open and Distributed Learning, 20*(1). https://doi.org/10.7202/1057972ar

Wisdom, S. L. (2015). Faculty support and guidance to doctoral candidates: Promotion of critical thinking. In S. Wisdom & L. Leavitt (Eds.), *Handbook of research on advancing critical thinking in higher education,* 371–395. IGI Global.

Wong, J., Baars, M., Davis, D., Van Der Zee, T., Houben, G., & Paas, F. (2019) Supporting self-regulated learning in online learning environments and MOOCs*: A systematic review, International Journal of Human–Computer Interaction, 35(4-5),* 356-373, https/.doi.org/10.1080/10447318.2018.1543084

Xu, Z., & Shi, Y. (2018). Application of constructivist theory in flipped classroom – Take college English teaching as a case study. *Theory and Practice in Language Studies, 8*(7), 880–887. http://doi.org/10.17507/tpls.0807.21

Yates, D., Moore, D., & McCabe (1999). *The practice of statistics.* W. H. Freeman and Company.

Zenger, J. H. & Folkman, J. (2002). *The extraordinary leader: Turning good managers into great leaders.* McGraw-Hill.

Appendix A: Survey Instrument for Former Students

Section A – BACKGROUND INFORMATION

Q1. Survey Research Information Sheet (Informed Consent)

Q2. What is your current age?

- Less than 30 years old
- 30 – 39 years old
- 40 – 49 years old
- 50 – 59 years old
- 60 years and older

Q3. What is your gender?

- Male
- Female
- Transgender

Q4. How do you describe your primary ethnicity? (check all that apply)

□ American Indian

□ Asian

□ Black or African American

□ Hispanic
□ Pacific Islander
□ White
□ Other (please specify) _____
□ Prefer not to say

Q5. When you began study at your university, were you?

- Married
- Living in a marriage-like relationship
- Widowed
- Separated
- Divorced
- Never Married

Q6. Not including yourself or spouse/partner, how many dependents (children or adults)

do you have?

Type number of children/ dependents: _____

Section B – EDUCATION INFORMATION

Q7. What degrees have you earned? (check all that apply)

□ BA
□ BS
□ MA
□ MS
□ MBA
□ Other (please specify)_____

Q8. At what university did you begin your doctoral studies? _____

Q9. When did you begin your doctoral studies at your university?

MM/YYYY_____

Q10. Did you attend orientation programs sponsored by the university/department/program?

- Yes
- No

IF ORIENTATION YES go to Q11. IF ORIENTATION NO, go to Q12.

Q11. Were the orientation programs effective in helping you to adjust to your doctoral studies

- Not at all Effective
- Somewhat Not Effective
- Neutral
- Effective
- Very Effective

Q12: Did you earn your Ed.D.?

- Yes
- No

IF NO, Go to Q14.

Q13. How long did it take you to complete your Ed.D. For calculation purposes, use the start date of your doctoral program?

IF TIME-TO-DEGREE COMPLETION ANSWERED, go to Q27.

Q14. If you discontinued your doctoral program, how far did you progress toward the completion of your doctoral degree at your university? (check all that apply)

□ Completed Coursework
□ Identified Dissertation Chair
□ Formed Dissertation Committee
□ Obtained IRB Approval
□ Completed Comprehensive Examination

Q15. – Q26. If you discontinued your doctoral program, why did you leave doctoral studies at your university? Please rate each of the following statements: **Likert Scale 1 – Likert Scale 7**

Q15. Could not afford to continue studies

Q16. Found doctoral studies too difficult

Q17. Demands on my family

Q18. Demands on my job

Q19. Program not to my liking

Q20. Disappointed with quality of program

Q21. Could not get approval for dissertation topic

Q22. Could not find the resources to complete my dissertation

Q23. Program did not fit my career goals

Q24.Change in career

Q25. Health Crisis

Q26. Other Reason(s): _____

Section C – WORK-LIFE-STUDY BALANCE

Q27. On average, how many hours were you working during your doctoral program?

- Below 20 hours/ week
- Between 20-30 hours/ week
- Between 31-40 hours/ week
- Over 40 hours/ week

Q28. On average, how many hours were you studying during your doctoral program?

- Below 20 hours/ week
- Between 20-30 hours/ week
- Between 31-40 hours/ week
- Over 40 hours/ week

Q29. On average, how many hours were your children in childcare?

- Below 20 hours/ week
- Between 20-30 hours/ week
- Between 31-40 hours/ week
- Over 40 hours/ week

Section D – PROGRAM INFORMATION

Q30. Did you participate in a doctoral cohort group?

- Yes
- No

IF COHORT YES, Go to Q30. IF COHORT NO, go to Q32

Q31. To what extent did the cohort group support your doctoral studies?

- Not supportive

- Somewhat not supportive
- Neutral
- Somewhat supportive
- Very supportive

Q32. Did you have a dissertation chair?

- Yes
- No

IF DISSERTATION CHAIR YES: Go to Q33. IF DISSERTATION NO: Go to Q39.

Q33 – Q38. Overall, how satisfied have you been with the interaction you have had with your dissertation chair on the following item:

Q33. Selection of dissertation topic

Q34. Selection of dissertation committee

Q35. Preparation of proposal

Q36. Conducting Dissertation research

Q37. Dissertation writing feedback and guidance

Q8. Accessibility of dissertation chair

Section D – The Community of Inquiry SURVEY

Q39. Considering your program in totality, please rate each of the following statements, where 1 represents the lowest rating and 10 represents the highest rating.

1. The instructors clearly communicated important course topics.

2. The instructors clearly communicated important course goals.
3. The instructors provided clear instructions on how to participate in course learning activities.
4. The instructors clearly communicated important due dates/ time frames for learning activities.
5. The instructors were helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.
6. The instructors were helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking
7. The instructors helped to keep course participants engaged and participating in productive dialogue
8. The instructors helped keep the course participants on task in a way that helped me to learn.
9. The instructors encouraged course participants to explore new concepts in this course.
10. Instructors' actions reinforced the development of a sense of community among course participants.
11. The instructors helped me to focus discussion on relevant issues in a way that helped me to learn.
12. The instructors provided feedback that helped me understand my strengths and weaknesses relative to the courses' goals and objectives
13. The instructors provided feedback in a timely fashion.

Q40. Considering your program in totality, please rate each of the following statements, where 1 represents the lowest rating and 10 represents the highest rating.

14. Getting to know each other course participants gave me a sense of belonging in the courses.
15. I was able to form distinct impressions of some course participants.
16. Online or web-based communication is an excellent medium for social interaction.
17. I felt comfortable conversing through the online medium.
18. I felt comfortable participating in the course discussions.
19. I felt comfortable interacting with other course participants.
20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.
21. I felt that my point of view was acknowledged by other course participants.
22. Online discussions help me to develop a sense of collaboration.

Q41. Considering your program in totality, please rate each of the following statements, where 1 represents the lowest rating and 10 represents the highest rating.

23. Problems posed increased my interest in course issues.
24. Course activities piqued my curiosity.
25. I felt motivated to explore content related questions.
26. I utilized a variety of information sources to explore problems posed in the courses.
27. Brainstorming and finding relevant information helped me resolve content related questions.
28. Online discussions were valuable in helping me appreciate different perspectives.
29. Combining new information helped me answer questions raised in course activities.
30. Learning activities helped me construct explanations/ solutions.
31. Reflection on course content and discussion helped me understand fundamental concepts in the classes.
32. I can describe ways to test and apply the knowledge created in the courses.
33. I have developed solutions to course problems that can be applied in practice.
34. I can apply the knowledge created in the courses to my work to other non-class related activities.

Q42.

35. Emotion was expressed when connecting with other students.
36. I felt comfortable expressing emotion through the online medium.
37. Expressing emotion in relation to expressing ideas was acceptable in the courses.
38. I found myself responding emotionally about ideas or learning activities in the courses.
39. The instructors acknowledged emotion expressed by students.
40. The instructors demonstrated emotion in online presentations and/ or discussions.

You are finished with the survey. THANK YOU!

Appendix B – Survey Instrument for Current Students

Q1. Survey Research Information Sheet (Informed Consent)

Q2. What is your current age?

- o Less than 30 years old
- o 30 – 39 years old
- o 40 – 49 years old
- o 50 – 59 years old
- o 60 years and older

Q3. What is your gender?

- o Male
- o Female
- o Transgender

Q4. How do you describe your primary ethnicity? (check all that apply)

- □ American Indian
- □ Asian
- □ Black or African American
- □ Hispanic
- □ Pacific Islander
- □ White
- □ Other (please specify) _____
- □ Prefer not to say

Q5. When you began study at your university, were you?

- o Married
- o Living in a marriage-like relationship
- o Widowed
- o Separated
- o Divorced
- o Never Married

Q6. Not including yourself or spouse/partner, how many dependents (children or adults)

do you have?

Type number of children/ dependents: _____

Section B – EDUCATION INFORMATION

Q7. What degrees have you earned? (check all that apply)

□ BA
□ BS
□ MA
□ MS
□ MBA
□ Other (please specify)_____

Q8. When did you begin your doctoral studies at your university?

Date (MM/YYYY) _____

Q9. At what university did you begin your doctoral studies?

_____

Q10. Did you attend a program orientation at your orientation?

- Yes
- No

IF ORIENTATION YES, go to Q11. IF ORIENTATION NO, go to Q12.

Q11. Were the orientation programs effective in helping you to adjust to your doctoral studies

- Not at all Effective
- Somewhat Not Effective
- Neutral
- Effective
- Very Effective

Q12. How far have you progressed toward the completion of your doctoral degree at your university? (check all that apply)

□ Completed Coursework

□ Identified Dissertation Chair

□ Formed Dissertation Committee

□ Obtained IRB Approval

□ Completed Comprehensive Examination

Section C – WORK-LIFE-STUDY BALANCE

Q13. On average, how many hours are you working during your doctoral program?

- Below 20 hours/ week
- Between 20-30 hours/ week
- Between 31-40 hours/ week
- Over 40 hours/ week

Q14. On average, how many hours are you studying during your doctoral program?

- Below 20 hours/ week
- Between 20-30 hours/ week
- Between 31-40 hours/ week
- Over 40 hours/ week

Q15. On average, how many hours are your children in childcare?

- Below 20 hours/ week
- Between 20-30 hours/ week
- Between 31-40 hours/ week
- Over 40 hours/ week

Section D – PROGRAM INFORMATION

Q16. Do you participate in a doctoral cohort group?

- Yes
- No

IF COHORT GROUP YES, go to Q17. IF COHORT GROUP NO, go to Q18.

Q17. To what extent has the cohort group supported your doctoral studies?

- Not supportive
- Somewhat not supportive
- Neutral
- Somewhat supportive
- Very supportive

Q18. Do you have a dissertation chair?

- Yes
- No

IF DISSERTATION CHAIR YES, go to Q19. IF NO, go to Q25.

Q19 – Q24. Overall, how satisfied have you been with the interaction you have had with your dissertation chair on the following item:

Q19. Selection of dissertation topic

Q20. Selection of dissertation committee

Q21. Preparation of proposal

Q22. Conducting Dissertation research

Q23. Dissertation writing feedback and guidance

Q24. Accessibility of dissertation chair

Section D – The Community of Inquiry Survey

Q25. Considering your program in totality, please rate each of the following statements, where 1 represents the lowest rating and 10 represents the highest rating.

1. The instructors clearly communicated important course topics.
2. The instructors clearly communicated important course goals.
3. The instructors provided clear instructions on how to participate in course learning activities.
4. The instructors clearly communicated important due dates/ time frames for learning activities.
5. The instructors were helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.
6. The instructors were helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking
7. The instructors helped to keep course participants engaged and participating in productive dialogue
8. The instructors helped keep the course participants on task in a way that helped me to learn.
9. The instructors encouraged course participants to explore new concepts in this course.
10. Instructors' actions reinforced the development of a sense of community among course participants.
11. The instructors helped me to focus discussion on relevant issues in a way that helped me to learn.
12. The instructors provided feedback that helped me understand my strengths and weaknesses relative to the courses' goals and objectives
13. The instructors provided feedback in a timely fashion.

Q26. Considering your program in totality, please rate each of the following statements, where 1 represents the lowest rating and 10 represents the highest rating.

14. Getting to know each other course participants gave me a sense of belonging in the courses.
15. I was able to form distinct impressions of some course participants.

16. Online or web-based communication is an excellent medium for social interaction.
17. I felt comfortable conversing through the online medium.
18. I felt comfortable participating in the course discussions.
19. I felt comfortable interacting with other course participants.
20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.
21. I felt that my point of view was acknowledged by other course participants.
22. Online discussions help me to develop a sense of collaboration.

Q27. Considering your program in totality, please rate each of the following statements, where 1 represents the lowest rating and 10 represents the highest rating.

23. Problems posed increased my interest in course issues.
24. Course activities piqued my curiosity.
25. I felt motivated to explore content related questions.
26. I utilized a variety of information sources to explore problems posed in the courses.
27. Brainstorming and finding relevant information helped me resolve content related questions.
28. Online discussions were valuable in helping me appreciate different perspectives.
29. Combining new information helped me answer questions raised in course activities.
30. Learning activities helped me construct explanations/ solutions.
31. Reflection on course content and discussion helped me understand fundamental concepts in the classes.
32. I can describe ways to test and apply the knowledge created in the courses.
33. I have developed solutions to course problems that can be applied in practice.
34. I can apply the knowledge created in the courses to my work to other non-class related activities.

Q28.

35. Emotion was expressed when connecting with other students.
36. I felt comfortable expressing emotion through the online medium.
37. Expressing emotion in relation to expressing ideas was acceptable in the courses.

38. I found myself responding emotionally about ideas or learning activities in the courses.
39. The instructors acknowledged emotion expressed by students.
40. The instructors demonstrated emotion in online presentations and/ or discussions.

You are finished with the survey. THANK YOU!

Appendix C – Survey Research Information Sheet

LINDENWOOD

Survey Research Information Sheet

You are being asked to participate in a survey conducted by Jeffrey Deckelbaum and Dr. Lynda Leavitt at Lindenwood University. We are doing this study to understand the factors affecting doctoral degree completion and informing future Ed.D. programs on best practices to prepare future scholarly practitioners with the knowledge and skills to lead transformational change. It will take about 10 minutes to complete this survey.

Your participation is voluntary. You may choose not to participate or withdraw at any time by simply not completing the survey or closing the browser window.

There are no risks from participating in this project. We will not collect any information that may identify you. There are no direct benefits for you participating in this study.

WHO CAN I CONTACT WITH QUESTIONS?

If you have concerns or complaints about this project, please use the following contact information:

Jeffrey Deckelbaum at 636-345-6834 or Jdeckelbaum@lindenwood.edu

Dr. Lynda Leavitt at 636-949-4756 or LLeavitt@lindenwood.edu

If you have questions about your rights as a participant or concerns about the project and wish to talk to someone outside the research team, you can contact Michael Leary (Director - Institutional Review Board) at 636-949-4730 or mleary@lindenwood.edu.

By clicking the appropriate link below, I confirm that I have read this form and decided that I will participate in the project described above. I understand the purpose of the study, what I will be required to do, and the risks involved. I understand that I can discontinue participation at any time by closing the survey browser. My consent also indicates that I am at least 18 years of age.

You can withdraw from this study at any time by simply closing the browser window.

Please feel free to print a copy of this information sheet.

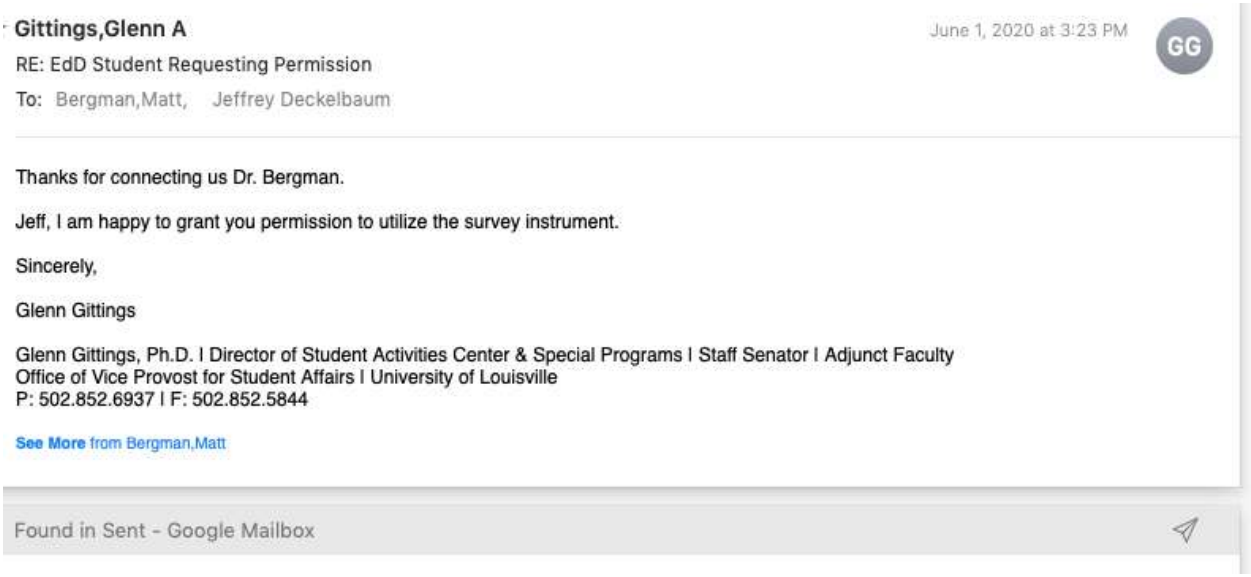
Link if you are a Current Ed.D. Student: Current Ed.D. Students

Link if you are a Former Ed.D. Student: Former Ed.D. Students

Appendix D – Permission to Use or Modify Existing Surveys and Adapting Figures

Permissions to Use Survey Instruments

Permission to use survey instrument from Gittings (2010)



Gittings,Glenn A June 1, 2020 at 3:23 PM

RE: EdD Student Requesting Permission

To: Bergman,Matt, Jeffrey Deckelbaum

Thanks for connecting us Dr. Bergman.

Jeff, I am happy to grant you permission to utilize the survey instrument.

Sincerely,

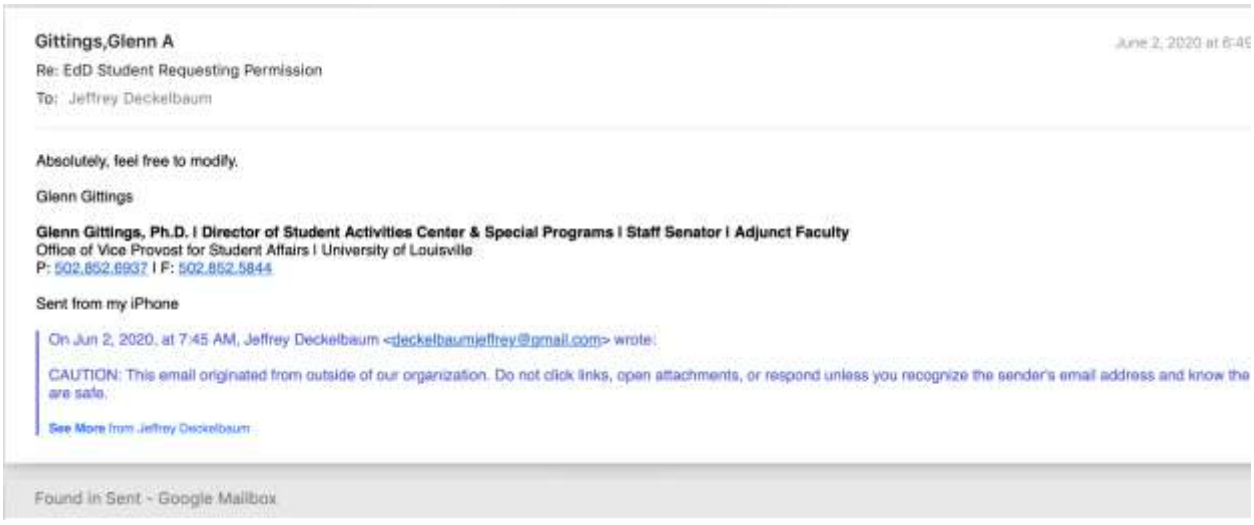
Glenn Gittings

Glenn Gittings, Ph.D. I Director of Student Activities Center & Special Programs I Staff Senator I Adjunct Faculty
Office of Vice Provost for Student Affairs I University of Louisville
P: 502.852.6937 I F: 502.852.5844

See More from Bergman,Matt

Found in Sent - Google Mailbox

Permission to modify survey instrument from Gittings (2010)



Gittings,Glenn A

Re: EdD Student Requesting Permission

To: Jeffrey Deckelbaum

Absolutely, feel free to modify.

Glenn Gittings

Glenn Gittings, Ph.D. I Director of Student Activities Center & Special Programs I Staff Senator I Adjunct Faculty
Office of Vice Provost for Student Affairs I University of Louisville
P: 502.852.6937 I F: 502.852.5844

Sent from my iPhone

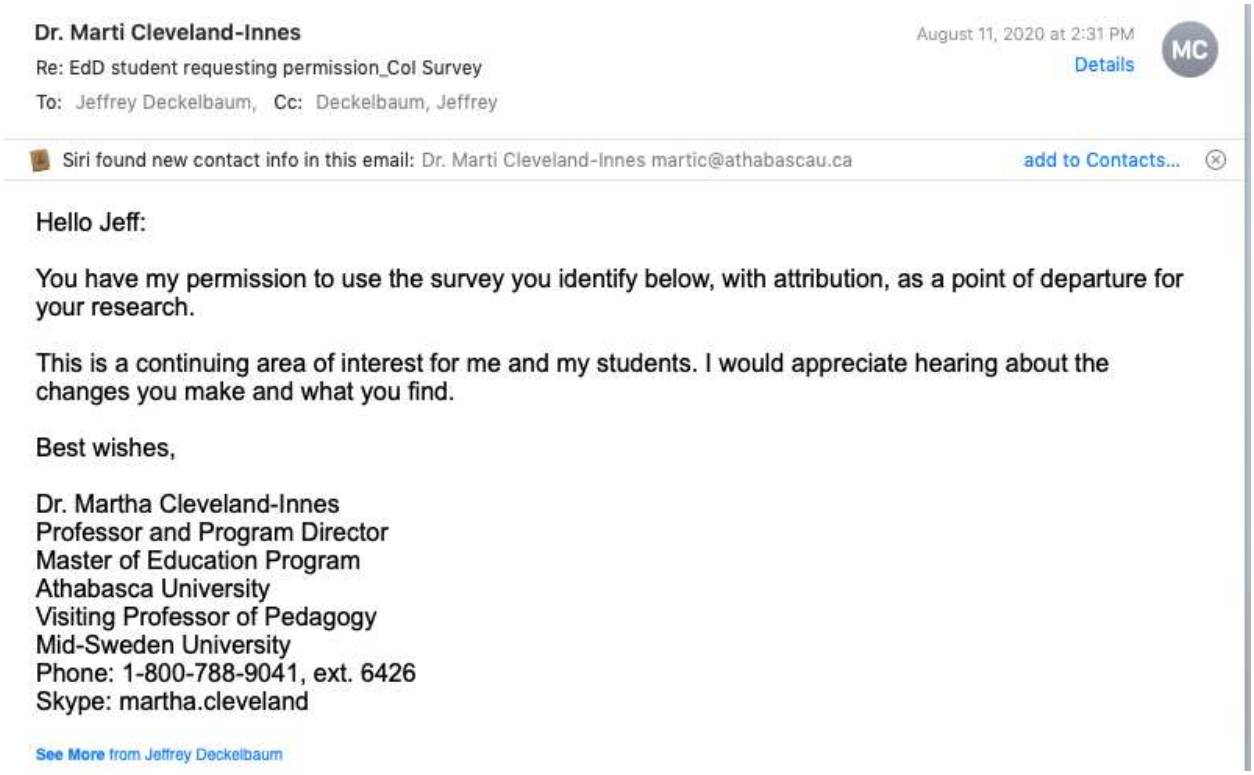
On Jun 2, 2020, at 7:45 AM, Jeffrey Deckelbaum <deckelbaumjeffrey@gmail.com> wrote:

CAUTION: This email originated from outside of our organization. Do not click links, open attachments, or respond unless you recognize the sender's email address and know the are safe.

See More from Jeffrey Deckelbaum

Found in Sent - Google Mailbox

Permission to use/ modify survey instrument from Cleveland-Innes & Campbell (2012)



Dr. Marti Cleveland-Innes
Re: EdD student requesting permission_CoI Survey
To: Jeffrey Deckelbaum, Cc: Deckelbaum, Jeffrey

August 11, 2020 at 2:31 PM
Details

MC

Siri found new contact info in this email: Dr. Marti Cleveland-Innes martic@athabascau.ca
add to Contacts...

Hello Jeff:

You have my permission to use the survey you identify below, with attribution, as a point of departure for your research.

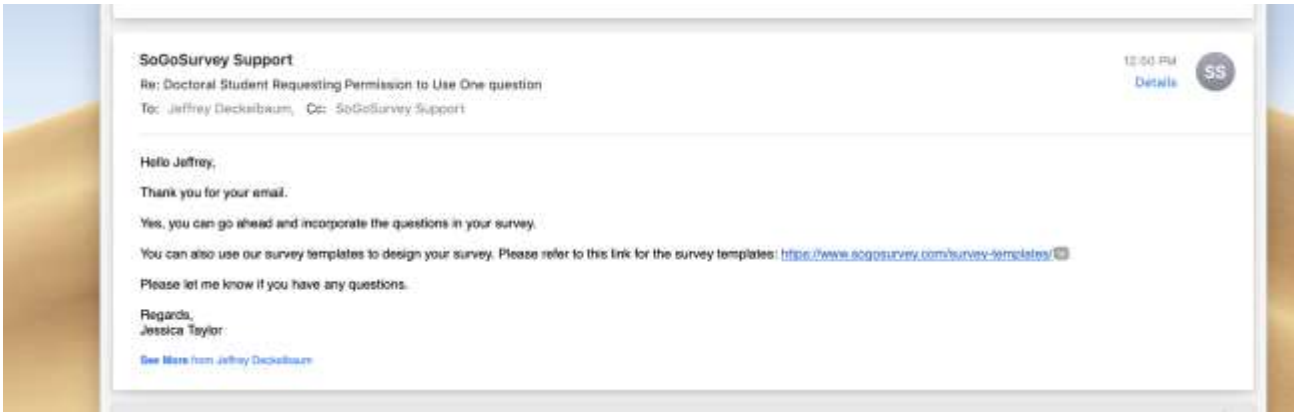
This is a continuing area of interest for me and my students. I would appreciate hearing about the changes you make and what you find.

Best wishes,

Dr. Martha Cleveland-Innes
Professor and Program Director
Master of Education Program
Athabasca University
Visiting Professor of Pedagogy
Mid-Sweden University
Phone: 1-800-788-9041, ext. 6426
Skype: martha.cleveland

See More from Jeffrey Deckelbaum

Permission to use and adapt SoGoSurvey (n.d.) questions



SoGoSurvey Support
Re: Doctoral Student Requesting Permission to Use One question
To: Jeffrey Deckelbaum, Cc: SoGoSurvey Support

Details

SS

Hello Jeffrey,

Thank you for your email.

Yes, you can go ahead and incorporate the questions in your survey.

You can also use our survey templates to design your survey. Please refer to this link for the survey templates: https://www.sogosurvey.com/survey-templates/

Please let me know if you have any questions.

Regards,
Jessica Taylor

See More from Jeffrey Deckelbaum

Permission to use the adaptation of the Community of Inquiry model.

Dear Jeffrey,

As the research and co-author of the following publication, you have my permission to use the research report on Emotional Analytics, including the adaptation of the Community of Inquiry model.

Rienties, B. and Alden Rivers, B. (2014) 'Measuring and understanding learners' emotions: evidence and prospects', Learning Analytics Review, Learning Analytics Community Exchange, Available: http://laceproject.eu/publications/learning-analytics-and-emotions.pdf

Best wishes,

Bethany Alden-Rivers

BETHANY ALDEN-RIVERS PhD

Associate Vice President for Institutional Effectiveness and Chief Assessment Officer

Office of Institutional Effectiveness

636.949.4737 (o) / 385.539.8128 (m) / balden-rivers@lindenwood.edu

Appendix E – Permission Email to Deans of Universities Requesting Permission to Survey Students

Dear Dean Jane Doe,

As a matter of introduction, my name is Jeff Deckelbaum, and I am an Ed.D. student at Lindenwood University in Saint Charles, MO. I am reaching out to seek your permission to survey former and current Ed.D. students for my dissertation research. The research population includes former students that completed and did not complete your university's online Ed.D. program, and students currently enrolled in the online Ed.D. program. One option for access to these two populations of students includes sending you a Lindenwood University IRB-approved message for informed consent with a link to surveys for both current and former students. This information can be distributed through your course management system or as you deem appropriate.

Through an extensive literature review, student persistence to doctoral degree completion due to high attrition levels has been and continues to be a significant problem in higher education. Thus, the purpose of the dissertation study is twofold:

1) Establish the factors related to persistence that lead to doctoral student attrition, and inform best practices and lessons learned to meet future scholarly-practitioner needs.
2) Develop a quantitative model to establish if statistical relationships exist between variables using the factors identified in the literature review to predict student persistence through degree completion in a three-year online Ed.D. program.

Your support, through online and anonymous survey feedback, will assist in answering these questions. I intend to survey between 25 and 40 universities that offer an online Ed.D. program predominately but not limited to the United States. The survey takes no more than 20 minutes to complete.

This study adds to the body of knowledge by developing a quantitative model that incorporates questions from the Community of Inquiry theoretical framework and focuses solely on online Ed.D. programs. Furthermore, the study could provide perspectives and insights to other higher education institutions having or planning to introduce professional doctoral programs to prepare scholarly practitioners.

Thank you for your consideration.

Jeff Deckelbaum

Appendix F – Social Media (LinkedIn and Facebook) Posts – Former Students

I am conducting a research study of online Education Doctorate Students (Ed.D.). The definition of "Online" means 80% or more of your coursework was or is delivered online. If you have been an Ed.D. student that (1) has completed and earned an Ed.D. degree or (2) started but did not finish the Ed.D. program, I would appreciate 10 minutes of your time to complete this survey. Your participation will help me:

1. Establish the factors related to persistence that lead to doctoral student attrition, and
2. Develop a quantitative model to predict student persistence through degree completion in online Ed.D. programs.

Your participation is voluntary and anonymous. You can choose to withdraw from the survey at any time by closing the browser window.

Please click on the link below if you are a former Ed.D. student. By clicking the link below, you confirm you have read this post and decided to participate in the survey.

Your feedback matters and is very important to my research.

If you have questions or concerns about this project, please email Jeff Deckelbaum at Jdeckelbaum@lindenwood.edu

Thank you!

#Ed.D. #EdD

Appendix G – Social Media (LinkedIn and Facebook) Posts – Current Students

I am conducting a research study of online Education Doctorate Students (Ed.D.). The definition of "Online" means 80% or more of your coursework was or is delivered online. If you are a student currently enrolled in an online Ed.D. program, I would appreciate 10 minutes of your time to complete this survey. Your participation will help me:

1. Establish the factors related to persistence that lead to doctoral student attrition, and
2. Develop a quantitative model to predict student persistence through degree completion in online Ed.D. programs.

Your participation is voluntary and anonymous. You can choose to withdraw from the survey at any time by closing the browser window.

Please click on the link if you are a current student. By clicking the link below, you confirm you have read this post and decided to participate in the survey.

Your feedback matters and is very important to my research.

If you have questions or concerns about this project, please email Jeff Deckelbaum at Jdeckelbaum@lindenwood.edu

Thank you!

#Ed.D. #EdD

Appendix H – CoI 34-Question Survey Descriptive Statistics

Table H1

Community of Inquiry Descriptive Statistics

	N	Mean	StdDev.	Skewness	Kurtosis
	Statistic	Statistic	Statistic	Statistic	Statistic
TP1	511	8.44	1.641	-1.508	2.929
TP2	511	8.54	1.654	-1.508	2.740
TP3	511	8.52	1.653	-1.458	2.248
TP4	511	9.19	1.287	-2.138	5.595
TP5	511	8.10	1.951	-1.357	1.843
TP6	511	8.27	1.779	-1.368	2.082
TP7	511	8.14	2.037	-1.479	2.076
TP8	511	8.09	2.034	-1.336	1.608
TP9	511	8.22	2.022	-1.372	1.557
TP10	511	8.07	2.173	-1.235	0.950
TP11	511	8.26	1.898	-1.438	1.970
TP12	511	8.09	1.994	-1.397	1.800
TP13	511	8.24	1.729	-1.627	3.183
SP1	511	7.89	2.537	-1.283	0.739
SP2	511	8.14	2.272	-1.537	1.869
SP3	511	6.77	2.554	-0.559	-0.658
SP4	511	7.92	2.299	-1.217	0.826
SP5	511	8.70	1.723	-2.082	5.490
SP6	511	8.69	1.746	-1.968	4.510
SP7	511	8.06	2.068	-1.293	1.401

Continued.

Table H1. Continued

SP8	511	8.42	1.830	-1.669	3.109
SP9	511	7.20	2.725	-0.877	-0.348
CP1	511	7.85	2.094	-1.188	1.245
CP2	511	8.03	1.956	-1.279	1.721
CP3	511	8.17	1.880	-1.420	2.298
CP4	511	8.56	1.712	-1.746	3.811
CP5	511	8.32	1.803	-1.460	2.373
CP6	511	7.30	2.588	-0.905	-0.166
CP7	511	8.27	1.795	-1.448	2.436
CP8	511	8.28	1.817	-1.584	3.068
CP9	511	8.30	1.884	-1.537	2.596
CP10	511	8.40	1.681	-1.496	2.863
CP11	511	8.47	1.740	-1.817	4.316
CP12	511	8.63	1.722	-1.831	4.105

N = 511. The skewness values exceeding |2.0| are shaded gray and will be addressed in the limitations section. All kurtosis values are less than |7.0| (Bandolas & Gerstner, 2016, p. 31).

Appendix I – Principal Component Analysis v. Principal Axis Factoring

The analysis in Appendix I compared Principal Components Analysis v. Principal Axis Factoring methods using a specified three-factor solution for the original 34 questions established by Arbaugh et al. (2008). The researcher used a combined former-current student database described in the literature with [n = 511] sample size. Table I1 and Table I2 depict Pattern Matrix comparative data:

Table I1

Pattern Matrix: Principal Component Analysis

	Component		
	1	2	3
TP8	**0.929**	-0.015	0.029
TP9	**0.902**	-0.013	0.045
TP6	**0.885**	0.009	-0.039
TP7	**0.867**	0.032	0.011
TP5	**0.858**	0.057	0.063
TP1	**0.851**	-0.051	-0.067
TP11	**0.839**	0.044	-0.057
TP2	**0.826**	-0.063	-0.070
TP3	**0.823**	0.028	0.051
TP10	**0.750**	0.053	-0.062
TP4	**0.742**	0.008	0.082
TP12	**0.741**	0.004	-0.113
TP13	**0.562**		-0.212
SP1	0.281	0.150	-0.267
SP4	-0.063	**0.962**	0.154

Table I2

Pattern Matrix: Principal Axis Factoring

	Factor		
	1	2	3
TP8	**0.946**	-0.019	0.053
TP6	**0.905**	0.004	-0.014
TP9	**0.900**	-0.012	0.057
TP7	**0.873**	0.032	0.031
TP11	**0.851**	0.042	-0.034
TP5	**0.842**	0.057	0.063
TP1	**0.841**	-0.053	-0.065
TP2	**0.807**	-0.062	-0.075
TP3	**0.781**	0.029	0.028
TP10	**0.741**	0.057	-0.050
TP12	**0.718**	0.007	-0.116
TP4	**0.667**	0.014	0.033
TP13	**0.525**	0.009	-0.218
SP1	0.287	0.148	-0.235
SP4	-0.069	**0.936**	0.148

Continued.

Table I1. Continued

SP9	0.028	**0.843**	0.019
SP3	0.061	**0.807**	0.111
CP6	-0.072	**0.699**	-0.141
SP6	0.030	**0.672**	-0.186
SP5	0.122	**0.663**	-0.108
SP7	0.021	**0.636**	-0.181
SP8	0.101	**0.598**	-0.185
CP4	-0.078	-0.041	**-0.916**
CP12	-0.041	-0.023	**-0.888**
CP11	-0.049	0.013	**-0.874**
CP3	0.060	-0.003	**-0.852**
CP9	-0.014	0.065	**-0.819**
CP10	0.015	0.058	**-0.819**
CP8	0.056	0.056	**-0.810**
CP5	0.065	-0.022	**-0.773**
CP7	0.054	0.153	**-0.759**
CP2	0.256	-0.040	**-0.717**
CP1	0.163	0.061	**-0.667**
SP2	0.151	0.168	-0.380

N = 511. Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. Variables equal to or greater than |.40| are bolded.

Table I2. Continued

SP9	0.026	**0.817**	0.020
SP3	0.059	**0.737**	0.078
SP6	0.038	**0.649**	-0.171
SP5	0.124	**0.637**	-0.101
CP6	-0.058	**0.633**	-0.153
SP7	0.035	**0.596**	-0.173
SP8	0.108	**0.568**	-0.175
CP4	-0.068	-0.035	**-0.885**
CP12	-0.038	-0.019	**-0.866**
CP3	0.050	-0.010	**-0.855**
CP11	-0.047	0.015	**-0.852**
CP8	0.044	0.052	**-0.811**
CP10	0.011	0.057	**-0.808**
CP9	-0.013	0.067	**-0.799**
CP7	0.038	0.148	**-0.764**
CP5	0.075	-0.012	**-0.736**
CP2	0.248	-0.048	**-0.717**
CP1	0.168	0.065	**-0.641**
SP2	0.174	0.166	-0.331

N = 511. Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization. Variables equal to or greater than |.40| are bolded.

Tables I2 and I3 compared the Correlation Matrices between Principal Component Analysis and Principal Axis Factoring. The correlation matrices, reflecting

correlations between factors, were slightly larger for Principal Axis Factoring than Principal Component Analysis.

Table I3

Correlation Matrix: Principal Component Analysis

Component	1	2	3
1	1.000	0.519	-0.691
2	0.519	1.000	-0.565
3	-0.691	-0.565	1.000

Note: Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Table I4

Correlation Matrix: Principal Axis Factoring

Factor	1	2	3
1	1.000	0.549	-0.721
2	0.549	1.000	-0.603
3	-0.721	-0.603	1.000

Note: Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Tables I5 and I6 compare the Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity parameters between Principal Component Analysis and Principal Axis Factoring methodologies.

Table I5

KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.963
Bartlett's Test of Sphericity	Approx. Chi-Square	17946.147
	df	561
	Sig.	0

Note. Principal Component Analysis.

Table I6

KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.963
Bartlett's Test of Sphericity	Approx. Chi-Square	17946.147
	df	561
	Sig.	0

Note. Principal Axis Factoring

Appendix J – Multiple Imputation Sensitivity Analysis

Appendix J summarized critical diagnostic information from Multiple Imputation Iteration 5, Iteration 11, and the Pooled Imputation Iteration. The Pooled Iteration, through SPSS, averaged the interval scale ratings. The four tables compared critical information between the three iterations. The Correlation Matrices and the initial factor analyses' diagnostic information reflected data from the initial extraction of five factors before specifying a reduced set of factors.

Table J1

Component Correlation Matrix (Imputation 5)

Component	1	2	3	4	5
1	1.000	0.366	-0.647	0.180	-0.471
2	0.366	1.000	-0.444	0.075	-0.492
3	-0.647	-0.444	1.000	-0.203	0.546
4	0.180	0.075	-0.203	1.000	-0.175
5	-0.471	-0.492	0.546	-0.175	1.000

Note. Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

Table J2

Component Correlation Matrix (Imputation 11)

Component	1	2	3	4	5
1	1.000	0.354	-0.647	0.197	-0.473
2	0.354	1.000	-0.432	0.089	-0.481
3	-0.647	-0.432	1.000	-0.219	0.547
4	0.197	0.089	-0.219	1.000	-0.182
5	-0.473	-0.481	0.547	-0.182	1.000

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

Table J3

Component Correlation Matrix (Pooled Imputation)

Component	1	2	3	4	5
1	1.000	0.357	-0.648	0.197	-0.473
2	0.357	1.000	-0.435	0.088	-0.482
3	-0.648	-0.435	1.000	-0.218	0.546
4	0.197	0.088	-0.218	1.000	-0.181
5	-0.473	-0.482	0.546	-0.181	1.000

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

Table J4

Imputation Iteration Comparative Data

	Imputation 5	Imputation 11	Pooled Imputation
KMO	0.963	0.963	0.963
Chi-Squared (Bartlett's)	17854.560	17910.362	17946.147
Bartlett's Test of Sphericity	$p < .001$	$p < .001$	$p < .001$
First Factor Variance, %	53.7	53.8	53.9
Variation Explained for eignevalues greater than 1.0	75.5	75.6	75.7

Note. [$n = 511$] for all imputation iterations. The three imputations bound combinations of a higher mean/ lower standard deviation, a lower mean/ higher standard deviation with the Pooled Imputation.

Thus, the researcher asserted no material difference existed between Imputation Iteration 5, Imputation Iteration 11, and the pooled imputation. Furthermore, the researcher argued the Pooled Imputation Iteration provided reliable and valid estimates for use in addressing the research questions and hypotheses statement associated with the modified Community of Inquiry survey responses.

Appendix K – CoI 40-Question Survey Descriptive Statistics

Table K1

Community of Inquiry Descriptive Statistics

	N	Mean	Std. Deviation	Skewness	Kurtosis
	Statistic	Statistic	Statistic	Statistic	Statistic
TP1	475	8.42	1.66	-1.520	2.932
TP2	475	8.52	1.68	-1.518	2.727
TP3	475	8.50	1.67	-1.448	2.209
TP4	475	9.18	1.29	-2.143	5.679
TP5	475	8.07	1.98	-1.358	1.786
TP6	475	8.25	1.81	-1.375	2.039
TP7	475	8.09	2.08	-1.451	1.916
TP8	475	8.05	2.06	-1.316	1.522
TP9	475	8.19	2.05	-1.353	1.466
TP10	475	8.00	2.20	-1.200	0.833
TP11	475	8.23	1.92	-1.423	1.918
TP12	475	8.08	1.99	-1.415	1.918
TP13	475	8.23	1.77	-1.599	3.000
SP1	475	7.84	2.56	-1.246	0.621
SP2	475	8.10	2.30	-1.489	1.672
SP3	475	6.84	2.55	-0.608	-0.591
SP4	475	7.99	2.29	-1.306	1.097
SP5	475	8.67	1.74	-2.068	5.428
SP6	475	8.66	1.77	-1.938	4.344

Continued.

Table K1. Continued.

SP7	475	8.03	2.09	-1.266	1.306
SP8	475	8.41	1.84	-1.663	3.093
SP9	475	7.29	2.70	-0.926	-0.241
CP1	475	7.80	2.13	-1.151	1.105
CP2	475	8.01	1.99	-1.260	1.598
CP3	475	8.16	1.91	-1.402	2.202
CP4	475	8.53	1.74	-1.742	3.713
CP5	475	8.31	1.83	-1.456	2.323
CP6	475	7.42	2.55	-0.996	0.059
CP7	475	8.26	1.83	-1.447	2.336
CP8	475	8.27	1.84	-1.583	3.019
CP9	475	8.29	1.91	-1.531	2.552
CP10	475	8.39	1.71	-1.483	2.767
CP11	475	8.44	1.77	-1.793	4.139
CP12	475	8.62	1.74	-1.838	4.127
EP1	475	7.29	2.55	-0.993	0.087
EP2	475	6.76	2.71	-0.673	-0.587
EP3	475	7.59	2.38	-1.067	0.407
EP4	475	6.55	2.61	-0.571	-0.620
EP5	475	6.97	2.70	-0.736	-0.493
EP6	475	6.39	2.81	-0.495	-0.906

N = 475. The descriptive statistics represent the 40 variables, which make up teaching, social, cognitive, and emotional presence. The analysis depicts the two skewness variables, TP4 and SP5, which exceed a threshold requirement of |2.0|.

Appendix L – Parallel Analysis

Table L1

Eigenvalues from SPSS and Parallel Analysis

	Eigenvalues	
Eigenvalue No.	SPSS	Parallel Analysis
2	3.319	1.560
3	2.374	1.510
4	1.942	1.470
5	1.332	1.430
6	0.872	1.390
7	0.736	1.350
8	0.677	1.320
9	0.603	1.290
10	0.533	1.260
11	0.489	1.230
12	0.463	1.210

Note. N = 475. Parallel analysis calculated using "SSPS, SAS, MATLAB, and R Programs for determining the number of components and factors using Parallel Analysis and Velicer's MAP test," by B. O'Connor (2000). https://people.ok.ubc.ca/brioconn/nfactors/nfactors.html

```
Run MATRIX

procedure:

PARALLEL ANALYSIS:

Principal

Components

Specifications for this Run:

Ncases    475

Nvars      40

Ndatsets  100

Percent    95
```

Syntax for analysis:

```
* Parallel Analysis program.


set mxloops=9000 printback=off width=80  seed = 1953125.

matrix.


* enter your specifications here.

compute ncases   = 500.

compute nvars    = 9.

compute ndatsets = 100.

compute percent  = 95.


* Specify the desired kind of parallel analysis, where:

  1 = principal components analysis

  2 = principal axis/common factor analysis.
```

```
compute kind = 2 .

****************** End of user specifications. ******************

* principal components analysis.
do if (kind = 1).
compute evals = make(nvars,ndatsets,-9999).
compute nm1 = 1 / (ncases-1).
loop #nds = 1 to ndatsets.
compute x = sqrt(2 * (ln(uniform(ncases,nvars)) * -1) ) &*
            cos(6.283185 * uniform(ncases,nvars) ).
compute vcv = nm1 * (sscp(x) - ((t(csum(x))*csum(x))/ncases)).
compute d = inv(mdiag(sqrt(diag(vcv)))).
compute evals(:,#nds) = eval(d * vcv * d).
end loop.
end if.

* principal axis / common factor analysis with SMCs on the diagonal.
do if (kind = 2).
compute evals = make(nvars,ndatsets,-9999).
compute nm1 = 1 / (ncases-1).
loop #nds = 1 to ndatsets.
compute x = sqrt(2 * (ln(uniform(ncases,nvars)) * -1) ) &*
            cos(6.283185 * uniform(ncases,nvars) ).
compute vcv = nm1 * (sscp(x) - ((t(csum(x))*csum(x))/ncases)).
compute d = inv(mdiag(sqrt(diag(vcv)))).
compute r = d * vcv * d.
compute smc = 1 - (1 &/ diag(inv(r)) ).
```

```
call setdiag(r,smc).
compute evals(:,#nds) = eval(r).
end loop.
end if.

* identifying the eigenvalues corresponding to the desired percentile.
compute num = rnd((percent*ndatsets)/100).
compute results = { t(1:nvars), t(1:nvars), t(1:nvars) }.
loop #root = 1 to nvars.
compute ranks = rnkorder(evals(#root,:)).
loop #col = 1 to ndatsets.
do if (ranks(1,#col) = num).
compute results(#root,3) = evals(#root,#col).
break.
end if.
end loop.
end loop.
compute results(:,2) = rsum(evals) / ndatsets.

print /title="PARALLEL ANALYSIS:".
do if   (kind = 1).
print /title="Principal Components".
else if (kind = 2).
print /title="Principal Axis / Common Factor Analysis".
end if.
compute specifs = {ncases; nvars; ndatsets; percent}.
print specifs /title="Specifications for this Run:"
 /rlabels="Ncases" "Nvars" "Ndatsets" "Percent".
```

```
print results /title="Random Data Eigenvalues"
 /clabels="Root" "Means" "Prcntyle"  /format "f12.6".


do if   (kind = 2).
print / space = 1.
print /title="Compare the random data eigenvalues to the".
print /title="real-data eigenvalues that are obtained from a".
print /title="Common Factor Analysis in which the # of factors".
print /title="extracted equals the # of variables/items, and the".
print /title="number of iterations is fixed at zero;".
print /title="To obtain these real-data values using SPSS, see the".
print /title="sample commands at the end of the parallel.sps program,".
print /title="or use the rawpar.sps program.".
print / space = 1.
print /title="Warning: Parallel analyses of adjusted correlation
matrices".
print /title="eg, with SMCs on the diagonal, tend to indicate more
factors".
print /title="than warranted (Buja, A., & Eyuboglu, N., 1992, Remarks
on parallel".
print /title="analysis. Multivariate Behavioral Research, 27, 509-
540.).".
print /title="The eigenvalues for trivial, negligible factors in the
real".
print /title="data commonly surpass corresponding random data
eigenvalues".
print /title="for the same roots. The eigenvalues from parallel
analyses".
```

```
print /title="can be used to determine the real data eigenvalues that
are".
print /title="beyond chance, but additional procedures should then be
used".
print /title="to trim trivial factors.".
print / space = 1.
print /title="Principal components eigenvalues are often used to
determine".
print /title="the number of common factors. This is the default in
most".
print /title="statistical software packages, and it is the primary
practice".
print /title="in the literature. It is also the method used by many
factor".
print /title="analysis experts, including Cattell, who often examined".
print /title="principal components eigenvalues in his scree plots to
determine".
print /title="the number of common factors. But others believe this
common".
print /title="practice is wrong. Principal components eigenvalues are
based".
print /title="on all of the variance in correlation matrices, including
both".
print /title="the variance that is shared among variables and the
variances".
print /title="that are unique to the variables. In contrast,
principal".
```

```
print /title="axis eigenvalues are based solely on the shared
variance".
print /title="among the variables. The two procedures are
qualitatively".
print /title="different. Some therefore claim that the eigenvalues from
one".
print /title="extraction method should not be used to determine".
print /title="the number of factors for the other extraction method.".
print /title="The issue remains neglected and unsettled.".

end if.
end matrix.

* Commands for obtaining the necessary real-data eigenvalues for
  principal axis / common factor analysis using SPSS;
  make sure to insert valid filenames/locations, and
  remove the '*' from the first columns.
* correlations var1 to var20 / matrix out ('filename') / missing =
listwise.
* matrix.
* MGET /type= corr /file='filename' .
* compute smc = 1 - (1 &/ diag(inv(cr)) ).
* call setdiag(cr,smc).
* compute evals = eval(cr).
* print { t(1:nrow(cr)) , evals }
 /title="Raw Data Eigenvalues"
 /clabels="Root" "Eigen."  /format "f12.6".
* end matrix.
```

Appendix M – Former EdD students Finished v. Not Finished

Table M1

Community of Inquiry Survey: Former Students Comparative Analysis

Former Students: Did Not Complete Ed.D			Former Students: Completed the Ed.D			
Descriptive Statistics			Descriptive Statistics			
	N	Mean		N	Mean	Mean Difference
TP1	11	7.09	TP1	196	8.40	1.31
TP2	11	7.27	TP2	196	8.47	1.20
TP3	11	7.36	TP3	196	8.57	1.20
TP4	11	8.27	TP4	196	9.26	0.98
TP5	11	7.18	TP5	196	8.05	0.86
TP6	11	7.09	TP6	196	8.31	1.22
TP7	11	7.09	TP7	196	8.08	0.99
TP8	11	6.73	TP8	196	8.08	1.35
TP9	11	6.64	TP9	196	8.18	1.55
TP10	11	5.55	TP10	196	8.14	2.60
TP11	11	5.73	TP11	196	8.29	2.56
TP12	11	6.00	TP12	196	8.12	2.12
TP13	11	6.64	TP13	196	8.19	1.56
SP3	10	4.30	SP3	196	6.49	2.19
SP4	10	7.50	SP4	196	7.72	0.22
SP5	10	7.50	SP5	196	8.77	1.27
SP6	10	7.70	SP6	196	8.87	1.17
SP7	10	6.50	SP7	196	8.34	1.84

Continued.

Table M1. Continued.

SP8	10	7.60		SP8	196	8.59	0.99
SP9	10	5.30		SP9	196	7.15	1.85
CP6	9	5.56		CP6	196	7.05	1.50
EP2	9	5.56		EP2	196	6.61	1.05
CP1	9	5.89		CP1	196	8.09	2.20
CP2	9	5.56		CP2	196	8.19	2.64
CP3	9	6.67		CP3	196	8.41	1.74
CP4	9	7.11		CP4	196	8.81	1.70
CP5	9	6.33		CP5	196	8.51	2.17
CP6	9	5.56		CP6	196	7.05	1.50
CP7	9	6.00		CP7	196	8.41	2.41
CP8	9	5.44		CP8	196	8.40	2.95
CP9	9	5.78		CP9	196	8.43	2.65
CP10	9	6.44		CP10	196	8.61	2.16
CP11	9	6.33		CP11	196	8.66	2.32
CP12	9	7.11		CP12	196	8.81	1.70
SP1	10	5.40		SP1	196	8.26	2.86
SP2	10	6.20		SP2	196	8.67	2.47
EP1	9	5.67		EP1	196	7.70	2.04
EP3	9	7.11		EP3	196	7.69	0.58
EP4	9	5.44		EP4	196	6.53	1.09
EP5	9	5.89		EP5	196	7.05	1.16
EP6	8	4.75		EP6	196	6.16	1.41

Note. The variables are grouped consistent with the Principal Component Analysis Pattern Analysis.

Appendix N: Time-to Degree

Figure N1.

Time-to-Degree Histogram (EdD Program Affiliated with CPED)

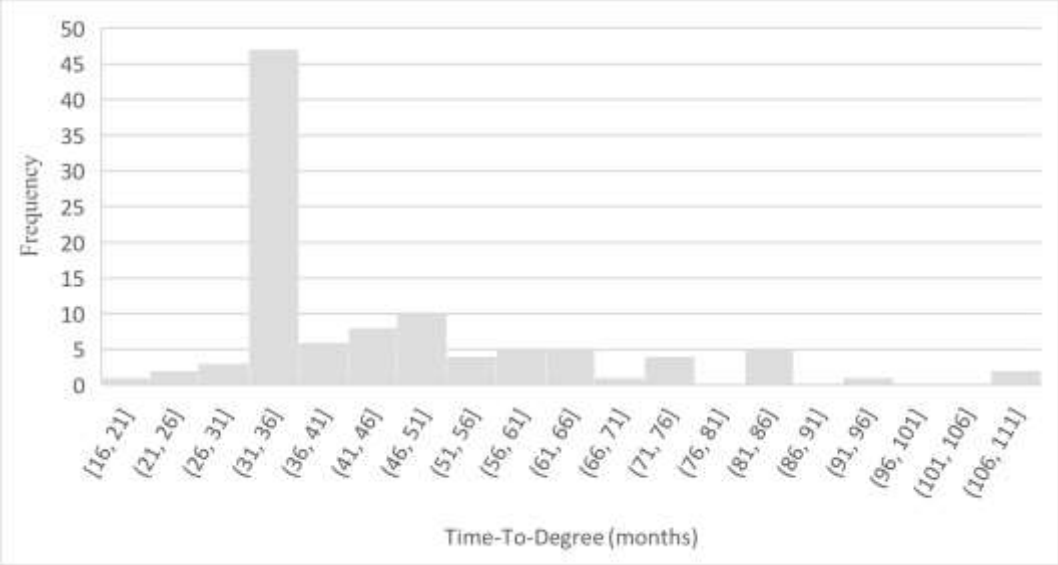
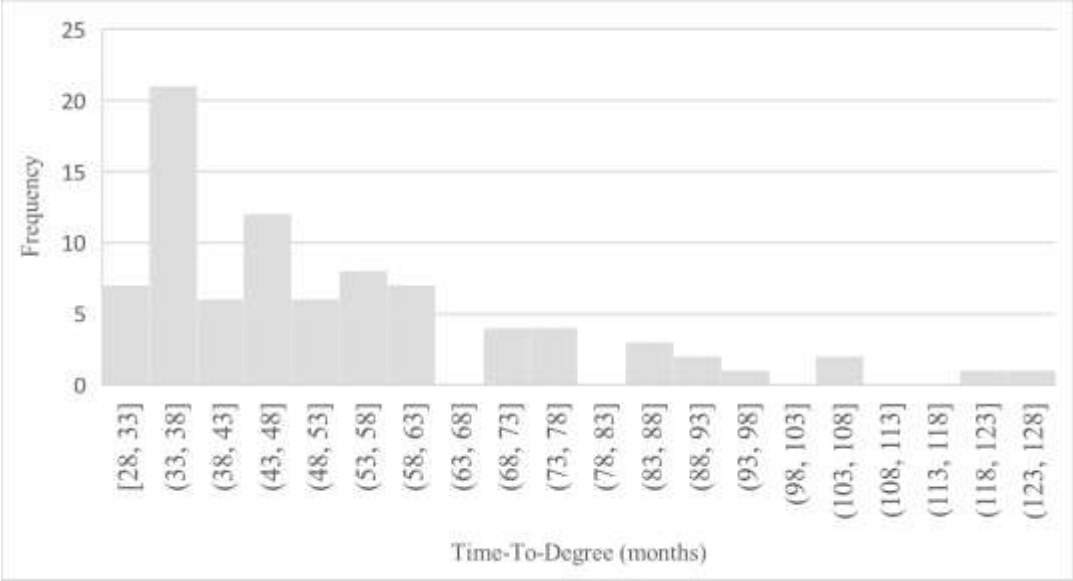


Figure N2.

Time to Degree Histogram (EdD Program Not Affiliated with CPED)



These two charts summarize the Shapiro-Wilk Test of Normality

Tests of Normality[a]

	Kolmogorov-Smirnov[b]			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
TimeToDegree_A	0.240	104	0.000	0.800	104	0.000	Reject

a. CPEDNumeric = CPED

b. Lilliefors Significance Correction

Tests of Normality[a]

	Kolmogorov-Smirnov[b]			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
TimeToDegree_A	0.155	85	0.000	0.866	85	0.000	Reject

a. CPEDNumeric = NoCPED

The Mann-Whitney Nonparametric test

Mann-Whitney Test

Ranks

CPEDNumeric		N	Mean Rank	Sum of Ranks
TimeToDegree_A	CPED	104	86.30	8975.00
	NoCPED	85	105.65	8980.00
	Total	189		

Test Statistics[a]

	TimeToDegree_A
Mann-Whitney U	3515.000
Wilcoxon W	8975.000
Z	-2.448
Asymp. Sig. (2-tailed)	0.014

a. Grouping Variable:

Reject Null Hypothesis

This chart shows:

a. The test for equal variances was not rejected, thus used equal variances for t-Test

b. Thus, the 95% Confidence Interval between Time to Degree completion between students whose EdD program affiliated with the CPED v. students whose EdD program did not affiliate with the CPED was [-12.68, -1.51] months. Interpreting those students whose EdD program affiliated with the CPED was between 1.5 and 13 months shorter than students whose EdD program did not affiliate with the CPED.

		Variances		t-test for Equality of Means						
									the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
TimeToDegree_A	Equal variances assumed	2.713	0.101	-2.507	187	0.013	-7.098	2.831	-12.683	-1.512
	Equal variances not assumed			-2.455	160.788	0.015	-7.098	2.891	-12.806	-1.389

Vitae

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SUMMARY

Currently enrolled in Lindenwood University's EdD Educational Leadership program to develop the knowledge and skills to become a scholar practitioner to solve the "wicked" problems facing higher education. Retired Engineering Executive, Adjunct Instructor, and Author with a passion and energy for people and students through continuous learning, diversity, inclusion, and ethical decision-making. Upon completing my doctoral program, I am committed to preparing the next generation of leaders through teaching and post-doctoral research opportunities.

QUALIFICATIONS

- Third-year EdD student; completed 42 credit hours-to-date with a 4.0 GPA.
- Adjunct Instructor teaching quantitative methods and statistics courses to undergraduate students; and participated in research and data analysis projects with Lindenwood University's Office of Institutional Effectiveness team members.
- Over 37 years of Aerospace Industry experience, including executive leadership positions, developing, building, testing, and providing post-delivery support of aircraft weapon systems for all United States military service branches and multiple international customers.

WORK EXPERIENCE

- Adjunct Instructor – Lindenwood University, College of Science, Technology and Health (August, 2021-present)
- Research and Survey Analyst – Lindenwood University, Office of Institutional Effectiveness (January 2020 – June 2020).
- Adjunct Instructor – Lindenwood University, School of Science (Jan 2016 – Dec 2019).
- The Boeing Company – Contract Hire/ Consultant (May 2014 – March 2015)
- RETIRED FROM THE BOEING COMPANY – November 2013 after 34 years of service
  - Vice President of Engineering, Boeing Defense Systems' (BDS): Military Aircraft Business Unit (Oct 2010 – Nov 2013)
  - Vice President of Engineering, Boeing Defense Systems' (BDS): Global Services and Support Business Unit (Jan 2006 – Oct 2010).
  - McDonnell Douglas/ Boeing: Held multiple positions of increasing responsibility in Engineering, Information Systems, Quality, and Manufacturing (November 1979 – December 2005)

EDUCATION

EdD Student – Lindenwood University, (Fall 2019 – December 2021 target date)
MBA – Washington University (1992 – 1994) – Executive Program
MS – Aerospace Engineering, San Diego St. University (1977 – 1979)

BS – Aeronautical and Astronautical Engineering, Purdue University (1973 – 1977)

HONORS/ AWARDS/ Other Achievements

Outstanding Aerospace Engineer – Purdue University (Sep 2013)
Author: The Guardian of Technical Excellence, Published May 2016