FACULTY PROVISIONS OF ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES IN HIGHER EDUCATION: AN ANALYSIS OF COMMUNITY COLLEGE FACULTY IN THE TRADITIONAL, HYBRID, AND ONLINE MATHEMATICS COURSE TEACHING ENVIRONMENTS

By

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To my mother, Susan Anne Staley Bergonzoni, whose courage in the face of a myriad of adversities and her unwavering love, faith, and support have inspired me every single day to strive for excellence. Thank you seems so insufficient for the woman who taught me that no matter the set of life’s circumstances one is dealt, the possibilities are limitless and dreams do come true. The collective lessons I've learned from my mother have fueled my journey toward attaining this doctoral degree. Never losing sight of the objective and a singular purpose, I will make a difference in the lives of others, just as she has made a difference in mine.
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>4</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>10</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>11</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>12</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>1 INTRODUCTION</td>
<td>14</td>
</tr>
<tr>
<td>Faculty Provisions of Accommodations and Students with Disabilities</td>
<td>14</td>
</tr>
<tr>
<td>Background Information of the Study</td>
<td>15</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>15</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>15</td>
</tr>
<tr>
<td>Purpose of Study</td>
<td>18</td>
</tr>
<tr>
<td>Research Questions</td>
<td>18</td>
</tr>
<tr>
<td>Methodology</td>
<td>19</td>
</tr>
<tr>
<td>Limitations</td>
<td>19</td>
</tr>
<tr>
<td>Organization of the Study</td>
<td>22</td>
</tr>
<tr>
<td>2 REVIEW OF THE LITERATURE</td>
<td>24</td>
</tr>
<tr>
<td>A Landscape of Mathematics Education: an Aerial View</td>
<td>27</td>
</tr>
<tr>
<td>Instructional Delivery Methods in Mathematics Education: Traditional, Online, &amp; Hybrid Courses</td>
<td>31</td>
</tr>
<tr>
<td>Barriers of Instruction, Services, &amp; Resources to Students</td>
<td>31</td>
</tr>
<tr>
<td>Attitudinal Barriers in Instructional Delivery</td>
<td>33</td>
</tr>
<tr>
<td>Conceptual Model: The Five C’s Model of Dropping Out</td>
<td>39</td>
</tr>
<tr>
<td>Chapter Summary</td>
<td>39</td>
</tr>
<tr>
<td>3 RESEARCH DESIGN AND METHODOLOGY</td>
<td>41</td>
</tr>
<tr>
<td>Instrument Development</td>
<td>42</td>
</tr>
<tr>
<td>Endorsement of the Study</td>
<td>44</td>
</tr>
<tr>
<td>Research Population</td>
<td>44</td>
</tr>
<tr>
<td>Florida Community College: The Survey Setting Landscape</td>
<td>45</td>
</tr>
<tr>
<td>Mathematics Faculty</td>
<td>46</td>
</tr>
<tr>
<td>Students with Disabilities</td>
<td>46</td>
</tr>
<tr>
<td>Survey Instrument</td>
<td>47</td>
</tr>
<tr>
<td>Administration of Survey Instrument</td>
<td>50</td>
</tr>
<tr>
<td>Data Analysis Procedures</td>
<td>51</td>
</tr>
<tr>
<td>Results</td>
<td>52</td>
</tr>
<tr>
<td>Chapter Summary</td>
<td>52</td>
</tr>
</tbody>
</table>
4 RESULTS ................................................................................................................................. 54

Survey Findings ....................................................................................................................... 54
  Research Question One ........................................................................................................... 55
  Research Question Two ......................................................................................................... 57
  Research Question Three ...................................................................................................... 61
Chapter Summary ................................................................................................................... 65

5 SUMMARY OF DISCUSSIONS, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS .......................................................... 71

Discussion of Conclusions ......................................................................................................... 72
  Research Question One .......................................................................................................... 72
  Research Question Two ......................................................................................................... 73
  Research Question Three ...................................................................................................... 73
Strategies & Intervention in the Instructional Delivery Environments .................................... 74
The 5 C’s Model ......................................................................................................................... 75
  Care ....................................................................................................................................... 75
  Connect ................................................................................................................................. 76
  Climate .................................................................................................................................... 77
  Control .................................................................................................................................... 78
  Curriculum ............................................................................................................................. 79
Implications of Study .................................................................................................................. 80
Recommendations for Future Research .................................................................................... 83
Chapter Summary ................................................................................................................... 84

APPENDIX

A MATHEMATICS TEACHING ENVIRONMENTS AND STUDENTS WITH DISABILITIES SURVEY ................................................................. 88

B ENDORSEMENT OF STUDY LETTER .................................................................................. 91

C DEVELOPMENTAL MATHEMATICS SURVEY INVITATION .................................................. 95

D COLLEGE LEVEL MATHEMATICS SURVEY INVITATION .................................................. 96

E DEVELOPMENTAL MATHEMATICS FOLLOW- UP PAPER SURVEY REMINDER ................................................................. 97

F DEVELOPMENTAL MATHEMATICS FOLLOW UP PAPER SURVEY REMINDER ................................................................. 99

G KEY DEFINITIONS ................................................................................................................ 101

LIST OF REFERENCES .............................................................................................................. 105

BIографИческИЙ скетч ............................................................................................................... 110
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-1</td>
<td>Survey results</td>
<td>67</td>
</tr>
<tr>
<td>4-2</td>
<td>Differences in accommodations by years of experience, online experience,</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>and number of students with disabilities</td>
<td></td>
</tr>
<tr>
<td>4-3</td>
<td>Differences in accommodations by type of instruction</td>
<td>69</td>
</tr>
<tr>
<td>4-4</td>
<td>Provisions of accommodations by years of experience, online experience,</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>and number of students with disabilities</td>
<td></td>
</tr>
<tr>
<td>4-5</td>
<td>Provide accommodations by type of instruction</td>
<td>70</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-1</td>
<td>Disabilities Resource Center (DRC) student population snapshot</td>
<td>87</td>
</tr>
</tbody>
</table>
Abstract of Dissertation Presented to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

FACULTY PROVISIONS OF ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES IN HIGHER EDUCATION: AN ANALYSIS OF COMMUNITY COLLEGE FACULTY IN THE TRADITIONAL, HYBRID, AND ONLINE MATHEMATICS COURSE TEACHING ENVIRONMENTS

By

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The purpose of this exploratory descriptive study was to examine the mathematics faculty provisions of accommodations for students with disabilities within a Florida Community College. Both developmental and college level mathematics courses were included in this study. This study examined courses taught in the traditional, hybrid, and online deliveries of instruction. Also, the type of instruction taught by the mathematics faculty was examined. Finally, the mitigating factors for providing reasonable accommodations to this particular student population were identified, and a possible intervention model for consideration is offered.

The sample population for this study consisted of mathematics faculty members within a Florida Community College as listed in the Crystal Reporting database as having taught developmental and/or college level mathematics in the 2009-2010 academic year (summer, fall, spring). As a result, 79 faculty responses were collected. In total, 34 participants completed the Mathematics Teaching Environments and Students with Disabilities Survey.
The survey results suggest that (a) the lack of item response from the mathematics faculty regarding the survey responses received are a limitation to the study, (b) the faculty attitudes and perceptions surveyed may impact how faculty teach students with disabilities, (c) both faculty populations display a barrier (i.e., disconnect) regarding the number of students who are self-identified as having disabilities and those numbers actually reported, and (d) the faculty responses received suggest training is a crucial component missing in addressing accommodations needs of students. Finally, the 5 C’s Model of dropping out (Repetto, Cavanaugh, Wayer, & Liu, 2010) is presented as a potential intervention model for students with disabilities in higher education.

This study illuminates an intervention model that should be considered. Additionally, the study suggests the faculty’s need for training regarding provisions of accommodations for students is necessary, regardless of the type of delivery of instruction utilized. With effective training, those working in administration, student affairs, and academic affairs can continue to "close of the loop" for students with disabilities, and at-risk students can be identified.
CHAPTER 1
INTRODUCTION

Faculty Provisions of Accommodations and Students with Disabilities

The purpose of this study was to examine the mathematics faculty provisions of accommodations for students with disabilities within a Florida Community College in higher education. A number of students with disabilities are self-identifying with the Disabilities Resource Center (DRC) as having learning disability diagnoses, which impact the subject area of mathematics. This potentially affects a student's academic performance, and, in turn, the retention rates of students successfully completing their math course sequences can be jeopardized. Therefore, it is crucial for all levels of mathematics faculty and their students to benefit from a broader base of knowledge related to this population; however, the online type of instruction offered may require a certain level of skill and training in order to effectively deliver reasonable accommodations and support to the students who may receive them. Last, this study examines what mitigating factors mathematics faculty may have that could inform how they provide the reasonable accommodations required in order to provide the necessary access (as determined by law) and to effectively serve this population of students. Also presented are recommendations and interventions for fostering a more collaborative partnership between academic and student affairs in order to effectively serve this population of students. Implications for future research are also discussed. Chapter 1 explains the purpose and significance of the study, introduces the research questions and methodology, and defines key terms.
Background Information of the Study

The problem addressed within this study is the faculty provisions of accommodations for students with disabilities within a Florida Community College in higher education. A literature review examining attitudinal barriers and perceptions revealed the following:

- Definition of a disability by law (Bento, 1996; Colbridge, 2000).
- Definition of the term "reasonable accommodation" (Colbridge, 2000).
- Definition of the term “attitudinal barriers” and perception of students with disabilities (Bento, 1996).
- Discussion of the attitudes and perceptions of students with disabilities and faculty (Soder, 1994; Bento, 1996).
- Discussion of the attitudes and perceptions of students with disabilities and peers (Bento, 1996).

Significance of the Study

A faculty member’s understanding of the various types of instructional deliveries and examination of the provisions of accommodations provided are essential for students with disabilities. However, a review of the literature revealed that minimal research addresses the attitudes, beliefs, and perceptions of faculty—this often presents as a barrier (i.e., disconnect) for students with disabilities and the impact may impede the student in teaching environments.

Statement of the Problem

The problem addressed within this exploratory study led to the examination of the mathematics faculty provisions of accommodations for students with disabilities within a Florida Community College in higher education. Students with disabilities, as identified by the DRC comprise the largest growing student minority within the United States.
In addition, a greater number of students with disabilities are pursuing a variety of postsecondary education programs. Thus, between the years of 1998 and 2000, students with disabilities attending four-year universities and colleges averaged 6% to 8% of the student population (Henderson, 2001, as cited in Stodden, 2006).

Despite this positive indicator of improving access to students with disabilities within the higher education environment, students face several transition-related issues as they plan and prepare and subsequently enroll in college. Not only must students be academically prepared for higher education, students with disabilities carry additional responsibilities and accountabilities with respect to presenting documentation of a disability in order to be eligible for accommodations and services, assessment information, programming, advocacy, decision-making, and transition once they enter college (Brinckerhoff, McGuire, & Shaw, 2002, as cited in Stodden, 2006).

Once in college, students with disabilities must, for the first time, request from faculty the necessary accommodations, services, and support for each class in which they are enrolled; work with individual faculty to implement the reasonable accommodations as assigned; manage their academic studies; and communicate to a variety of constituents about the necessary accommodations, services, and support they may be eligible to receive. What is all too often the case, however, is that students are identified as at being “at risk,” rendering them unable to maintain their academic studies and resulting in limited numbers of students completing their programs (Stodden 2006). Several mitigating factors can contribute to low retention and completion rates. In many instances, students with disabilities are hindered or overwhelmed as a result of varied or limited support services or advocates, as well as a large student-instructor
ratio, for which they may not be accustomed due to the low classroom ratios they may have been afforded in their high school experiences. All of these contributory factors may lead to such students’ unique needs going unrecognized, resulting in limited direct student-instructor contact (Brinkerhoff, 1994; Stodden, 2001, as cited in Stodden, 2006).

One specific issue that significantly impacts students’ experiences in college is the limited and often varying amounts of services and supports available on campus. Disabilities Resource Center providers across the nation are often faced with providing specialized services to meet increased demand for these services. In addition, the range of services and supports offered by postsecondary education institutions is still relatively new and not well known by university faculty, staff, and administrators (Getzel, Stodden, & Briel, 2001, as cited in Stodden, 2006). As a result, faculty and other stakeholders may find it difficult and challenging to accommodate students simply because they lack an understanding of students’ needs or familiarity with campus resources and services that are provided, much less how to execute them (Stodden, 2006). Furthermore, the heavy workload and demand of many disability service providers (DSPs) present significant barriers to students seeking and securing services (McGuire, Scott, & Shaw, 2003, as cited in Stodden 2006).

As a result of the multitude of factors mentioned above, the need for academic accommodations, service academic adjustments, resources, and services are being assigned to a wide array of students with disabilities in higher education. While there are many reasons that could be responsible for this increase in student services with respect to this study, this shift is due to two primary reasons:
1. Students are indeed aware and, thus, are more knowledgeable of the self-identifying process necessary to become eligible to receive academic accommodations and services offered at the postsecondary level.

2. Students are finding themselves with repeated attempts and difficulties related to the subject area of mathematics, present in both the developmental and college level mathematics courses.

**Purpose of Study**

The purpose of this exploratory study was to examine a Florida Community College’s faculty provisions of accommodations for students with disabilities enrolled in developmental and college level mathematics courses. This required an examination of the mathematics faculty in the traditional, hybrid, and online mathematics courses taught within a Florida Community College. The types of instruction, the provisions of accommodations provided to students with disabilities, and the mitigating factors that may exist were examined. The mitigating factors included faculty experience, online years of teaching, number of students with disabilities, types of instruction related to providing for students with disabilities, and access to reasonable accommodations for students in the teaching environments within a Florida Community College.

**Research Questions**

Three research questions were examined in this study. They are as follows:

1. What are the types of instruction delivered by mathematics faculty within a Florida Community College?

2. What are the provisions of accommodations provided to students with disabilities in higher education of mathematics faculty within a Florida Community College?

3. What are the potential mitigating factors, such as faculty experience, online years of teaching, number of students with disabilities, and types of instruction for developmental and college level mathematics courses that may be related to providing students with disabilities access to reasonable accommodations as assigned (extended time on exams or extended time and additional classroom accommodations) in either teaching environment?
Methodology

A quantitative survey was designed to address the research questions. The survey instrument, initially developed as an original online survey, was created and disseminated to the mathematics faculty. The survey was monitored, and the method of face validity was incorporated throughout the research process. Associate Professor Dr. Jeanne Repetto, faculty member with the University of Florida’s College of Special Education, served as the overseeing supervisor for the Institutional Review Board (IRB) approval. Through the process of multiple discussions via telephone, emails, and face validity, the integrity of this study remained intact. The survey instrument, named the Mathematics Teaching Environments and Students with Disabilities Survey, was created and distributed to the mathematics faculty sample population as determined by the Crystal Reporting database (Appendix A).

During the fall 2011 semester, the survey instrument (Appendices C and D) was emailed to the identified mathematics faculty, which included the developmental (MAT 0002, MAT 0020, and MAT 0024) and college level mathematics (MAT 1033, MAC 1105, and Non-Algebra courses) faculty listed in the Crystal Reporting database or in the Florida’s Community College Directory. The survey instrument was first made available through Survey Monkey®, a Web-based application. Respondents entered all responses electronically. The types of inventories utilized to measure the items on the survey instrument were categorical responses (for demographic data), dichotomous responses (i.e., yes and no), and open-ended, free-response questions.

Limitations

The study was limited to individual faculty members identified as teaching during the 2009-2010 academic year. The participants were pulled from the Crystal Reporting
In addition, only a select group of mathematics faculty members were included. Furthermore, the participants were contacted only if they had been identified as having taught the following developmental and college level mathematics courses: MAT 0002, MAT 0020, MAT 0024, MAT 1033, MAC 1105, and Non-Algebra courses. The participants were also limited to those who had a valid email address listed in the Crystal Reporting database and the Florida’s Community College Directory. Not every faculty member could be contacted successfully. This is due to varied reasons, such as high employee turnover and undeliverable email addresses, and some faculty had retired from the institution at the time the data was requested. The results of this study, therefore, are only a snapshot of the mathematics faculty serving in that capacity during the summer 2009 and spring 2010 semesters. This population has since changed over time, with the addition of more sections of online and hybrid courses. Because of these factors, the responses collected may not generalize over time.

Information from this exploratory descriptive study was drawn from the collective mathematics individual faculty responses. The study was designed to be completed electronically, and multiple attempts were made to secure a maximum number of responses for the purposes of data collection, but it was evident quite quickly that a limited scope of control was possible with respect to the response rate received. In addition, the request of the Crystal Reporting database results was directly dependent upon the following factors:

- A supervisory request for the data results was required.
- The Community College’s Internet Technology Services (ITS) staff, responsible for processing the specified data and criteria, requested an effort to protect the internal validity of the study.
As a result of the factors presented above, the timing of the study itself, given the internal organization processes, may be a contributory factor and, therefore, is presented as a limitation to this study (Appendix B).

Another important limitation is the institution itself and its academic calendar, as well as the faculty members’ outside obligations. The initial mathematics faculty survey notifications were sent electronically and were administered toward the end of the Fall 2011 term upon receipt of the Crystal Reporting database results. This may have resulted at a time when the mathematics faculty were either preparing for personal leave or were only holding adjunct positions at the Community College. The scope of responsibilities would have been expected to decrease when follow-up emails were sent to the respective identified faculty population to complete the survey in the beginning of the spring 2012 term (Appendices C and D). Due to the individual faculty members’ scheduling commitments, this may have prohibited some of them from successfully completing the survey.

Another contributing limitation may be the faculty members’ years of service to the college. Some senior faculty members may not have completed the electronic survey simply due to comfort level—they may have been less proficient with technology than their newer faculty counterparts, who were perhaps more accustomed to using electronic formats of communication.

Finally, it is important to recognize that although some of the survey results did not appear to be statistically significant, this may be a limitation of the sample size collected. It is probable that with a larger sample size, the p-value would be smaller. An assumption has been made that the mathematics faculty who participated in the
study responded honestly and fairly due to the efforts taken to protect the anonymity and the delivery methods of those responses collected. The open-ended responses to questions regarding disability, self-identification, attitudes, barriers to instruction, and difference in accommodation provided relative to teaching platforms were subject to individual bias, attitudes, and self-perception.

**Organization of the Study**

A review of the literature was conducted regarding the history of students with disabilities in higher education, attitudinal barriers, beliefs, and perceptions of faculty. In addition, the unique tenets of traditional, hybrid, and online teaching environments for Community College mathematics faculty and the provisions of accommodations provided were closely examined and considered at the time this study was conducted. A glossary of terms was also carefully constructed (Appendix G). Finally, shifts in teaching expectations were taken into account for the hybrid courses of both the developmental and college level mathematics. Therefore, a discussion of the landscape of mathematics education; instructional delivery methods; barriers identified for the types of instruction utilized; and the attitudinal barriers, perceptions, and beliefs that may exist in the instructional delivery was essential to this research. Finally, the conceptual framework that can be applied toward this study is introduced toward the end of Chapter 2. A chapter summary is also included at the end of each chapter. Chapter 3 contains an explanation of the research design and methodology (i.e., the data collection and data analysis procedures used in this study). Chapter 4 contains the findings from the data analysis. Chapter 5 includes a discussion of conclusions, an in-depth summary of the study’s research questions, discussion of the conclusions, implications of the findings, limitations of the study, and a more detailed discussion of
recommendations with possible strategies and interventions. Finally, recommendations for future research are discussed as a result of this study.
CHAPTER 2
REVIEW OF THE LITERATURE

The Americans with Disabilities Act (ADA, 1990) and the ADA Amendments Act (AADA, 2008) expanded the vision of more accessible education for diverse students to include a variety of categorical disabilities (Appendix G). Students with disabilities are a unique minority population of students who may require faculty and administration to examine and be sensitive to their additional needs, to maintain a working knowledge of the mechanisms of support available, and to understand the critical issues that may impact the structure of the teaching and learning environment. In fact, students with disabilities are now the largest unrepresented population in the United States (Paul, 2000). As such, it is imperative to create collegiate environments that are accessible for this population. According to Paul (2000):

Time and circumstances have proven strong modifiers of higher educational organizations, which now have become more focused on extended educational opportunities and career development issues. This expanded ‘vision’ also has brought an increasingly diverse student body, more extensive curricula, and a greater range of education-related activities and services (p. 200).

Of equal importance are those higher education institutions, specifically community colleges, that have seen dramatic increases in the number of students enrolling in developmental education courses, most prevalently in developmental mathematics courses (Knapp, 2005; National Center for Education Statistics, 1991; Parsad & Lewis, 2003). Developmental courses are defined as non-college credit preparatory courses for students who fall short of the standard entry requirements for college credit courses. Developmental mathematics courses are precursory courses for the general education mathematics courses (i.e., Intermediate Algebra and College Algebra), requiring some students to take one to three courses, or to make several
attempts at the same course, before they are ready to move into the college level courses required for their intended course of study. Unfortunately, research indicates that the passing rates for students enrolled in developmental mathematics courses have decreased nationally (Bailey, Jeong, & Cho, 2009; Gerlaugh, Thompson, Boylan, & Davis, 2007). With decreasing budgets and increased accountability measures, institutions have begun to review the effectiveness of their developmental education programs by examining the passing rates of students within the spectrum of mathematics courses in tandem with students' persistence toward completing their educational goals. Some researchers (Bellanca, 1998; Smittle, 2003; Wolford, 1996) have maintained that in order to successfully increase student success in developmental courses, instructors should be cognizant of their students’ learning styles and incorporate teaching strategies to demonstrate for students how best to study. This increases the likelihood of student success in developmental mathematics (Bellanca, 1998; Smittle, 2003; Wolford, 1996). Other research has documented the importance of outside-the-classroom services, such as tutoring and advising, for students in developmental education programs (Gerlaugh et al., 2007). Students with disabilities are no exception to this recommended practice; consequently, such students have additional needs and issues that arise in the educational environment. Postsecondary institutions have a responsibility to provide appropriate and reasonable accommodations for students with disabilities as defined by the ADA (1990) and the AADA (2008) (Appendix G) once students self-identify at their respective universities or collegiate settings as having disabilities. The challenge for these institutions lies within technology advancement and the varied methods of service delivery provided. This, in
turn, can potentially impact how accommodations and services are effectively communicated and offered to students with disabilities. Thus, this exploratory descriptive study examines the mitigating factors that can contribute to the success or failure of students with disabilities as they are taught a mathematics sequence of courses in the pursuit of their academic goals and degree attainment. This includes, but is not limited to, developmental and college level mathematics courses taught in the traditional, hybrid, and online environments. The curriculum can be executed in a variety of methods, including the hybrid and totally online curriculum instruction. This study defines traditional and online environments in the same context as the United States Department of Education (ED, 2010) report on online learning. The report describes traditional courses as “face-to-face instruction” while online learning is defined as “learning that takes place partially or entirely over the Internet” (p. 30). For the purposes of this study, the online environment will be divided into two categories: totally online with no face-to-face components and online learning where components are combined with face-to-face learning—often referred to as hybrid or blended courses.

In summary, this exploratory descriptive study critically examined the issues concerning students with disabilities. The issues included the scope of instructional environments (i.e., delivery in traditional, online, and hybrid or blended courses); barriers to the accommodations, services, and resources that may be offered to students; the role that advocacy plays for students and their faculty members; and the scope of responsibilities and measures of accountability required by both faculty and students.
A Landscape of Mathematics Education: an Aerial View

An alarming and increasing trend in higher education is the growing percentage of students needing developmental courses in English, mathematics, and reading. To illustrate this point, Bailey et al. (2009) found that more than half of community college students enroll in at least one developmental education course during their tenure in college. Typically, students are referred to and placed in developmental education courses through assessment and advising procedures. Once students are notified of their need to take developmental coursework, they have the option of taking courses in a variety of formats—traditional, online, and hybrid or blended. Historically, developmental education arose out of demand for a more skillful workforce by the business community. The document *A Nation at Risk* (National Commission on Excellence in Education, 1983) indicated a demonstrated need for a more rigorous coursework beyond high school education to increase the number of students attending college. In the early 1980s, a little more than 10% of students in high school took college preparatory curriculum. In the 1990s, almost 30% of high school students took college preparatory curriculum (Boylan, 1999). The numbers continually increased with a little more than 50% taking college preparatory curriculum 30 years after *A Nation at Risk* was published. However, changes in high school curriculum and instruction have resulted over the last two decades in an increased need for developmental courses at community colleges and universities. Furthermore, advances in technology and changes in the skill sets needed in business and industry have created an increased demand for college-level coursework.

Demographically speaking, students enrolled in developmental courses are a diverse population. Both traditional and non-traditional students can be seen in
developmental courses. Traditional students are defined as students ages 18 to 25 entering college after graduating from high school. Non-traditional students are typically students who are returning from the workforce to acquire additional skills, or students who have dropped out of college and decided to return to finish their degree. The typical age range of non-traditional students is anyone older than 25 (Boylan, Bonham, & White, 1999; Calcagno, Crosta, Bailey, & Jenkins, 2007).

One category of students sometimes found more often in developmental courses are students with learning disabilities (Boylan, Bonham et al., 1999). Limited research has documented the performance of students with learning disabilities in developmental education courses and more specifically in developmental mathematics courses. However, before dwelling on the performance of students with disabilities in these courses, it is important to understand what the environment of developmental education looks like for all students. An important distinction in developmental education is that the courses are typically housed under the department of mathematics or centralized under the organizational structure of developmental education programs and student support services. For instance, Gerlaugh et al. (2007) surveyed 116 community colleges and found that only 44 % had centralized programs—an increase of 4% from data reported 10 years earlier (p. 2). In addition to centralized programs, Bailey et al. (2009) provide distinct differences between course and sequence. The authors define sequence as a “process that begins with initial assessment and referral to remediation and ends with completion of the highest developmental course—the course that in principle completes the student’s preparation for college level studies” (p. 256).
More specifically, students enrolled in developmental education courses at the community college were found to have barriers to successful completion of both courses and sequence of courses. Some of these contributing factors include a lower completion rate of courses, greater student withdrawal rates, higher levels of test anxiety, and more external locus of control than that of college-ready student peers (Bettinger & Long, 2004; Attewell 2006; Bahr 2010; & Wong, 2009). These correlating factors are critical to consider because course completion and the sequence of completion are directly connected to persistence and graduation rates and are subsequently tied to accountability standards for community colleges. As a result, developmental mathematics has become a primary area of focus for community colleges due to levels of dropout and withdrawal rates that are greater than other developmental subject areas. This is also evidenced by research conducted by authors Burley, Butner, & Cejda, (2001) revealing that 85% of first-time college freshmen were remediated in mathematics.

Of even greater concern is the number of students repeating developmental mathematics courses. Bailey et al. (2009) followed students from the Achieving the Dream community college initiative, designed to improve outcomes for community college students by collecting longitudinal data on first-time, credential-seeking students in specified cohorts. The results indicated that 33% of students referred to math remediation completed their sequence of developmental education (Bailey et al., 2009, p. 256). Twenty-nine percent of students referred to math exited their sequences after failing or withdrawing from one of their courses, while only 11% didn’t failed a course, but did not finish the sequence (Bailey et al., 2009, p. 256). Additionally, some students
opted out or avoided taking developmental courses even when they were referred by an advisor or placed through assessment. Bailey et al. (2009) found that more students do not complete their sequences because they do not enroll in the first or a sequence course, resulting in the failing of a class. They also found that 55% of those who complete the developmental sequences also complete their gatekeeper courses. Gatekeeper courses are defined as “the first courses students take after remediation to satisfy program requirements” (Bailey et al., 2009, p. 256).

Failure rates, withdrawal rates, and non-completers of courses and sequences all contribute to the complex structures within developmental education programs. Further complicating matters is the fact that in order to successfully attain accountability standards, community colleges must find more creative ways to help developmental mathematics students to be successful academically. Repetto et al.’s (2010) 5 C’s Model and Long’s (2004, 2010) Five Factors Model may provide a vehicle of support in an effort to accomplish this task. For a student to fulfill any academic educational goal, the student must pass the developmental mathematics sequence, as well as the required college-level mathematics course or courses. Unfortunately, it is not uncommon for students to struggle in the of area mathematics for any number of reasons including age, gender, grade point average (GPA), academic commitment, institutional experience, student academic integration, placement grades, and student performance (Umoh, Eddy, & Spaulding, 1994). However, a critical element not examined in Umoh, Eddy & Spaulding’s study (1994) is that of pedagogical factors that impact or influence the success rates of students enrolled in developmental mathematics courses. Another study by Waycaster (2001) focused on method of
instruction, which was defined as either a lecture where students received instruction and worked on exercises or individualized, in which students were tasked to complete computer-aided instruction (CAI). CAI has evolved into a plethora of instructional delivery formats, calling for a need to explore the various models of instructional delivery. Of particular concern is the examination of students with disabilities enrolled in developmental mathematics courses due to the fact this population tends to struggle to an even greater degree and requires a higher level of instructional support.

**Instructional Delivery Methods in Mathematics Education: Traditional, Online, & Hybrid Courses**

Before one can truly conceptually understand the academic impact of an online teaching environment for students with disabilities, it is of critical importance to understand the unique distinctions and definitions of what constitutes traditional, online, and hybrid course environments. This includes the composition of the courses and how they are similar and different in instruction and delivery. As previously stated, traditional and online environments are defined in the same context as the ED (2010) report on online learning. The report describes traditional courses as “face-to-face instruction” while online learning is defined as “learning that takes place partially or entirely over the Internet” (p. 30). For students with disabilities in developmental mathematics courses, several barriers must be taken into account. Further, these barriers may become more complex in nature depending upon the type of instructional delivery, the student’s learning style, and the instructor’s particular teaching style.

**Barriers of Instruction, Services, & Resources to Students**

The development of this analysis began with a very specific interest to be addressed— to examine the faculty provisions of accommodations provided for
students with disabilities. In doing so, the types of instruction delivered by mathematics faculty within a Florida Community College were examined. This examination is critical in order to provide effective types of instruction. Particularly, teaching the subject area of mathematics is never an easy task for faculty. However, with respect to the population of students with disabilities, the landscape becomes far more complex. For the purposes of the analysis, it is clear from the research that it is important to clarify existing issues, which need to be addressed. Most notably:

- How is the term “disability” defined by law?
- What populations are affected?
- What types of barriers exist for students with disabilities?

Furthermore, for students who have been identified as having learning disabilities related to the area of mathematics or having mathematics difficulty, there is a greater risk of failure in the successful completion of their mathematics sequences. While much focus and attention has been paid to this area with respect to mathematics learning disabilities in the K-12 environment, it is important to note that less research has been applied to students who have been identified as having mathematics-related learning disabilities in the higher education environment. Often not until students have already had multiple attempts of failure is the issue addressed.

According to the ADA, (Appendix G), the term disability is defined as “a physical or mental impairment that substantially limits one or more major life activities of such individual” (Colbridge, 2000, p.29). The most common of these fall into the categories of physical, learning, and psychological disabilities.

Physical and attitudinal barriers are, by far, the most predominantly discussed topics throughout the research. For example, students with physical disabilities have
mobility challenges and, as a result, face architectural obstacles within the school’s existing environment when in a traditional setting (Paul, 2000). In contrast, attitudinal barriers are far more prevalent across all three methods of delivery and are often not considered when taking into account the population of students with disabilities in higher education environments. Attitudinal barriers can be described as “ambivalent attitudes on faculty behaviors towards students with disabilities” (Bento, 1996, p 201). These barriers will discuss in greater detail below.

Attitudinal Barriers in Instructional Delivery

An important factor taken into consideration acknowledges that varying disabilities result in different needs, reactions, and concerns. This is important when studying barriers and how faculty members, when taking into account the various instructional delivery methods, can improve upon them. What exactly is considered an “attitudinal barrier?” Before one can recognize the attitudinal barriers that exist for students with disabilities, it is important to have a clear construct of what the phrase “attitudinal barrier” means. According to Rao (2004), attitudes are characterized by more than 30 operational definitions. Researchers have been concerned with understanding how social behaviors and attitudes serve as motivators for behaviors (Rao, 2004). More simply, Lefrancis (1994) describes attitudes “as a prevailing inconsistent tendency to react in a certain way” (as cited in Soder, 1990, p. 227). Attitudinal barriers, for example, have been described as being “ambivalent” attitudes towards the student’s needs regarding academic accommodations. In a study conducted by Soder (1990), the author examined attitudes, often deemed to be negative and prejudiced, toward people with disabilities and concluded that an individual’s interpretation in terms of ambivalence was found. Furthermore, the research indicated that reactions toward
people with disabilities are seen as a result of conflicting values. As a result, faculty assumptions of attitudes as being prejudiced are questioned.

Attitudinal barriers can be divided into two groups: internal (coming from within the individual) and external (originating from the opinions of influential figures in individual lives). Due to such varied experiences, an individual’s perspective may be challenged. In turn, one’s attitudes are translated into behaviors and actions when confronted with individuals with disabilities in a future setting. As a result, one’s individual attitude toward students with disabilities, whether positive or negative, could be a potential barrier; therefore, the challenge from a research perspective is to identify why such attitudes exist within each delivery method and what populations might be more affected than others, particularly those distinctions that make up traditional versus online instructional delivery. In doing so, one can examine how such methods of instruction can impact the attitudes of faculty interactions with students when determining what is deemed as a reasonable and appropriate accommodation for each instructional delivery model.

For instance, Bento (1996) further explored such attitudinal barriers and presented findings in the traditional environment, which assessed the attitudes of non-disabled faculty at a “Mid-Atlantic University” toward students with disabilities as compared to other institutions. Bento (1996) describes in detail three major types of barriers:

1. Informational barriers, which are described as barriers that limit understanding of the nature of the various types of disabilities and their implications, as well as limited knowledge of applicable legislation.

2. Ethical barriers, which are described as having a relationship of procedural versus substantive justices and competing toward the disabled student and toward the classroom as a whole.
3. Attitudinal barriers, which are described as the effects of ambivalent attitudes on faculty behaviors toward students with disabilities.

With regard to the informational barriers that exist, Bento (1996) discovered that there are problems that need to be addressed for both the faculty member and the student requiring accommodations. For example, it was revealed that disabled students are typically the main source of all information a faculty member receives in reference to the student’s disability and need for special accommodations. This, in turn, raises issues related to the disability for the faculty member, such as feeling embarrassed; doubting whether an “invisible disability,” such as a learning disability, was actually present or justified the accommodations requested”; and “wondering why the accommodation had not been requested with enough advance notice” (Bento, 1996, p. 201). Through intense faculty interviewing, it was discovered that faculty members typically responded that they knew too little about living with a disability and that they had feelings of ambivalence about acquiring the necessary information to educate themselves. Additionally, taking the initiative to research information regarding a particular disability seemed to be a luxury their already-crowded schedules could not afford.

Bento (1996) also discovered that this incongruence of information and lack of knowledge presented problems for the students. Students expressed feelings of dissatisfaction that faculty felt the student must provide a crash course on the disabilities that required them to seek academic accommodations. The author found that this was emotionally difficult for the students to handle, and it made the students feel as if they were being perceived as a disability, rather than as a person. Students often took offense at some faculty members' thinly disguised suspicions about "taking
advantage” of the disability. As a result of these perceptions, students were left feeling humiliated when treated as if they were asking the faculty member for their requested accommodations as opposed to being viewed as being given special treatment (Bento, 1996).

With regard to the ethical barriers that exist, Bento (1996) discovered that faculty often failed to communicate to the disabled students their reasons for hesitation in granting the accommodations requested by the students. Additionally, when the faculty did present reasons for hesitation, they did so in such a manner that was perceived by the students as being insensitive or unfair. This resulted in each party perceiving the other as unreasonable and inflexible.

Such ethical dilemmas can be further classified into two groups, according to Bento (1996). They are described as procedural versus substantive justice, as well as fiduciary responsibility to the students verses the common good of the class. Procedural justice is defined, as “applying the same procedures and rules, impartially and properly, to all students” while substantive justice is defined as “educating and evaluating each student, in accurate and effective ways” (p. 201).

Bento’s (1996) study also revealed:

Faculty members felt torn between two concepts of justice. Would it be fair to the disabled student to submit him or her to the same rules of the other students, if the application of those rules had a differential effect on that student? Would it be fair, however, to the rest of the class if the disabled student received differential treatment (p. 201)?

Further ethical complications would arise when “faculty members felt that procedural justice considerations should prevail and that requested accommodations should be denied” (Bento, 1996, p.201). The “disabled student would then argue that substantive justice considerations should take precedence, and that the
accommodations should be granted” (p. 201), or when “granting the accommodation fulfilled the professor’s fiduciary responsibility toward the disabled student, who was entitled to receiving the best possible service from the instructor. But it also generated costs for the other students, which jeopardized the instructor’s obligation towards the common good of the class” (p. 202). Such an example would be seen “when the requested accommodation implied a change of the instructional methods, processes, or materials that could have an adverse impact for the rest of the class” (p. 202).

With regard to the attitudinal barriers that exist, Bento (1996) discovered that an important issue was found in creating barriers to understanding between faculty and disabled students. Faculty members were typically characterized by having deep-rooted ambivalence. “Ambivalence has historically characterized societal reactions to people with physical or mental disabilities, who alternatively receive help or special consideration, or mistreatment and disregard” (Bento, 1996, p. 202). In several cases, these feelings were compounded by a phenomenon called reactance—“the professors grieved the perceived loss of their academic freedom, curtailed by the legal requirements of special accommodations” (p. 202). While it is clear that these barriers exist in the educational environment, it is also important to note that for student affairs professionals, the opposite can also be true. Often times, it is believed that implementing the attitudinal changes may, in fact, have a positive influence on the informational and ethical issues, as well. In other words, if faculty members were to become more positive, this is likely to increase the faculty level of information about the disability involved, thus allowing a more effective level of interaction with the disabled students.
In another study, conducted by Lehmann, Davies, & Laurin (2000), a different perspective was examined. The authors’ purpose involved examining the perceptions and ideas of students with various disabilities, “including hearing impairment, deafness, low vision, blindness, learning disabilities, traumatic brain injury, cerebral palsy, paraplegia, and quadriplegia” (Lehmann et al., 2000, p. 60). The students were asked to offer their perspectives and feelings on barriers to their success and academic needs. “As the students explain their experiences represented in their colleges, four barriers emerged:

1. The lack of understanding and acceptance for students with disabilities.
2. The lack of adequate services to assist in issues of an academic nature.
3. The lack of financial resources and how to acquire them.
4. The lack of self-advocacy and training needed to live independently” (Lehmann et al., 2000, p. 61).

When addressing the issue of the lack of understanding and acceptance for students with disabilities, the students’ conveyed that “some teachers and TAs [teaching assistants] don’t have an understanding of students’ needs. They cause damage to students with disabilities through their lack of understanding. It makes me think sometimes, so who has the real problem? Me or them?” (Lehmann et al., 2000, p. 61).

Finally, students discussed the need for environmental support on campus and in the community so that they could more easily manage access to dependable transportation, buildings, restrooms, and adaptive computer technology on their campuses and at their banks (pp. 61-62).

With respect to faculty’s attitudes towards students with disabilities in the online environment, little has been explored on this topic. Disability service providers do,
however, maintain that a new trend of attitudinal barriers exist for students with disabilities for those in the online environment. Most notably, this can be seen when a faculty member questions the rationale behind the need for extended time on an exam that is delivered in the online environment, often demanding that a student who has been self-identified as having a disability must have their online exam proctored as opposed to their non-disabled peers (Huber, 1997).

Overall, these findings clearly note that it is necessary to gather further research in the area of online formats in developmental mathematics instruction. Until such time, it is imperative for faculty to be cognizant of the strategies and interventions required in the instructional delivery models.

**Conceptual Model: The Five C’s Model of Dropping Out**

The Five C’s Model of dropping out (Repetto et al., 2010) was also examined as a framework for this study. The 5 C’s Model includes the following components: Care, Connect, Climate, Control, and Curriculum.

This conceptual model and its focus on students with disabilities in secondary educational environments served as the foundation for the research study, and each of these components were present for this study. More about this conceptual model will be discussed in Chapter 5.

**Chapter Summary**

Faculty provisions of accommodations for students with disabilities become a complex and multifaceted landscape within the area of the higher education mathematics teaching and learning environments. They can become more inexplicitly difficult to both define and address with respect to both student and faculty understanding of needs when taking into consideration the nature of the various
teaching platforms being implemented within such environments. For example, this dynamic must be examined through the lenses of both the type of teaching platform being taught (traditional, hybrid, and online) and the nature of the students’ needs for such provisions of accommodations, which are required by law.

To provide a context for further exploring these concepts, this chapter reviewed the following foundations and areas for consideration: the landscape that exists with respect to the developmental and college mathematics education; the various types of instructional delivery methods that have evolved in the higher education environment; barriers that have been shown to exist to those types of instruction; the role of accommodations, services, and resources available to students with disabilities most typically offered by a DRC; and the various faculty attitudinal barriers. Finally, the conceptual framework and components of the 5 C’s Model of dropping out (Repetto et al., 2010) are presented within this exploratory descriptive study. Chapter 3 will outline the procedures used in this exploratory descriptive study and the methods used for analyzing the data collected.
CHAPTER 3
RESEARCH DESIGN AND METHODOLOGY

The purpose of Chapter 3 is to outline the procedures used in this study and the methods used for analyzing the data collected. The statement of purpose is restated, as are the specific research questions developed for this particular study. In addition, this chapter includes information related to the research population, instrument development, validity and reliability, endorsement of the study, administration of the instruction, and data analysis. The chapter concludes with a chapter summary.

Statement of Purpose

The purpose of this exploratory descriptive study was to examine faculty provisions of accommodations for students with disabilities within a Florida Community College in higher education. This required an examination of the mathematics faculty in the traditional, hybrid, and online mathematics courses taught within a Florida Community College. In light of the increasing number of students self-identifying with the DRC as having learning disabilities and this self-identification affecting the area of mathematics and/or jeopardizing academic performance and successful mathematics sequence course completion, it is crucial that all levels of mathematics faculty benefit from a broader knowledge base related to the population of students with disabilities. As an unintended consequence, this pattern suggests that the retention of students is also at risk. Therefore, it is pivotal that mathematics faculty understand and possess the skillset to differentiate between the traditional versus the online platform of instruction; in particular, they must grasp how the online delivery of instruction may require a certain level of skill and training in order to effectively provide the reasonable accommodations and support to the students who may receive them. Last, this study
examines which factors influence faculty members providing the reasonable accommodations that may be required. Most notably, faculty attitudes, beliefs, and perceptions regarding disability may exist. As a result, this study was initiated, research methods were created, and the three research questions were developed for consideration. They are as follows:

1. What are the types of instruction delivered by mathematics faculty within a Florida Community College?

2. What are the provisions of accommodations provided to students with disabilities in higher education of mathematics faculty within a Florida Community College?

3. What are the potential mitigating factors, such as faculty experience, online years of teaching, number of students with disabilities, and types of instruction for developmental and college level mathematics courses, that may be related to providing students with disabilities access to reasonable accommodations as assigned (extended time on exams or extended time and additional classroom accommodations) in either teaching environment?

Instrument Development

A quantitative survey research design was used to address the exploratory research questions presented for the purposes of this study. Best described by McMillan and Schumacher (2006), "quantitative survey research design allows researchers to collect data from a sample at one point in time via a questionnaire" (as cited by Rodkin, 2011, p. 67). An electronic, Web-based questionnaire was developed via Survey Monkey® as the survey instrument for the sample population of mathematics faculty identified in the 2009-2010 academic year. In addition, as Porter’s (2004) research has reflected, instrument development and use of Web-based surveys have been shown to be effective for both the researcher and the participants. In turn, this allows for an increased response rate to be obtained (Rodkin, 2011).
As stated previously, the survey instrument was initially developed during a study in which an original Web-based survey was created, and the method of face validity was incorporated throughout the process. During the course of the survey development, the survey was subjected to rigorous tests for reliability and validity and underwent both internal and external review by the leading researchers in student and academic affairs. In addition, The Office of Educational Research, located within the College of Education at the University of Florida, also provided guidance and support in modification and refinement of the online survey instrument during the initial phases of the survey development. Supplementary support was also provided from the Office of Institutional Research and Planning at the Community College. Finally, the survey and its data collection by way of the Crystal Reporting database received endorsement by the researcher’s supervisor (the Community College’s associate vice president of academic affairs) and the University of Florida’s IRB. It is important to note the support of University of Florida Associate Professor of Special Education Dr. Jeanne Repetto, who served as the overseeing supervisor for the IRB approval. These combined efforts offered face validity and reliability, and they ensured the integrity of the study remained intact.

The survey instrument was initially developed and designed to be an electronic, Web-based survey. Before the sample population was notified by email about participating in the survey, the instrument was externally reviewed by leading researchers in the student affairs field. It was also shared with the overseeing supervisor and external committee member, Dr. Jeanne Repetto, prior to submission for IRB review. In addition, the University of Florida IRB granted approval for this research.
Endorsement of the Study

As stated by Berdie, Anderson, and Neibuhr (1986), "the endorsement of key individuals or organizations has a major effect on the attitude of people being asked to participate in the survey and is helpful in achieving a high response rate" (p. 9, as cited in Rodkin, 2011, p. 68). As stated previously, the survey was reviewed and received endorsement by the researcher's supervisor (the Community College's associate vice president of academic affairs) and the University of Florida's IRB.

Initial email endorsements were received for this study and were provided by the researcher's immediate supervisor (the associate vice president of academic affairs) (Appendix B). Survey reminders were sent electronically to each mathematics department faculty member to increase participation and response rate (Appendices C and D). Finally, to increase the response rate of the respondents, a letter and copy of the online survey (Appendices E and F) were created and sent to each of the mathematics department chairpersons. In addition, a face validity meeting was conducted with each of the Community College's mathematics departmental chairpersons, who were given a detailed explanation of the objective, importance of the study, and reasons why faculty should be encouraged to participate.

Research Population

The research population for this study included mathematics faculty who taught within a Florida Community College during the 2009-2010 academic year. The sample population was identified as having taught the following courses:

- MAT 0002
- MAT 0020
- MAT 0024
- MAT 1033
• MAC 1105
• Non-Algebra Mathematics Courses

Additionally, the mathematics faculty members were identified as having taught in the traditional and/or online courses with respect to the developmental and college level mathematics courses. In order to provide an adequate snapshot of the research population surveyed, it is important to have a strong body of knowledge about what the stakeholders of this particular study look like. They include:

• The Community College itself.
• The mathematics faculty.
• The students-with-disabilities population as self-identified by the Crystal Reporting database and the DRC.

Below is a more detailed description of each of these stakeholders, all of which make up the research population as demonstrated in this study.

**Florida Community College: The Survey Setting Landscape**

The particular Florida Community College surveyed within the southern part of the state can be described as having the following identifying characteristics:

• Situated in rural North Central Florida, just a few miles from the local university.
• Provides quality instruction and educational programs leading to associate of arts degrees (AA) in more than 50 majors.
• Provides more than 80 associate of science degrees (AS) and associate of applied science degrees (AAS), as well as certificates of training.
• 85 % of the student population lives in rural areas.
• Serves this region of communities in the surrounding counties by offering courses at one main campus, five rural satellite centers, and an online campus.
• The philosophy of the college has been, and continues to be, one of student centeredness, with a focus on providing services to the community.
• Provides a distance learning option.
• Offers study abroad programs.

• Offers evening and weekend study opportunities. This has proven to serve as a solid option for those who work full-time and enroll as nontraditional students.

• As a typical two-year college in a “college town,” there are options for on-campus, part-time employment, which allows students to cover some tuition expenses. Additionally, this Community College setting helps students evaluate their career options and find full-time job opportunities upon graduation.

• One of 19 chartered members of the League for Innovation, the Florida Community College had a fall 2008 enrollment of 16,846 credit students. Of this enrollment, 5,393 (32%) consisted of minority students.

• The Community College’s growth and expansion can be attributed to two main causes: educational programs that are designed to meet the needs of students and community and a helpful learning environment that enables students to do their best (Long, 2010).

Mathematics Faculty

The population for this study consisted of mathematics faculty members within a Florida Community College. The mathematics faculty members sampled were also listed in the Crystal Reporting database as having taught developmental and/or college level mathematics for the academic year of 2009-2010 (summer, fall, spring). A total of 79 faculty members were surveyed. In the end, 34 participants of the study completed the Mathematics Teaching Environments and Students with Disabilities Survey (Appendix A).

Students with Disabilities

The student population for this study consisted of Florida Community College students who were identified as having documented disabilities via the Crystal Reporting database. Additionally, the student population was listed in the Crystal Reporting database as having been self-identified with the DRC. It is also important to take into consideration that more than 700 students were listed as being self-identified
with the DRC—not only as having documented disabilities, but as being eligible to receive academic accommodations, services, and resources offered by the Florida Community College. Such students are classified in one of the nine following disability categories:

- Autism Spectrum Disorder (ASD)
- Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD)
- Learning Disability (LD)
- Other Health Impaired (OHI)
- Physical
- Psychological
- Speech/Hearing
- Traumatic Brain Injury (TBI)
- Vision

In addition, there were more than 600 classroom and testing accommodations available at the DRC at the Florida Community College. Some of the most commonly assigned categories granted to students included:

- Extended time for class assignments and exams
- Distraction-reduced environment
- Note-taking services
- Tape recording of lectures
- Use of adaptive technology
- Priority seating
- Priority registration

**Survey Instrument**

The survey instrument was first administered via Survey Monkey®, an electronic, Web-based survey. Final attempts to increase response rate and respondent participation were delivered in person to the respective mathematics chairpersons via paper method. In addition, a face-to-face meeting took place in an effort to protect the validity of the study and to stress the importance of participation in this study. The survey developed for the Florida Community College mathematics faculty was named
Mathematics Teaching Environments and Students with Disabilities Survey (Appendix A).

During the fall 2011 semester, the survey instrument was emailed to all developmental and college mathematics faculty members listed in the Crystal Reporting database and the Florida Community College's Directory. As stated previously, the instrument was first made available through Survey Monkey®, a Web-based survey. Participants were given instructions, and all responses were entered electronically. Also, paper copies of the same survey were distributed in person to the respective mathematics department chairpersons. The types of inventories utilized to measure the items on the survey instrument were categorical responses (for demographic data), dichotomous responses (i.e., yes and no), and open-ended, free-response questions (Appendix A).

Follow-up email reminders were then sent to the respective mathematics chairpersons during the month of February during the spring 2012 semester in an effort to solicit faculty participation after a low response rate was received via the Web-based survey. This method was employed with a single-minded objective—to increase response rate of the survey participation that was originally intended to occur for the mathematics faculty via Survey Monkey®, the Web-based survey. Finally, paper surveys were delivered in person to each respective mathematics department chairperson during the spring 2012 semester. The paper surveys were accompanied by a cover letter (Appendices E and F). On April 11, 2012, each mathematics department chairperson was asked to have their faculty members complete and return the surveys to them by the firm deadline of April 20, 2012 (Appendices E and F). In addition,
telephone conferences and individual face-to-face meetings were held with each department chairperson. Through this process, the researcher strived to achieve multiple objectives. The objectives are as follows:

- To convey the importance and completion of the survey.
- To discuss the purpose of the study.
- To provide a detailed explanation of the participation and the value that may be contributed from both a departmental and collegiate perspective.

Ultimately, the objectives of each of the meetings held with the mathematics department chairpersons addressed several topical areas, most notably:

- The overall vision and purpose of study regarding the type of mathematics instructional delivery identified.
- The faculty response rate received (or lack thereof) after the unsuccessful attempts, which were conducted via the Web-based survey.
- The faculty provisions of accommodations that may be identified as being provided for students with math related learning disabilities,
- Examination of the mitigating factors, including years of experience, online experience, number of students with disabilities, and types of instruction for developmental and college level mathematics courses that may be related to providing students with disabilities access to reasonable accommodations as assigned (extended time on exams or extended time and additional classroom accommodations) in either teaching environment.

The survey instrument itself consisted of 12 questions. They were divided into the following sections:

- Faculty demographic information, such as years of teaching experiences, courses taught, and years of online teaching experience.
- The instructional practices provided to students by the mathematics faculty.
- The average number of students with disabilities per mathematics course section.
- Possible accommodations provided to students with disabilities.
The possible differences that may exist when providing academic accommodations or modifying course curriculum in the various formats and possible challenges in providing students with disabilities academic accommodations that may result within these three uniquely district teaching platforms.

Administration of Survey Instrument

Once the survey items were collected, the instrument was first programmed for online administration via a secure Web-based survey on November 11, 2011. The Web-based survey instrument was also tested prior to distribution to the two mathematics faculty populations. In an effort to protect the study’s integrity, the results were also stored in a secure, password-protected online database, which could only be accessed by the researcher and also did not contain any identifiable fields, including an Internet Protocol (IP) address. In addition, each email distributed to the mathematics faculty contained complete and detailed instructions for accessing the online survey, including a hyperlink. A phone number and return email address were also provided so that the participants of the sample could contact the researcher directly if they had any questions regarding the survey questions, the study itself, or access necessary for the survey instrument in order to effectively complete the survey readily and successfully (Rodkin, 2011) (Appendices C and D).

Despite the countermeasures taken and the concentrated efforts to secure eligible survey responses, attempts at the online administration of the surveys, telephone communications, and follow-up email reminders distributed to the mathematics department chairpersons, the low response rates received from the sample population identified to the online administration of the survey still remained. Therefore, the decision was made to administer paper copies of the same survey to the respective mathematics department chairpersons personally (Appendices E and F).
On Friday, April 11, 2012, a cover letter and paper copies of the Web-based survey were delivered in person to each respective mathematics department chairperson, and a face validity meeting was held with each (Appendices E and F).

The time allotted to distribute and collect as high a response rate as possible and to give participants the opportunity to complete the survey spanned from November 11, 2011 to April 27, 2012. As a result, 34 responses were successfully collected. Data were entered manually into an organized spreadsheet, and a coding manual was also developed. This manual identified categorical variable names and response codes for the survey responses collected. Open-ended text responses were recorded into a separate spreadsheet.

**Data Analysis Procedures**

Data analyses procedures using SAS® (version 9.3) and several statistical data analyses were performed. A level of significance of .05 was used for all tests. These analyses included:

- Descriptive statistical analysis, which is primarily described as the practice of quantitatively describing the main features of the data collection. Descriptive statistics aim to summarize a particular data set presented within the study.

- Kruskal-Wallis test, which is often used with one independent variable with two or more levels and an ordinal dependent variable. In other words, it is the nonparametric version of ANOVA.

- Fisher’s Exact test, which is employed for small sample sizes and for categorical data that result from classifying objects in two different ways. This test is also used to examine the significance of the association (contingency) between the two kinds of classification.

- Wilcoxon Rank Sum test which, is a nonparametric alternative to the two-sample t-test, which is based solely on the order in which the observations from the two samples fall.
Results

Of the 81 email addresses for the sample, three email addresses failed, either due to faculty turnover or faculty retirements. This, in turn, reduced the sample to 79. The final 79 respondents included an initial sample population of 32 respondents identified as having taught developmental mathematics courses; 47 respondents were identified as having taught college level mathematics courses. Based on the eligible sample of 34 surveys received, the final response rate collected was 48.04% (Table 4-1).

Chapter Summary

Chapter 3 provided an explanation of the research design and methodology, data collection, and data analysis procedures used for the execution for this study. The sample population consisted of Florida Community College mathematics faculty identified as having taught developmental and/or college level mathematics courses for the 2009-2010 academic year. This demographic information was collected by use of the Crystal Reporting database, Florida’s Community College Directory, a Web-based survey, and, finally, paper versions of the Web-based survey that were hand-delivered to the respective mathematics department chairpersons. Data were initially collected using Survey Monkey®, a Web-based survey. As a result of the low response rate received on two separate occasions, follow-up, face-to-face validity meetings were held, and paper copies of the Web-based survey were hand-delivered to the respective mathematics chairpersons. The instructions were included, and chairpersons were asked to distribute surveys to the mathematics faculty identified for the 2009-2010 academic year. The data were coded and entered into a database. Descriptive statistics were run in the form of frequency distributions. To analyze the survey questions, further analyses, such as the Kruskal-Wallis test, Fisher’s Exact test, and
Wilcoxon Rank Sum test, were performed. Chapter 4 presents the survey findings from the data analysis as a result of this research study. The results as they relate to each of the research questions posed are also discussed. A summary of the chapter is also included. Chapter 5 includes a summary of the study, discussion of the conclusions, strategies, intervention models for consideration, and recommendations for future research.
CHAPTER 4
RESULTS

Survey Findings

The purpose of this exploratory descriptive study was to examine the mathematics faculty provisions of accommodations within a Florida Community College for students with disabilities in higher education. This required an examination of a Florida Community College’s mathematics faculty in the traditional, hybrid, and online mathematics courses taught. This examination led to the identification of the types of instruction, the provisions of accommodations provided for students with disabilities, the mathematics faculty, and mitigating factors, such as the faculty experience, years of online teaching, number of students with disabilities, and types of instruction for students with disabilities within a Florida Community College. In light of the increasing number of students self-identifying with the DRC as having learning disabilities in a mathematics-related area and this self-identification affecting the area of mathematics and/or jeopardizing academic performance and successful mathematics sequence course completion, all levels of mathematics faculty and their students would benefit from a broader base of knowledge related to this population. Therefore, it is pivotal that mathematics faculty understand and possess the skillset to differentiate between the traditional versus the online or hybrid platform of instruction; in particular, they must grasp how the online delivery of instruction may require a certain level of skill and training in order to effectively provide the reasonable accommodations and support to the students who may receive them. Last, this study examines which mitigating factors may be related to faculty members providing the reasonable accommodations required. As a result, this study examined the following research questions for consideration:
1. What are the types of instruction delivered by mathematics faculty within a Florida Community College?

2. What are the provisions of accommodations provided to students with disabilities in higher education of mathematics faculty within a Florida Community College?

3. What are the potential mitigating factors, such as faculty experience, online years of teaching, number of students with disabilities, and types of instruction for developmental and college level mathematics courses, that may be related to providing students with disabilities access to reasonable accommodations as assigned (extended time on exams or extended time and additional classroom accommodations) in either teaching environment?

Research Question One

Research question one explored the types of instruction delivered to students in higher education by mathematics faculty within a Florida Community College. In order to examine this research question effectively, it was important to include details, estimates, and a broad overview of the demographic information of the sample population surveyed. In doing so, the results indicated that the mathematics faculty at the Community College had a mean of 12.8 (9.3) with respect to the years of experience teaching mathematics courses. The courses identified as being taught included the following:

- Beginning Algebra
- Elementary Algebra
- Intermediate Algebra
- College Algebra
- Non-Algebra Mathematics Courses

The faculty surveyed also indicated that the years spent teaching in the online environment had a mean of 2.8 (9.3). In addition, the survey results revealed all three types of mathematics delivery of instruction were offered to students. They included:

1. Traditional
2. Hybrid
3. Online
Of those mathematics faculty surveyed, the characteristics illuminated the following findings: Of the 34 responses received, 3% of the mathematics faculty taught via Web only, 32% of the faculty taught hybrid or blended courses, and 56% of the faculty taught no online classes. The majority of this sample population of faculty taught a traditional mathematics course of instruction. A small percentage (6%) of this mathematics faculty taught both Web-only and hybrid courses, and only 9% of the mathematics faculty surveyed taught all four types of instruction (Table 4-1).

Mathematics faculty members were also asked to identify the types of instructional practices and support they provide to students when teaching in online environments. Of those mathematics faculty surveyed, the characteristics indicated the following findings: 15% of the mathematics faculty provided online community support to students, 26% of the faculty provided an open discussion forum to students, 18% of the faculty provided modules as an instructional support, 26% of faculty provided homework only, and 6% of the faculty provided other practices as instructional support. Thus, the findings suggest that the majority of the sample population of faculty surveyed provided minimal instructional support to students, and open discussion forums and homework only were the two most prevalent instructional practices provided to students when teaching in online formats (Table 4-1).

In addition, the mathematics faculty members surveyed were asked to provide an open-ended response to the question asking them to identify types of instructional practices provided to students in online environments. As a result, one respondent provided the following commentary in response to this question:

In my studio classes, I have 1 or 2 focus group sessions a week (depending on the class). I prepare my lessons by looking at the homework
assignments and quizzes they will be doing. I prepare a notetaking guide where I include definitions, vocabulary and key examples that would guide them and help them do their assignments successfully. This helps me too because this way I pace myself properly by giving them all the tools they will need during the week.

When addressing the survey question with respect to teaching in an online environment and the types of instructional practices that are provided to students with disabilities, 71% of the faculty surveyed indicated none were given, 6% of the faculty indicated one was given, 12% indicated two types of instructional practices were provided, 9% indicated three practices were provided, and 3% indicated four instructional practices were utilized. This response suggests that a barrier (i.e., disconnect) with faculty is present due to the fact that the provisions of accommodations is low despite the documented need for students with disabilities (Table 4-1).

**Research Question Two**

Research question two explored the provisions of accommodations provided specifically for students with disabilities in higher education of mathematics faculty within a Florida Community College. As previously established both in terms of the literature review and in practice, the number of students served with accommodations at the DRC and those students who are self-identifying as having disabilities has grown tremendously. As such, it was important for the study to examine from the mathematics faculty surveyed the average number of students with disabilities present in their courses. The results indicated that the average number of students with disabilities present in their mathematics courses was 1.9 (1.4). This is a vital reporting. Of those students who had self-identified with the DRC as having any type of disability, the largest population of students served were those diagnosed with learning disabilities. This finding fosters speculation that a discrepancy exists with faculty and students with
disabilities they may be serving in their classroom. As a result, faculty members need to not only be aware of accommodations, but also prepared to offer accommodations. Breaking down this barrier begins with professional development and training that may be required for faculty, regardless of the level of mathematics courses taught or years of service in teaching mathematics. There is also a demonstrated need for a higher level of disability awareness and identification of students who may have disabilities. Furthermore, faculty members need to foster an awareness of how to implement effective teaching practices for this student population. Only then can they begin to have a greater sense of the various academic accommodations, services, and resources offered by the DRC, as well as by campus-wide departments.

Mathematics faculty members were also asked to indicate what accommodations they make when instructing students with disabilities. Of the 34 respondents, 94 % of the mathematics faculty surveyed indicated they provide these provisions of accommodation to students. Forty-one percent of the faculty indicated they provide classroom, lab, or library provisions of accommodations to their students. Finally, 12 % of faculty surveyed indicated they had provided the provisions of accommodation in the form of computer and adaptive technology to students with disabilities (Table 4-1).

Mathematics faculty members were asked in survey Question #6, “When teaching in an online environment, what types of instructional practices do you provide students?” Twelve faculty members responded, and their open-ended responses included the following commentary:

Participant One: In my studio classes, I have 1 or 2 focus group sessions a week (depending on the class). I prepare my lesson by looking at the homework assignments and quizzes that they will be doing. I prepare a note-taking guide where I include definitions, vocabulary
and key examples that would guide them and help them through their assignments successfully. This helps me too because this way I pace myself properly by giving the students all the tools they will need during the week.

Participant Two: Multiple tries. Give students time in class to ask questions on online homework, build quizzes based on practice quizzes, open practice quizzes.

Participant Three: Post notes, videos, links to text, provide discussion forum and encourage questions.

Participant Four: Discussion, one on one explanations.

Participant Five: Limited by provided software.

Participant Six: Class notes video presentation.

Participant Seven: Online access, quizzes, tutorials, homework, email.

Participant Eight: My math lab homework problems.

Participant Nine: Paperwork and lectures posted.

Participant Ten: Homework only lab practice, Live Sessions, Recorded reviews.

Ten faculty members out of 34 responded to survey Question #10—“In what ways do you adapt, change, or modify curriculum accommodations in online classrooms?”

Their open-ended responses included the following commentary:

Participant One: I don’t think there is many changes in the curriculum as there is in the delivery of material and assessing the knowledge and learning.

Participant Two: By making myself more available to answer questions.

Participant Three: Lectures online. Work online.

Participant Four: I don’t give quizzes in lecture only format, allow for multiple tries on quizzes too.

Participant Five: Only delivery changes.

Participant Six: Longer time on quizzes and tests.

Participant Seven: Streamline lecture, some group work, open forum for questions.

Participant Eight: Try to do what department outlines.
Participant Nine:  Pick through the problems to put in the homeworks
Participant Ten:  Short bits of info in chunks

Ten faculty members out of the 34 responded to survey Question #11—“What challenges have you encountered when accommodating students with disabilities in an online mathematics classroom?” Their open-ended responses included the following commentary:

Participant One:  The biggest challenge for me has been the anxiety levels of students especially in the beginning of the course. It seems to me they feel like they will have no support or not as much support as they do in traditional classes. I don’t believe this is true in studio classes, so I work hard at convincing them that they will have the support and the help they need to be successful. And they do

Participant Two:  None. I can accommodate students with disabilities easily
Participant Three:  Never had any challenges
Participant Four:  Some students react negatively to exposure to computer radiation effects, management issues
Participant Five:  None. DRC is great to work with
Participant Six:  Extended time requirements
Participant Seven:  The visually impaired student is hard to accommodate
Participant Eight:  I have a visually impaired student and sometimes forget to enlarge a copy for her
Participant Nine:  Don’t teach online
Participant Ten:  The testing to get the code to testing center and extend the time

Once again, the participants’ responses provided strengthen the barrier (i.e., disconnect) that may be present for faculty and echo that training is needed with respect to delivery of instruction for online classrooms and the provisions of accommodations needed for students with disabilities. The responses also indicate that perhaps further awareness and collaboration is necessary both by administration, student affairs, and
academic affairs in an effort to accommodate the challenges that faculty may encounter with respect to students with visual impairments.

**Research Question Three**

The purpose of research question three was to provide an analysis of the potential mitigating factors that may be related to providing students with disabilities access to reasonable accommodations to which they are assigned in either teaching environment. The mitigating factors that were examined included years of experience, online experience, number of students with disabilities, and types of instruction for developmental and college level mathematics courses that may be related to providing students with disabilities access to reasonable accommodations as assigned (extended time on exams or extended time and additional classroom accommodations) in either teaching environment.

Table 4-2 examines whether differential accommodations (according to modality of instruction) were significantly related to years of experience, years of online experience, and number of students with disabilities. The test performed was the Kruskal-Wallis test. With respect to the mitigating factor of whether there are differences in accommodations with respect to years of experience, the results indicated the following:

- Mathematics faculty who provided no response resulted in a mean of 17.0 (11.8).
- Mathematics faculty who answered no resulted in a mean of 13.5 (8.7).
- Mathematics faculty who answered yes resulted in a mean of 10.1 (8.5)

As a result of this particular finding, the p-value is .2645. An important issue to consider is whether there is reason to believe that experienced faculty are more likely to provide accommodations than those faculty who may have fewer years of experience (Table 4-2).
With respect to the mitigating factor of whether there are differences in accommodations with respect to online experiences, the results indicated the following:

- Mathematics faculty who provided no response resulted in a mean of 1.7 (2.7).
- Mathematics faculty who answered no resulted in a mean of 2.7 (4.7).
- Mathematics faculty who answered yes resulted in a mean of 3.3 (3.8).

As a result of this particular finding, the p-value is .4150. In other words, there may be no relationship between these two variables (Table 4-2).

With respect to the mitigating factor of whether there are differences in accommodations and students with disabilities, the results indicated the following:

- Mathematics faculty who provided no response resulted in a mean of 0.9 (0.7).
- Mathematics faculty who answered no resulted in a mean of 2.1 (1.0).
- Mathematics faculty who answered yes resulted in a mean of 2.2 (2.0).

As a result of this particular finding, the p-value is .0324 and is, thus, statistically significant. In other words, the mathematics faculty members surveyed believe that there is a difference in accommodations and students with disabilities. This strengthens the study with respect to the barrier (i.e., disconnect) present in faculty providing reasonable accommodations for students (Table 4-2).

With respect to the mitigating factor of whether there are differences in accommodations by type of instruction, the results indicated the following:

- Developmental mathematics faculty who provided no response to the question presented resulted in a response rate of 8 %.
- Mathematics faculty who provided no response to the question presented resulted in a response rate of 24 %.
- Developmental mathematics faculty who provided no as a response to the question presented resulted in a response rate of 54 %.
- Mathematics faculty who provided no as a response to the question presented resulted in a response rate of 38 %.
• Developmental mathematics faculty who provided a yes response to the question presented resulted in a response rate of 38%.

• Mathematics faculty who provided yes as a response to the question presented resulted in a response rate of 38%.

As a result of these particular findings when comparing the developmental mathematics and college level mathematics faculty, the p-value is .5223.

• Mathematics faculty who provided no response to the question presented of having no online experience resulted in a response rate of 26%.

• Mathematics faculty who provided no response to the question presented of having online experience resulted in a response rate of 7%.

• Mathematics faculty who provided no as a response to the question presented of having no online experience resulted in a response rate of 37%.

• Mathematics faculty who provided no as a response to the question presented of having online experience resulted in a response rate of 53%.

• Mathematics faculty who provided yes as a response to the question presented of having no online experience resulted in a response rate of 37%.

• Mathematics faculty who provided yes as a response to the question presented of having online experience resulted in a response rate of 40%.

As a result of these particular findings when comparing the mathematics faculty members’ experiences with no online teaching and online teaching experience, the p-value is .3566. In addition, the non-response rates are also telling. The results indicated by the college mathematics faculty as having the exact percentage reported for those who felt there were differences in accommodations by type of instruction and those who did not is also telling and possibly warrants further research in this area (Table 4-3).

With respect to the mitigating factor of provisions of accommodations by years of experience, the results indicated the following:
• Mathematics faculty who provided none or exam only as an accommodation to students with disabilities, the N=20, and the response received resulted in a mean of 10.7 (7.5).

• For mathematics faculty who provided exam accommodations and any additional provisions of accommodations for students with disabilities, the N=14, and the responses received resulted in a mean of 15.9 (10.9).

• The p-value for years of experience is .1642.

With respect to the mitigating factor of provisions of accommodations by online experience, the results indicated the following:

• Mathematics faculty who provided none or exam only as an accommodation to students with disabilities, the N=20, and the response received resulted in a mean of 2.9 (4.2).

• For mathematics faculty who provided exam accommodations and any additional provisions of accommodations for students with disabilities, the N=14, and the responses received resulted in a mean of 2.8 (3.9).

• The p-value for online experience is .9407.

With respect to the mitigating factor of provisions of accommodations and number of students with disabilities, the results indicated the following:

• Mathematics faculty who provided none or exam only as an accommodation to students with disabilities, the N=20, and the response received resulted in a mean of 2.0 (1.5).

• For mathematics faculty who provided exam accommodations and any additional provisions of accommodations for students with disabilities, the N=14, and the responses received resulted in a mean of 1.8 (1.4).

• The p-value for online experience is .7404 (Table 4-4).

With respect to the mitigating factor of whether faculty members provide accommodations by type of instruction, the results indicated the following:

• Developmental mathematics faculty who provided no accommodations to students with disabilities or only exam accommodations resulted in a response rate of 69 %.

• College level mathematics faculty who provided no accommodations to students with disabilities or only exam accommodations resulted in a response rate of 52 %.
Developmental mathematics faculty who provided exam accommodations plus any additional accommodations by type of instruction resulted in a response rate of 31%.

College level mathematics faculty who provided exam accommodations plus any additional accommodations by type of instruction resulted in a response rate of 48%.

As a result of these particular findings, when comparing the developmental mathematics courses and college level mathematics courses, the p-value is .4774.

Mathematics faculty who provided no accommodations to students with disabilities or only exam accommodations by type of instruction and had no online experience resulted in a response rate of 53%.

Mathematics faculty who provided no accommodations to students with disabilities or only exam accommodations and had online experience resulted in a response rate of 67%.

Mathematics faculty who provided exam accommodations plus any additional accommodations and had no online experience in resulted in a response rate of 47%.

Mathematics faculty who provided exam accommodations plus any additional accommodations by type of instruction resulted in a response rate of 33%.

As a result of these particular findings, when comparing the developmental mathematics courses and college level mathematics courses for faculty with no online teaching and online teaching experience, the p-value is .4953 (Table 4-5).

**Chapter Summary**

Chapter 4 provided a description of how the data were collected and the reporting of statistical analyses in relation to the research questions. Overall, the information obtained as a result of the Mathematics Teaching Environments and Students with Disabilities Survey delivered interesting and noteworthy research reporting. The lack of non-responses received from the mathematics faculty overall to certain questions
contained within the survey proved to be the most telling aspect of the survey itself. Of the 34 surveys returned, 12 were completed by developmental mathematics faculty members, and 22 were completed by college-level mathematics faculty members. The results of the survey indicate a strong discrepancy is present with mathematics faculty as evidenced by the number of students who are reported as being self-identified as having a disability versus the responses reported by the mathematics faculty per semester. The results also indicated a barrier (i.e., disconnect) regarding the differences in accommodations by years of experience, online experience, and the number of students with disabilities.

Based on the findings presented in Chapter 4, Chapter 5 includes a summary derived from the study. Also conclusions drawn from this study are also discussed. Strategies and intervention models are presented, and, finally, implications of the study are presented, and recommendations for future research as a result of this exploratory descriptive study are provided.
<table>
<thead>
<tr>
<th>Question</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q #1 Years of Experience</td>
<td>12.8 (9.3)</td>
</tr>
<tr>
<td>Q# 2 Which of these courses do you typically teach?</td>
<td></td>
</tr>
<tr>
<td>a) Beginning Algebra</td>
<td>65% (22)</td>
</tr>
<tr>
<td>b) Elementary Algebra</td>
<td>41% (14)</td>
</tr>
<tr>
<td>c) Intermediate Algebra</td>
<td>50% (17)</td>
</tr>
<tr>
<td>d) College Algebra</td>
<td>44% (15)</td>
</tr>
<tr>
<td>e) Non-Algebra Mathematics Courses</td>
<td>35% (12)</td>
</tr>
<tr>
<td>Q# 3 Years taught in Online Environment</td>
<td>2.8 (9.3)</td>
</tr>
<tr>
<td>Q# 4 Which type of Teaching do you participate in?</td>
<td></td>
</tr>
<tr>
<td>a) Web Only</td>
<td>3% (1)</td>
</tr>
<tr>
<td>b) Hybrid</td>
<td>32% (11)</td>
</tr>
<tr>
<td>c) No Online Classes</td>
<td>56% (19)</td>
</tr>
<tr>
<td>d) Both Web Only and Hybrid</td>
<td>6% (2)</td>
</tr>
<tr>
<td>e) All four types of instruction</td>
<td>9% (3)</td>
</tr>
<tr>
<td>Q# 5 When Teaching in an online format what type of instructional practices do you provide students?</td>
<td></td>
</tr>
<tr>
<td>a) Online Community</td>
<td>15% (5)</td>
</tr>
<tr>
<td>b) Open Discussion Forum</td>
<td>26% (9)</td>
</tr>
<tr>
<td>c) Modules</td>
<td>18% (6)</td>
</tr>
<tr>
<td>d) Homework only</td>
<td>26% (9)</td>
</tr>
<tr>
<td>e) Other practices</td>
<td>6% (18)</td>
</tr>
<tr>
<td>Q# 6 When teaching in an online environment, what types of instructional practices do you provide?</td>
<td></td>
</tr>
<tr>
<td>a) 0</td>
<td>71% (24)</td>
</tr>
<tr>
<td>b) 1</td>
<td>6% (2)</td>
</tr>
<tr>
<td>c) 2</td>
<td>12% (4)</td>
</tr>
<tr>
<td>c) 3</td>
<td>9% (3)</td>
</tr>
<tr>
<td>d) 4</td>
<td>3% (1)</td>
</tr>
<tr>
<td>Q#7 In a typical section, what is the average number of students with a disability present in your mathematics course?</td>
<td>1.9 (1.4)</td>
</tr>
</tbody>
</table>
Table 4-1. Continued.

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean (SD) or % (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q# 8 What accommodations are made when instructing students with disabilities?</td>
<td></td>
</tr>
<tr>
<td>a) Classroom/Lab/Library</td>
<td>41% (14)</td>
</tr>
<tr>
<td>b) Exam graded in class tasks</td>
<td>94% (32)</td>
</tr>
<tr>
<td>c) Computer and adaptive technology</td>
<td>12% (4)</td>
</tr>
<tr>
<td>Q# 9 Do you believe there are differences in accommodations when teaching in different formats?</td>
<td></td>
</tr>
<tr>
<td>a) No response</td>
<td>18% (6)</td>
</tr>
<tr>
<td>b) No</td>
<td>44% (15)</td>
</tr>
<tr>
<td>c) Yes</td>
<td>38% (13)</td>
</tr>
<tr>
<td>Q# 10 In what ways do you adapt, change or modify curriculum in online classrooms?</td>
<td>Responded 29% (10)</td>
</tr>
<tr>
<td>Q# 11 What challenges have you encountered when accommodating students with disabilities in an online mathematics classroom?</td>
<td>Responded 29% (10)</td>
</tr>
<tr>
<td>Q# 12 In what ways are you informed/notified that you have students with disabilities in your classroom?</td>
<td></td>
</tr>
<tr>
<td>a) No response</td>
<td>3% (1)</td>
</tr>
<tr>
<td>b) Letter</td>
<td>71% (24)</td>
</tr>
<tr>
<td>c) Student or other</td>
<td>26% (9)</td>
</tr>
</tbody>
</table>

*Multiple choices given to respondents so that responses do not sum up to 100%
### Table 4-2. Differences in accommodations by years of experience, online experience, and number of students with disabilities

<table>
<thead>
<tr>
<th></th>
<th>No Response Mean (SD)</th>
<th>No Mean (SD)</th>
<th>Yes Mean (SD)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of Experience</td>
<td>17.0 (11.8)</td>
<td>13.5 (8.7)</td>
<td>10.1 (8.5)</td>
<td>.2645</td>
</tr>
<tr>
<td>Online Experience</td>
<td>1.7 (2.7)</td>
<td>2.7 (4.7)</td>
<td>3.3 (3.8)</td>
<td>.4150</td>
</tr>
<tr>
<td>Number of Students</td>
<td>0.9 (0.7)</td>
<td>2.1 (1.0)</td>
<td>2.2 (2.0)</td>
<td>.0324</td>
</tr>
</tbody>
</table>

*Kruskal-Wallis test result

### Table 4-3. Differences in accommodations by type of instruction

<table>
<thead>
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<th></th>
<th>No Response</th>
<th>No</th>
<th>Yes</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental Math</td>
<td>8%</td>
<td>54%</td>
<td>38%</td>
<td>.5223</td>
</tr>
<tr>
<td>College Math</td>
<td>24%</td>
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<td>38%</td>
<td></td>
</tr>
<tr>
<td>No online experience</td>
<td>26%</td>
<td>37%</td>
<td>37%</td>
<td>.3566</td>
</tr>
<tr>
<td>Online experience</td>
<td>7%</td>
<td>53%</td>
<td>40%</td>
<td></td>
</tr>
</tbody>
</table>

*Fisher’s exact test result

### Table 4-4. Provisions of accommodations by years of experience, online experience, and number of students with disabilities

<table>
<thead>
<tr>
<th></th>
<th>None or Only Exam</th>
<th>Exam+</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=20</td>
<td>N=14</td>
<td></td>
</tr>
<tr>
<td>Years of Experience</td>
<td>10.7 (7.5)</td>
<td>15.9 (10.9)</td>
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</tr>
<tr>
<td>Online Experience</td>
<td>2.9 (4.2)</td>
<td>2.6 (3.9)</td>
<td>.9407</td>
</tr>
<tr>
<td>Number of Students</td>
<td>2.0 (1.5)</td>
<td>1.8 (1.4)</td>
<td>.7404</td>
</tr>
</tbody>
</table>

Wilcoxon rank sum test result
Table 4-5. Provide accommodations by type of instruction

<table>
<thead>
<tr>
<th></th>
<th>None or Only Exam</th>
<th>Exam +</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental Mathematics</td>
<td>69%</td>
<td>31%</td>
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<tr>
<td>College Level Mathematics</td>
<td>52%</td>
<td>48%</td>
<td></td>
</tr>
<tr>
<td>No online experience</td>
<td>53%</td>
<td>47%</td>
<td>.4953</td>
</tr>
<tr>
<td>Online experience</td>
<td>67%</td>
<td>33%</td>
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*Fisher’s exact test result*
CHAPTER 5
SUMMARY OF DISCUSSIONS, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of Chapter 5 is to present a summary of the study with respect to faculty provisions of accommodations for students with disabilities. Also, the study’s conclusions are discussed, and recommendations for future research are provided.

The purpose of this exploratory descriptive study was to examine the Florida’s Community College faculty provisions of accommodations for students with disabilities in higher education at a Florida Community College. This required an examination of a Florida Community College’s mathematics faculty in the traditional, hybrid, and online mathematics courses taught. This examination led to the identification of the types of instruction, the provisions of accommodations provided for students with disabilities, the mathematics faculty, and mitigating factors, such as the faculty experience, years of online teaching, number of students with disabilities, and types of instruction for students with disabilities within a Florida Community College. The research conducted may shed light on issues related to providing students with math-related disabilities access to the reasonable accommodations they are assigned in either teaching environment.

As a result, this study examined the following research questions for consideration:

1. What are the types of instruction delivered by mathematics faculty within a Florida Community College?
2. What are the provisions of accommodations provided to students with disabilities in higher education of mathematics faculty within a Florida Community College?
3. The mitigating factors that were examined included the following: years of experience, online experience, number of students with disabilities, and types of instruction for developmental and college level mathematics courses that may be
related to providing students with disabilities access to reasonable accommodations as assigned (extended time on exams or extended time and additional classroom accommodations) in either teaching environment?

**Discussion of Conclusions**

Based on the information presented in Chapter 4, this section presents conclusions drawn from this study’s findings. Also, the findings are discussed in further detail. As with the findings presented in Chapter 4, the conclusions drawn relate back to the three research questions presented as part of this exploratory descriptive study.

**Research Question One**

Research question one examined the types of instruction delivered by mathematics faculty within a Florida Community College. What was found as a result of the study is that there are five categories of mathematics course taught and four types of instruction that are utilized at the Community College surveyed. The courses are as follows:

- Beginning Algebra
- Elementary Algebra
- Intermediate Algebra
- College Algebra
- Non-Algebra Mathematics Courses

The types of instructional delivery offered by the mathematics courses faculty at the time this study was conducted are as follows:

- Web Only
- Hybrid
- No Online Classes
- Both Web Only and Hybrid

What was found as a result of the mathematics faculty surveyed is that some faculty members, particularly those with fewer than five years of experience, indicated in their open-ended response questions that they felt it would be helpful if they had more
professional development and training with respect to teaching mathematics in online environments.

**Research Question Two**

Research question two examined the provisions of accommodations provided to students with disabilities in higher education of mathematics faculty within a Florida Community College. What was found as a result of the study is that while some faculty members do provide various forms of accommodations for students with disabilities, the findings suggest there is a barrier (i.e., disconnect) present among the mathematics faculty at the Community College. For example, it is clear from the findings that an overwhelming majority (94 %) of faculty members are aware of the provisions of extended time on graded in-class tasks. (94 %).

**Research Question Three**

Research question three examined the potential mitigating factors, such as faculty experience, online years of teaching, number of students with disabilities, and types of instruction, that may be related to providing students with disabilities access to reasonable accommodations to which they are assigned in either teaching environment. What was found as a result of the study is that there is evidentiary support demonstrating there is a barrier (i.e., disconnect) present with the Florida Community College mathematics faculty as to the numbers of students the faculty reported as having a disability in their classroom as 1.9 (1.4). Conversely, the number of students who have been reported as having self-identified with a disability at the Florida Community College’s DRC is much larger. In fact, it is important to note that many of the students who are self-identified and eligible to receive accommodations at the DRC are those students classified as having learning disabilities (Figure 5-1). There is a
significant finding when addressing the number of students with disabilities and the differential response to accommodations for online teaching. This finding revealed to have a p value of .0324 (Table 4-2).

**Strategies & Intervention in the Instructional Delivery Environments**

One of the challenges is to incorporate effective teaching strategies in both the traditional and online environments. This includes, but is not limited to, the varying teaching styles that exist versus a student’s learning style, teaching beliefs and practices, the level of teaching experience acquired by a faculty member for successful execution of the institutional delivery environment, and the knowledge and skills necessary to accommodate a student’s needs within those environments.

DSPs also share in similar challenges in addressing the academic accommodations needs of students and finding a balance with what are deemed as the essential requirements of a course. For instance, it is often easy to conceptualize for faculty or staff the need for extended time on exams, but how does one address the appropriate behavior and expectations of working in a lab with a partner for students who have acquired various degrees of mathematical skills or often are accustomed to working alone? A student may be expected to perform or interact in a clinical setting where the clinician may have no idea about the student’s disability or may have an inability to perform essential mathematical requirements when dealing with patients. A delicate balance must protect the confidentially of the student while not disclosing the nature of the disability. This is an all-too-common scenario for the DSPs. The bottom line in combating such issues is building collaborative partnerships and communication and fostering a more informed awareness approach for students with disabilities between faculty, staff, and students in order to ensure student success. One
collaborative partnership model that has demonstrated success in the K-12 environments is the 5 C’s Model for dropping out. This model also has potential and promise for serving postsecondary education students with disabilities (Repetto et al., 2010).

**The 5 C’s Model**

The 5 C’s Model for dropping out (Repetto et al., 2010) consists of five tenets. Each one is described in greater detail below. The 5 C’s Model tenets are as follows: Care, Connect, Climate, Control, and Curriculum.

**Care**

This tenet asserts that an instructor’s involvement or lack thereof can impact students’ perceptions of learning; therefore, care should be taken into consideration when incorporating lesson plans and interacting with students. Additionally, educators can mentor students towards their educational goals (Repetto et al., 2010). This tenet can be most effectively achieved by administration and faculty fostering a caring, disability-friendly learning environment where students with disabilities feel included and not made to feel as less capable than their peers simply because of having a documented disability. For instance, a faculty member revealed the following open-ended response to a survey question:

>I have a visually impaired student and sometimes forget to enlarge a copy for her

Another faculty member revealed the following open-ended response to a survey question:

>The biggest challenge for me has been the anxiety levels of students especially in the beginning of the course. It seems to me they feel like they will have no support or not as much support as they do in traditional classes. I don’t believe this is true in studio classes, so I work hard at
convincing them that they will have the support and the help they need to be successful. And they do

An instructor’s active and consistent involvement plays an important role in any student’s success, but it is even more vital when addressing the provisions of accommodations for a student with a disability that may adversely impact that student’s perceptions as part of the learning process. Therefore, it is vital for administration, as well as for the faculty members involved, to set the tone and provide as much support as possible to address the student’s individual needs as proactively as possible.

Connect

This tenet can be accomplished in a variety of methods, including transition planning, evaluation of future, and implementation of the steps required in order for students to meet their intended goals. For instance, virtual schools are meeting this objective by changing their curriculum and instructional practices (Repetto et al., 2010). This objective can begin with the administration by fostering open communication with faculty. This can be accomplished by a variety of ways. First, it is important that faculty members know they must provide accommodations to a student via facilitation of the accommodation letter that is provided by the DRC on behalf of the student. Second, it is equally important to have all parties actively involved in the accommodation process for the student. This includes knowing what is needed and expected of the administration, faculty member, and the student in order to carry out the accommodations that may be required. For instance, a faculty member indicated the following response when asked to detail the biggest challenge faced when providing accommodations to students with disabilities in an online mathematics classroom:

The visually impaired student is hard to accommodate
This is a prime example of where the component of connect is so important. Such types of provisions of accommodations cannot be accomplished alone. It is not just the responsibility of the DRC personnel, the faculty, student, or academic affairs—it is a college-wide responsibility. Not only is connection necessary for all parties involved, but there is also a legal obligation requiring the college to provide students with disabilities the access necessary from the moment they enter the higher education environment until they leave.

Climate

This tenet asserts the importance of providing safe and caring learning environments. The key to changing the school climate is systematic change with teacher and administrative support (Christie, Jolivette, & Nelson 2007, as cited in Repetto et al., 2010). With respect to this study, this tenet must begin with the community college administration if any effective change is to begin. This includes the organization as a whole, as well as the respective mathematics departments. As mentioned previously, providing access to professional development and training necessary for faculty is the first step in addressing the need for purposeful systematic change. In doing so, a more inclusive teaching and learning environment can be achieved. For instance, when asked in the survey to highlight the biggest challenge when providing accommodations to students with disabilities in an online mathematics classroom, a faculty member reported the following:

The testing to get the code to testing center and extend the time

The component of climate could potentially be improved upon by providing the administrative and departmental support necessary to “bridge the gap” between the
faculty member’s obligations to accommodate the student accordingly in the online environment and the administration’s technical support to accomplish such tasks.

**Control**

This tenet asserts that students can be taught to take control of their learning. Central to the core success of this tenet are metacognitive learning strategies. Such strategies teach students to evaluate academic and behavior situations. These strategies have been shown to have a direct impact on successful student learning outcomes (Repetto et al., 2010). With respect to higher education, this tenet must also begin with the administration and student and academic affairs professionals. This goal can be accomplished by communicating with students the importance of the role that self-advocacy plays in the higher education experience. Students with disabilities in postsecondary environments must self-identify and take charge of their individual academic accommodation needs within the classroom. They likely did not do this in their secondary education experiences. In order to accomplish this task, students must know via their individualized accommodation plans the accommodations for which they are eligible, and they must take control of their academic success and learning experiences by communicating their needs to their individual faculty members. In essence, it is equally critical that students learn as early as possible the importance of taking responsibility for their own learning experiences. This includes being held accountable for their role in the learning process. For example, they must request their accommodation letters at the DRC and consistently utilize their provisions of accommodations as assigned.
Curriculum

This tenet demonstrates that students are more likely to remain engaged in a curriculum that supports their academic needs and exposes them to effective teaching strategies. These strategies include both student and teacher time on task. This ensures both successful academic and behavior experiences (Repetto et al., 2010). With respect to this tenet, it is critical that faculty know their scope of responsibility and accountabilities associated with the support and academic needs required for effective teaching strategies for students with disabilities. This includes faculty building in teaching mechanisms and incorporating a more universal design approach for course curriculum and requirements. Another important factor administration and faculty need to take into account is fostering an awareness of accommodations in the first place. In order to accomplish this task, faculty members need to know of the provisions of accommodations that may exist for a student. Also, faculty members need to be aware that students may have wide ranges of accommodations and collaborations with the DRC, and this is essential in understanding effective teaching strategies and options so they are able to effectively develop and deliver course curricula as seamlessly as possible for this population of students.

Each one of the tenets highlighted above detail the potential for successful integration for online instructional delivery environments for students with disabilities. This model was initially developed as an intervention model for students enrolled in virtual K-12 schools. The model serviced all at-risk student populations, including those students identified as having disabilities. The question to explore is whether the same principles within this conceptual model can be applied to the higher education instructional delivery environments. For example, when addressing the needs of online
curriculum for students with disabilities, the tenet of connect could be implemented into practice quite easily in the higher education environment. This could be achieved by offering more training and professional development in this area. With that said, this is not just the responsibility of the Community College’s DRC and its providers. The strategies and interventions employed must be campus-wide initiatives, most especially between student affairs and academic affairs in an effort to “close the loop” in the teaching and learning process.

Overall, the 5 C’s Model for dropping out represents a comprehensive view of the social, emotional, and academic needs of students with disabilities in high school (Hammond, Linton, Smink, & Drew, 2007, as cited in Repetto et al., 2010). In addition, the model offers a structure for designing schools and courses to improve graduation rates for these students. In addition, the efficacy of the 5 C’s Model in virtual schools has been demonstrated by schools that are successfully increasing course completion and credit recovery for students with disabilities (as cited by Repetto et al., 2010).

As a whole, the 5 C’s Model for dropping out has the potential to work effectively in the traditional, hybrid, and online environments. This conceptual model of practice can be easily implemented for faculty. Ultimately, incorporating such a model within the mathematics course environments can serve as an intervention for both academic and student development. This, in turn, can result in successful course completion, addressing student retention and fostering an overall successful teaching and learning experiences for all parties.

**Implications of Study**

A number of implications can be drawn from this particular study. Most especially, as discussed previously, this study identified a need for the mathematics faculty to
foster a greater sense of awareness when teaching students with disabilities. The study has demonstrated that barriers (i.e., disconnect) exist with the mathematics faculty, and this could have a profound impact in the teaching and learning process. If faculty members are not taking a proactive approach with respect to the training, barriers, and professional development needed to carry out the legal obligations required of them when addressing the needs of this particular student population, nobody wins.

This, in turn, might affect a number of facets, both departmentally and campus-wide, particularly in terms of educating and training individuals on the laws associated with providing access to students with disabilities, the reasonable accommodations identified, and services that may be required for students with disabilities. Regardless of the type of delivery of instruction, it is evident that it is essential to have the full cooperation of the organization and not just those who work in student affairs or in a DRC. Graduate school faculty, administrators, and community college faculty and staff are all responsible for becoming knowledgeable in this area. In addition, individuals who aspire to serve in senior-level faculty positions, such as department chairs or vice presidents, may also benefit from these findings.

Organizations should increase their efforts to establish mandatory training requirements for new faculty hires and those who serve in adjunct faculty capacities. This gives new professionals more opportunities to learn about the expectations and training that may be required of them beforehand as opposed to waiting until the situation presents itself. Some of the study’s respondents had indicated they not only needed the training, but they wanted it.
Faculty should also look at the curriculum, content, and structure of their course materials. Respondents who indicated a “no response” when asked in what ways they modify, change, or adapt course curriculum need to be aware of their scope of responsibility. The conceptual model of the 5 C’s for dropping out (Repetto et al., 2010) shows promise for being effective in the higher education environment. This model could provide both administration and faculty the opportunity to improve the retention efforts for students with disabilities who may be identified as at-risk and to ensure that the provisions of accommodations required for such students are being met.

Community college student and academic affairs divisions should make it a priority to invest in professional development experiences for their entry-level and mid-level employees, to include aspects of cross-training, exposure to disability aspects required for the various teaching environments, and servicing students with disabilities in the higher education environment.

Those who aspire to senior-level student affairs positions may also learn important lessons from this study. They should begin the process by meeting with their DRC and its students to really develop an understanding of the mitigating factors that are impacting the delivery of instruction and service to students with disabilities. Students especially, when given a voice and an encouraging platform on which to exchange ideas, have benefited greatly from this process.

Finally, community college presidents charged with hiring new administrators at senior levels may benefit from developing an awareness of both the faculty and students with disabilities. They can determine if the candidates have the desired skillsets and knowledge base required for this very unique area of student affairs.
Recommendations for Future Research

Generally speaking, many follow-up studies could be derived as a result of this study. Therefore, continued efforts should be made to contact via additional methods of communication the sample population who did not respond. Using a multiple-mode survey design approach (for example, adding phone calls and/or additional letters and self-addressed, stamped envelopes sent via U.S. mail) has been effective in improving data quality. In addition, it can result in increasing overall response rates received by the participants associated with the study (Dillman, Smyrth, & Christian, 2009, as cited in Rodkin, 2011).

More specifically, due to this research being a study with a concentrated focus in the examination of mathematics faculty and provisions for students with disabilities in higher education, the exploration of the mathematics faculty population was examined as a whole and not as two separate distinct populations. The research only targeted faculty identified as having taught for one academic year; therefore, some future recommendations for follow-up studies include, but are not limited to, the following questions for further consideration:

• What are the differences that exist between developmental and college level mathematics and provisions of accommodations?

• What are the differences that exist between developmental and college level mathematics and types of instruction?

• What are the barriers that exist between developmental and college level mathematics and types of instruction?

• What are the differences that exist between developmental and college level mathematics and provisions of accommodations for students with disabilities?
What are the differences that exist between developmental and college level mathematics and types of instruction for students with disabilities?

How can the Five Factors Model (Long, 2004, 2010) be extended to benefit the students who are identified as at-risk in the subject area of mathematics in the postsecondary environment?

Ultimately, the quest to answer the research questions stated above could result in rich data collected to demonstrate the interventions and the provisions of accommodations that are necessary for students with disabilities.

Equally important to take into account for further exploration is the possibility of infusing the components from the conceptual model. The next phase and step to explore is to test the 5 C’s Model for dropping out presented in this exploratory descriptive research study to determine if the conceptual model can be extended in postsecondary environments. Creating a course curriculum and section specifically designed for students with disabilities is another possibility. Identifying students with disabilities before they are “at risk” for dropping out of college can promote successful mathematics course completion. If faculty selected and trained to teach the developmental and college level courses are appointed, trained, and provided with the tools needed where the students “learning style” and the faculty’s “teaching style” could be combined into a cohort section specific to this student population, student retention efforts could be increased, and repeated course attempts could quite possibly be decreased. By implementing such a course curriculum and design, everyone stands to benefit.

**Chapter Summary**

This exploratory descriptive study examined the provisions of accommodations provided for students with disabilities in the traditional, hybrid, and online teaching
environments and mathematics faculty who were identified within a Florida Community College. Strategies and interventions, such as The 5 C’s Model for dropping out (Repetto et al., 2010), were discussed in detail.

With respect to the study itself, what was found as a result revealed several key points. The most notable finding illuminated from survey responses is a clear indication from faculty that not only is training and professional development necessary, but it is critical to provide access and opportunities for their training.

With respect to the students with disabilities, it is clear from the collective research and data collected that there was a clear barrier (i.e., disconnect) present between faculty perceptions of students who had self-identified as having disabilities self-disclosed to them versus the actual number reported within this study. Additionally, the findings demonstrated that some faculty members do believe there is a difference in instruction with respect to the type of teaching platform and accommodations provided.

Ultimately, this study illustrates several key points for consideration. First, for those who are in student and academic affairs and who also aspire to serve as experts in the various types of instruction platforms of teaching, this study highlights the need for professional development. Awareness is also crucial with respect to students with disabilities and provisions of accommodations.

Second, this study could provide a “roadmap” for professionals and stakeholders who wish to foster a dialogue about the barriers that are present, including the “disconnect” that may be present for some faculty.

Finally, this exploratory descriptive study provides a practical and useful model for strategies and intervention within the higher education environment. This is the first
step in the “closing the loop” process for mathematics faculty. The model presented is the beginning of providing a more effective teaching and learning environment for administration, faculty, and students. Ultimately, the goal is to improve teaching practices and the delivery of instruction in order to achieve academic success and retention of at-risk students.
Figure 5-1. Disabilities Resource Center (DRC) student population snapshot
APPENDIX A
MATHEMATICS TEACHING ENVIRONMENTS AND STUDENTS WITH DISABILITIES
SURVEY

Mathematics Teaching Environments and Students with Disabilities

Servicing Students with Disabilities in the Mathematics Environments

The aim of this survey is to explore instructional practices of mathematics faculty in traditional, hybrid, and online environments. In particular, the researchers are interested in understanding what instructional practices that help to facilitate student achievement gains for students with disabilities. This survey is part of a exploratory research study examining instructional practices and accommodations in traditional, hybrid, and online mathematics courses for students with disabilities.

Informed Consent

We are conducting an interview as part of a independent study special topics graduate course on examining transition services for students with disabilities. The purpose of the study is to learn about what services are provided to students with disabilities in the traditional, hybrid, and online mathematics classroom environments. The survey questions are found via the online link provided to you. You will not have to answer any question you do not wish to answer unless otherwise specified.

There are no anticipated risks, compensation, or other direct benefits to you as a participant in this survey. You are free to withdraw your consent to participate and may discontinue your participation in survey at any time without consequence.

If you have any questions about this research protocol, please contact Kelly A. Mongiovi at 352-395-5275 or my faculty supervisor, Dr. Jeanne Repetto, at 352-273-4281. Questions or concerns about your rights as a research participant may be directed to the IRB02 Office, University of Florida, Box 112250, Gainesville, FL 32611; (352) 392-0433.

By taking the survey, you grant us permission to report your anonymous responses in the final manuscript to be submitted to my faculty supervisor as part of my course work.

1. How many years of experience have do you current have teaching mathematics courses at Santa Fe College? Please provide a numbered response (i.e. 2, 4, 10).

2. Which of these courses do you typically teach? (Please select all that apply):
   - [ ] a) Beginning algebra
   - [ ] b) Elementary algebra
   - [ ] c) Intermediate algebra
   - [ ] d) College algebra


3. How many years have you spent teaching in an online environment?
   Please provide a numbered response if applicable. (i.e. 2, 4, 10).

4. What type of teaching do you participate in currently?
   a) Web only – no face to face interaction
   b) Hybrid (Blended) – Meets with students in campus classroom and participates in online platform discussions or assignments
   c) No online classes- All instruction takes place in traditional classroom- face to face interactions.
   d) Both Web only and Hybrid (Blended)
   e) All four types of instruction

5. When teaching in an online format, what types of instructional practices do you typically provide students (Please select all that apply)?
   1. online community
   2. open discussion forum
   3. modules
   4. homework only
   5. other
   If other, please explain in the box provided below:

6. When teaching in an online environment, what type(s) of instructional practices do you provides students?

7. In a typical section, what is the average number of students with disabilities present in your mathematics courses? Please provide a numbered response (i.e. 2, 4, 10)


- e) Non-Algebra mathematics courses
8. What accommodations are made when instructing students with disabilities? (Please check the most common accommodations that you typically provide):

- 1. Classroom/Lab/Library (classroom instruction could include: power point slides, note takers, adjustable tables).
- 2. Exam Graded In-class tasks (Exam Graded In-class tasks could include: extended time on tests, testing accommodations such as location & personnel).
- 3. Computer & Adaptive Technology (Computer & Adaptive Technology could include reading and writing software programs or voice recognition software programs).

9. Do you believe there are differences in accommodations when teaching in different formats (i.e. blended, traditional or online?)

- yes
- no
- If yes, please explain in the box provided below:

10. In what ways do you adapt, change, or modify curriculum in online classrooms?

11. What challenges have you encountered when accommodating students with disabilities in an online mathematics classroom?

12. In what ways are you informed/notified that you have students with disabilities in your classroom?
APPENDIX B
ENDORSEMENT OF STUDY LETTER

Kelly Mongiovi

From: Dave Yonutas
Sent: Wednesday, June 01, 2011 3:01 PM
To: Kelly Mongiovi
Subject: RE: Access to data information for proposed study

My pleasure, Kelly. As always, I live to serve! :D) Let me know how I can help.

d
David N. Yonutas PhD
Associate Vice President
Academic Affairs
3000 NW 83 Street, F-252A
Gainesville, FL 32606
(352) 395-5379 P
(352) 395-7962 F
dave.yonutas@sfcollege.edu

"I expect to pass through this life but once.
Therefore, if there be any kindness I can show, or any good thing I can do for another human being, let me do it now, for
I shall not pass this way again."

William Penn

-----Original Message-----
From: Kelly Mongiovi
Sent: Tuesday, May 31, 2011 7:23 PM
To: Dave Yonutas
Cc: Pattie Locascio; Amy Quillen; Portia Taylor; Ed Bonahue; Claudia Connelly; Jeanne Repetto
Subject: RE: Access to data information for proposed study

Hi Dave et al.,

Thank you so much for your prompt response and attention to this matter. I appreciated the collective information and
I will continue to foster communication as needed with Claudia, you, and the various stakeholders involved at SFC along
with my PI, Dr. Repetto at the University of Florida. As soon as we have further identified the necessary criteria for the
purposes of our study and IRB consideration for approval, I will be in touch.

With Gratitude,

Kelly A. Mongiovi, M.Ed.
Counseling Specialist
Disabilities Resource Center
Santa Fe College
3000 NW 83rd Street
Building S, Room 234
Gainesville, FL 32606-6210
Phone: 352-395-5275
Fax: 352-395-4100
Email: kelly.mongiovi@sfcollege.edu
Website: http://dept.sfcollege.edu/drc/

"Adding value to the lives of our students and enriching our community".

From: Dave Yonutas
Sent: Tuesday, May 31, 2011 3:31 PM
To: Kelly Mongiovi
Cc: Patti Locascio; Amy Quillen; Portia Taylor; Ed Bonahue
Subject: RE: Access to data information for proposed study

Kelly — Best wishes on your dissertation! I spoke briefly with Patti Locascio, the college’s attorney, regarding the IRB process at Santa Fe. She is trying to set up a meeting with Amy Quillen, who may be familiar with the process at SF. However, the college’s primary contact was Mike Droll, who has recently retired. The college does have an IRB made up of faculty and staff from SF and UF, but I have never participated on it.

Patti mentioned that in the past, as long as a university’s IRB approved a study, we usually did not have a problem with it. However, participation by students who are under 18 can complicate matters significantly (5% of our students are under 18 years of age).

Please let me know if you have any questions and I will try to find the answers, Kelly.

David N. Yonutas PhD
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(352) 395-7362 F
dave.yonutas@sfcollege.edu

"I expect to pass through this life but once.
Therefore, if there be any kindness I can show, or any good thing I can do for another human being, let me do it now, for I shall not pass this way again."

William Penn

From: Kelly Mongiovi
Sent: Tuesday, May 31, 2011 1:42 PM
To: Dave Yonutas
Subject: FW: Access to data information for proposed study
Dave:

FYI see below. I will be in touch as needed.

Thanks!

Kelly A. Mongiovì, M.Ed.
Counseling Specialist
Disabilities Resource Center
Santa Fe College
3000 NW 83rd Street
Building S, Room 234
Gainesville, FL 32606-6210
Phone: 352-395-5275
Fax: 352-395-4100
Email: kelly.mongiovì@sfc.edu-kelly.mongiovì@sfc.edu%20-
Website: http://dept.sfc.edu/drc/ AC Weblog: Welcome to the Advising Council Weblog | Santa Fe College |
Gainesville, FL http://ac.blog.sfc.edu/> Nomination Forms for Advising Awards: Awards for Excellence in Advisement | Santa Fe College | Gainesville, FL http://ac.blog.sfc.edu/?page_id=535>
"Adding value to the lives of our students and enriching our community".

From: Kelly Mongiovì
Sent: Tuesday, May 31, 2011 1:38 PM
To: Portia Taylor; Claudia Connelly
Cc: Repetto, Jeanne B; david.yonutas@sfc.edu; Patti Locascio
Subject: RE: Access to data information for proposed study

Dr. Taylor:

Thank you for the prompt response and information. I have also spoken with Claudia and I will take the necessary steps to inquire and accurately complete the IRB process.

Kelly A. Mongiovì, M.Ed.
Counseling Specialist
Disabilities Resource Center
Santa Fe College
3000 NW 83rd Street
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Gainesville, FL 32606-6210
Phone: 352-395-5275
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Email: kelly.mongiovì@sfc.edu-kelly.mongiovì@sfc.edu%20-
Website: http://dept.sfc.edu/drc/ AC Weblog: Welcome to the Advising Council Weblog | Santa Fe College |
Gainesville, FL http://ac.blog.sfc.edu/> Nomination Forms for Advising Awards: Awards for Excellence in Advisement | Santa Fe College | Gainesville, FL http://ac.blog.sfc.edu/?page_id=535>
"Adding value to the lives of our students and enriching our community".

From: Portia Taylor
Sent: Sunday, May 29, 2011 6:59 PM
To: Kelly Mongiovì; Claudia Connelly
Cc: Repetto, Jeanne B; david.yonutas@sfc.edu; Patti Locascio
Subject: RE: Access to data information for proposed study

Kelly,

You must also submit to Santa Fe's IRB before you can proceed. Please contact Dr. David Yonutas in this regard. Thank you.

Pt

From: Kelly Mongiovi
Sent: Friday, May 27, 2011 8:17 AM
To: Portia Taylor; Claudia Connelly
Cc: Repetto, Jeannette B
Subject: Access to data information for proposed study Good Morning Ladies,

I am hoping you can provide me with some feedback and guidance with respect to a proposed study I am currently partnering with one of my dissertation committee members at the University of Florida. We are looking to examine students with disabilities academic success and/or those students who may be at risk who are enrolled in the traditional math classes versus the math online platform of courses. We are wanting to capture this data using the DRC's Access-A-File program. No identifying information regarding the students will be disclosed; we are simply using the categorical information and numbers. Any data will be coded accordingly and randomly selected to protect and maintain the confidentiality of the data collected.

We must submit an IRB for consideration with the University of Florida by June 1st. Dr. Repetto will be serving as the Principle Investigator (PI) for supervision and guidance. I'm just wanting to ensure that I am taking the proper proactive measures with respect to SFC before proceeding. Any feedback and suggestions you may be able to provide would be greatly appreciated.

Sincerely,

Kelly A. Mongiovi, M.Ed.
Counseling Specialist
Disabilities Resource Center
Santa Fe College
3000 NW 83rd Street
Building S, Room 234
Gainesville, FL 32606-6210
Phone: 352-395-5275
Fax: 352-395-4100
Email: kelly.mongiovi@sfcollege.edu
"Adding value to the lives of our students and enriching our community".
APPENDIX C
DEVELOPMENTAL MATHEMATICS SURVEY INVITATION

Kelly Mongiovi

From: Kelly Mongiovi
Sent: Tuesday, November 22, 2011 4:15 PM
To: Kelly A. Mongiovi (kelly.mongiovi@sfccollege.edu)
Subject: *Mathematics Teaching Environments and Students with Disabilities Survey*

Dear Esteemed Colleague:

Santa Fe College invites you to participate in an "Mathematics Teaching Environments and Students with Disabilities Survey," designed to gauge your opinions on what is required in order to examine student and teaching learning needs and possible barriers in both the traditional, hybrid, and online environment in the area of elementary mathematics education.

You are receiving this survey because your feedback and expertise is valuable. Your opinions and the information about your teaching methods, experience, and barriers to effective practice will be carefully considered and they will influence further examination of policies and programs regarding elementary mathematics education in Alachua County.

The survey will take approximately 15 minutes to complete. If you cannot complete the survey in one sitting, you may stop at any point and you will be able to return back to the survey later and pick up with it where you left off.

This link provided is uniquely tied to your email address; please do not forward this message to others. To take the survey, click on the link provided. If you prefer, you may also copy and paste the following information into your web browser:

http://www.surveymonkey.com/s/6MW5N6Q

Thank you in advance for your participation. If you feel you have received this e-mail in error, have additional questions regarding the survey, or if you have additional feedback you would like to provide, my contact information appears below for your convenience.

Again, thank you for your participation!

Kindest Regards,

Kelly A. Mongiovi, M.Ed.
Counseling Specialist
Disabilities Resource Center
Santa Fe College
3000 NW 83rd Street
Building S, Room 234
Gainesville, FL 32606-6210
Phone: 352-395-5275
Fax: 352-395-4100
Email: kelly.mongiovi@sfccollege.edu
Website: http://dept.sfccollege.edu/drc/

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APPENDIX D
COLLEGE LEVEL MATHEMATICS SURVEY INVITATION

Kelly Mongjovi

From: Kelly Mongjovi
Sent: Tuesday, November 22, 2011 4:17 PM
To: Kelly A. Mongjovi (kelly.mongjovi@scollege.edu)
Subject: **Mathematics Teaching Environments and Students with Disabilities Survey**

Dear Esteemed Colleague:

Santa Fe College invites you to participate in an "Mathematics Teaching Environments and Students with Disabilities Survey," designed to gauge your opinions on what is required in order to examine student and teaching learning needs and possible barriers in both the traditional, hybrid, and online environment in the area of postsecondary mathematics education.

You are receiving this survey because your feedback and expertise is valuable. Your opinions and the information about your teaching methods, experience, and barriers to effective practice will be carefully considered and they will influence further examination of policies and programs regarding postsecondary mathematics education in Alachua County.

The survey will take approximately 15 minutes to complete. If you cannot complete the survey in one sitting, you may stop at any point and you will be able to return back to the survey later and pick up with it where you left off.

This link provided is uniquely tied to your email address; please do not forward this message to others. To take the survey, click on the link provided. If you prefer, you may also copy and paste the following information into your web browser:

http://www.surveymonkey.com/s/B2MKP6

Thank you in advance for your participation. If you feel you have received this e-mail in error, have additional questions regarding the survey, or if you have additional feedback you would like to provide, my contact information appears below for your convenience.

Again, thank you for your participation!

Kindest Regards,

Kelly A. Mongjovi, M.Ed.
Counseling Specialist
Disabilities Resource Center
Santa Fe College
3000 NW 83rd Street
Building S, Room 234
Gainesville, FL 32606-6210
Phone: 352-395-5275
Fax: 352-395-4100
Email: kelly.mongjovi@scollege.edu
Website: http://dept.scollege.edu/drc/

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APPENDIX E
DEVELOPMENTAL MATHEMATICS FOLLOW-UP PAPER SURVEY REMINDER

Santa Fe College
Disabilities Resource Center

Date: April 11, 2012

To: College Level Prep Math Faculty
Santa Fe College

From: Kelly A. Mongiovi, M.Ed.
Counseling Specialist, SFC Disabilities Resource Center

Re: “Mathematics Teaching Environments and Students with Disabilities Questionnaire”

Dear Esteemed Santa Fe Colleague:

I am writing to you with a most sincere request. This past Fall 2011 and Spring 2012 semesters, I invited you to participate via email through a Survey Monkey link in the “Mathematics Teaching Environments and Students with Disabilities Questionnaire,” designed to gauge your opinions and experiences as a result of your teaching mathematics courses at Santa Fe College. As some of you may be aware, I am in the final stages of writing my dissertation and completing my Ph.D. at the University of Florida. Part of my dissertation requirements involve the completion of the survey questionnaire. Your responses offered will provide the College, Student Affairs as well as Academic Affairs a better understanding of the success in the learning outcomes for students with disabilities in mathematics courses.

You are receiving this questionnaire because your feedback, comments, and participation are critical to the Disabilities Resource Center, the Diversities of Student & Academic Affairs & Santa Fe College. Your opinions and the insights shared about your experience will be carefully considered and they will ultimately be used to strengthen and provide improvements and insights into student success and effective teaching strategies for students with math related disabilities at Santa Fe College.

The survey will take approximately 10 minutes to complete. The responses you provide will remain strictly confidential. By doing so, you are giving your informed content to
participate in the questionnaire. Feel free to answer the open-ended questions on a separate sheet of paper if needed. If you have already submitted your responses to the survey online, then please disregard this notification.

Upon completion of the survey, please return to the copy your department chair, Mark Dicks, no later than Friday, April 20, 2012. If you have additional questions regarding the questionnaire, or if you have additional feedback you would like to provide, my contact information appears below for your convenience.

Again, thank you for your participation!

With Appreciation,

Kelly A. Mongiovi, M.Ed.
Counseling Specialist
Disabilities Resource Center
Santa Fe College
3000 NW 83rd Street
Building S, Room 234
Gainesville, FL 32606-6210
Phone: 352-395-5275
Fax: 352-395-4100
Email: kelly.mongiovi@sfc.edu
Website: http://dept.sfc.edu/drc/
Date: April 11, 2012

To: College Level Math Faculty
    Santa Fe College

From: Kelly A. Mongiovi, M.Ed.
      Counseling Specialist, SFC Disabilities Resource Center

Re: “Mathematics Teaching Environments and Students with Disabilities Questionnaire”

Dear Esteemed Santa Fe Colleague:

I am writing to you with a most sincere request. This past Fall 2011 and Spring 2012 semesters, I invited you to participate via email through a Survey Monkey link in the “Mathematics Teaching Environments and Students with Disabilities Questionnaire,” designed to gauge your opinions and experiences as a result of your teaching mathematics courses at Santa Fe College. As some of you may be aware, I am in the final stages of writing my dissertation and completing my Ph.D. at the University of Florida. Part of my dissertation requirements involve the completion of the survey questionnaire. Your responses offered will provide the College, Student Affairs as well as Academic Affairs a better understanding of the success in the learning outcomes for students with disabilities in mathematics courses.

You are receiving this questionnaire because your feedback, comments, and participation are critical to the Disabilities Resource Center, the Divisions of Student & Academic Affairs & Santa Fe College. Your opinions and the insights shared about your experience will be carefully considered and they will ultimately be used to strengthen and provide improvements and insights into student success and effective teaching strategies for students with math related disabilities at Santa Fe College.

The survey will take approximately 10 minutes to complete. The responses you provide will remain strictly confidential. By doing so, you are giving your informed consent to

Building S, room 229 • 3000 NW 83rd Street • Gainesville, FL 32606-6210
Office 352.395.4400 • Fax 352.395.4100 • E-mail disability.info@sfc.edu
www.sfc.edu
participate in the questionnaire. Feel free to answer the open-ended questions on a separate sheet of paper if needed. If you have already submitted your responses to the survey online, then please disregard this notification.

Upon completion of the survey, please return to the copy your department chair, Katey Arnold, no later than Friday, April 20, 2012. If you have additional questions regarding the questionnaire, or if you have additional feedback you would like to provide, my contact information appears below for your convenience.

Again, thank you for your participation!

With Appreciation,

Kelly A. Mongiovi, M.Ed.
Counseling Specialist
Disabilities Resource Center
Santa Fe College
3000 NW 83rd Street
Building S, Room 234
Gainesville, FL 32606-6210
Phone: 352-395-5275
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Website: http://depi.sfcollege.edu/drc/
APPENDIX G
KEY DEFINITIONS

**Americans with Disabilities Act.** The ADA defines a disability as “any mental or physical condition that substantially limits an individual’s ability to perform one or more major life activities” as compared with the average person in the general population. Major life activities include, but are not limited to, walking, seeing, hearing, speaking, breathing, performing manual tasks, caring for one’s self, working and learning” (Excelsior College, 2012).

**Attitudinal Barriers.** According to Rao (2004), attitudes are characterized by more than 30 operational definitions. Researchers have been concerned with understanding how social behaviors and attitudes serve as motivators for behaviors (Rao, 2004). More simply, Lefrancis (1994) describes attitudes “as a prevailing inconsistent tendency to react in a certain way” (as cited in Soder, 1990, p. 227). Attitudinal barriers have been described as being “ambivalent” attitudes towards the student’s needs regarding academic accommodations.

**College-Level Mathematics Courses.** For the purposes of this study, a college level mathematics course is defined as the courses of Intermediate Algebra (MAT 1033), College Algebra (MAC 1105), and Non-Algebra courses.

**Community College.** For the purposes of this study, a community college is referred to as a nonprofit, two-year institution of higher education where the most common degree being conferred to students is an associate’s degree (Rodkin, 2011).

**Disability.** The ADA defines a disability as “any mental or physical condition that substantially limits an individual’s ability to perform one or more major life activities” as compared with the average person in the general population. Major life activities
include, but are not limited to, walking, seeing, hearing, speaking, breathing, performing manual tasks, concentrating, caring for one’s self, working, learning, and the operation of a major bodily function such as those of the immune system, respiratory system, etc.” (Excelsior College, 2012).

**Disabilities Resource Center.** According to 42 USCS, the term Disability Resource Center means "an entity established by a State as part of the State system of long-term care, to provide a coordinated system for providing:

(A) comprehensive information on the full range of available public and private long-term care programs, options, service providers, and resources within a community, including information on the availability of integrated long-term care;

(B) personal counseling to assist individuals in assessing their existing or anticipated long-term care needs, and developing and implementing a plan for long-term care designed to meet their specific needs and circumstances; and;

(C) consumers’ access to the range of publicly-supported long-term care programs for which consumers may be eligible, by serving as a convenient point of entry for such programs (“Aging and Disabilities,” 2012).

**Developmental Mathematics Courses.** For the purposes of this study, a developmental level math course is defined the following courses: Prep Pre-Algebra (MAT 0002), Elementary Algebra plus Arithmetic (MAT 0020), and Elementary Algebra (MAT 0024).

**Hybrid Learning.** For the purposes of this study, hybrid learning is defined as “a mixture of classroom and online instruction” (Buzzetto-More & Sweat-Guy, 2006, p. 152).

**Math Difficulty.** Math difficulty is characterized by those elements in which environmental, social or economic factors impede the development of mathematical knowledge” (Maccini, Mulcahy, & Wilson, 2007; Swanson, 2009).
**Math-Related Learning Disability.** According to the National Center for Learning Disabilities (NCLD, 2012), students with a math-related learning disability may cause difficulty in visualizing patterns, different parts associated with a math problem or identifying the critical information that is required in order to solve equations and more complex problems.

**Online Learning.** For the purposes of this study, online learning is defined as “learning that takes place partially or entirely over the Internet” (U.S. Department of Education [ED], 2010, p. 30).

**Provisions of Accommodations.** The provisions of academic accommodations can be characterized as having a shared responsibility between the College and the student requesting an accommodation. In addition, it is recognized that such academic accommodations requests are intended to “level the playing field” for students with disabilities, but are not intended to give students an academic advantage (University of Guelph, 2012).

**Reasonable Accommodations.** Reasonable accommodation refers to “the provision of aids or modification to testing, services or a program of study, which allows access by individuals with disabilities” (Excelsior College, 2012).

**Student Affairs.** Student affairs refers to the division within a college or university charged with assuming a number of complex administrative and learning-experiential matters of students’ time outside of the classroom (Moneta & Jackson, 2011; Sandeen, 1996). Positive experience and interactions with programs under the purview of student affairs has been shown to have a significant impact on student retention, persistence, and learning (Kuh, Schuh, Whitt, & Associates, 1991; National Association of Student...

**Traditional Learning.** For the purposes of this study, traditional learning is defined as “face-to-face instruction” (ED, p. 30).
LIST OF REFERENCES


University of Guelph. (2012). *Academic accommodation for students with disabilities, guidelines and procedures*. Retrieved from [http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1587.shtml](http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1587.shtml)


BIOGRAPHICAL SKETCH

Kelly Anne Mongiovi was born on July 18 in Charleston, South Carolina. Kelly and her family lived in Buffalo, New York until she was 9 years old, at which time, they moved to Palm Bay, Florida. After graduating from Palm Bay High School in 1995 (she ranked No. 2 in her graduating class), Kelly attended Brevard Community College, where she received a full academic scholarship. Upon graduating with honors from Brevard Community College in 1997, she transferred to the University of Florida to pursue degrees in occupational and speech therapy.

After graduating from the University of Florida and receiving a Bachelor of Arts degree in communication sciences and disorders in 2000, she began her career as a student affairs professional. She held positions with the University of Florida’s College of Business and the Dean of Students Office’s Disability Resource Center (DRC). In 2004, she was admitted to the College of Education master’s program in student personnel and higher education, and she maintained her appointment with the Dean of Students Office. During this time, she was the recipient of various accolades, including the University’s Division of Student Affairs Superior Accomplishment Award, the Student of the Month Award on behalf of the College of Education, and the prestigious University of Florida’s university-wide Superior Accomplishment Award.

Upon receiving her Master of Education degree in 2006, Kelly returned to her roots and assumed the position of counseling specialist with the DRC at Santa Fe College. At the urging and support of key faculty members at the University of Florida, Kelly decided to pursue her doctorate in higher education administration. She was admitted to the University of Florida as a doctoral student in 2009, and she earned her degree of Doctor of Philosophy in Higher Education Administration in 2012.
During the completion of her doctoral program, Kelly continued her appointment and passion for teaching and helping students succeed at Santa Fe College. She also began advanced research on various students with disabilities and faculty populations with respect to attitudes and perceptions, the leadership gap that can often exist within student and academic affairs, as well as examination of teaching and learning styles. She served as the co-lead principal investigator for a study with the support of University of Florida faculty, Santa Fe College administration, and a fellow University of Florida doctoral student. She also presented her research findings throughout her service to Santa Fe College at various national and state conferences.

Her research interests include higher education administration and policy, best practices for fostering successful teaching and learning environments for students with disabilities, individuals’ attitudes and perceptions regarding students with disabilities and special populations such as GED, transition from secondary to postsecondary education, and promoting the needs for access and advocacy for students with disabilities, as well as underrepresented student populations.