The Dissertation Committee for Benjamin Butler Ferrell, Jr.
certifies that this is the approved version of the following dissertation:

THE EFFECTS OF STUDENT PSYCHOLOGY ON

REMEDIAL MATH SUCCESS:

A CASE STUDY ON NON-ACADEMIC INTERVENTIONS

Committee:

_____
Norma V. Cantu, Co-Supervisor

_____
Richard J. Reddick, Co-Supervisor

_____
Edwin R. Sharpe

_____
Marilla D. Svinicki

_____
John E. Roueche

THE EFFECTS OF STUDENT PSYCHOLOGY ON REMEDIAL MATH SUCCESS: A CASE STUDY ON NON-ACADEMIC INTERVENTIONS

by

Benjamin Butler Ferrell, Jr., B.B.A.; M.A.

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THE EFFECTS OF STUDENT PSYCHOLOGY ON

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Supervisors: Norma V. Cantu; Richard J. Reddick

This single case study explored the relationship between non-academic interventions that supported student psychosocial factors and remedial math success. The theoretical framework proposed that remedial math success was linked to psychosocial factors as described by Bandura's social cognitive theory rather than merely cognitive factors possessed by the student. The literature review revealed that remedial math success in community colleges was chronically problematic, that psychosocial factors were fundamental to human development and learning and well supported by neuroscience, and that above average academic success has long been positively correlated with programs of non-academic interventions. According to the findings of this study, non-academic interventions such as case management, cohorts, accelerated remedial math coursework, childcare, and emergency financial assistance, provided psychosocial support essential to learning and development, which in turn resulted in extraordinary success in remedial math completion. The conclusion drawn

from the findings is that effective psychosocial support is essential to achieving exceptional remedial math success rates.

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Chapter One: Introduction

Something appears to be missing in the way community colleges prepare academically at-risk students for college level math courses such as Algebra. After decades of requiring remedial education for these students, persistently high failure rates have placed community colleges under intense academic, social, and political pressures to find what is missing and rectify it. To date they have not.

In an effort to expand the search, this study draws upon theories of learning from the field of social psychology in the form of Bandura's social-cognitive theory (Bandura, 1986). Social cognitive theory holds that learning is the reciprocal interaction of a triadic system consisting of (a) the individual; (b) the environment that has shaped, currently shapes, and is in turn shaped by the individual; and, (c) the individual's social interactions with others. From this perspective, it might be suggested that community colleges that are simply offering remedial instruction to at-risk students may be focusing on only one element of human learning. The focus is on the student as an individual, while looking to the at-risk student to supply for himself or herself, the critical factors of a supportive educational environment and guided social interactions with others facing similar educational challenges. A large body of research suggested that, in spite of basic math instruction having been generally available throughout the K-12 years, impoverished environmental factors and social interactions may have largely contributed to the at-risk status of the students in the first place. Failing to consider these factors in

remedial education efforts is tantamount to nothing more than the community college perpetuating the failed educational systems the at-risk students have long been accustomed to, and providing no reason for these students to believe their results will be different than before.

Statement of the Problem

The math problem. Algebra, a branch of mathematics defined by Merriam-Webster's 11th Collegiate Dictionary as a "generalization of arithmetic in which letters representing numbers are combined according to the rules of arithmetic" (Merriam-Webster, 2009, p. 30), is arguably the most difficult course in American postsecondary education for millions of college students who are underprepared for college level math (Complete College America, 2012). Unfortunately for these students, passing Algebra is generally required by most colleges and universities in order earn a college degree, whether it be an Associate's degree in a community college or a Baccalaureate degree at a 4-year university (Li, Uvah, Amin, & Okafor, 2010; Mathematical Association of America, 2013).

Over the last several decades, attempts to solve this problem have spawned a costly multi-billion dollar industry in postsecondary education known as remedial math (also referred to as developmental math), which is intended to teach high school level math to adults (18+) in order to pass a college level Algebra course. The underlying assumption behind remedial math education has been that failure to pass Algebra is

simply due to the absence of fundamental math skills not learned (or forgotten) in high school, and that requiring preparatory math courses would solve the problem. Yet, in spite of an estimated $3 billion (Strong American Schools, 2008) invested annually by states to provide remedial math courses, and millions more dollars provided by private grantors such as the Bill and Melinda Gates Foundation (2013) to find a solution to the low success rates, only approximately 30% of the students requiring remedial math ever pass a college level Algebra course (Bailey, 2008; Bailey, Jeong, & Cho, 2009; Complete College America, 2012; Strong American Schools, 2008).

Remedial education in the United States is taught at universities and community colleges, with approximately 75% of the 1.3 million remedial students attending community colleges (Sparks & Malkus, 2013; Strong American Schools, 2008). The American community college concept was developed in the late 19th century, and envisioned open-door, non-selective institutions that provided the first two years of a 4-year college education, or postsecondary workforce training, to all who wish to avail themselves of such opportunities. By their very nature, community colleges often enroll students who lack sufficient skills in reading, writing, and mathematics; skills that are deemed necessary for college level coursework (A. M. Cohen & Brawer, 2009). In the past, these students were allowed to enroll in college level courses immediately, and take their chances on passing the courses. Many of these students failed. Due to these high failure rates, the state legislators who partially funded these failed attempts at college

began to require pre-assessment tests for students to determine their degree of preparedness for college level courses. If a student was deemed deficient in one or more of the basic academic skills, they were required to take remedial courses to develop the necessary skills for college coursework. This pre-testing has resulted in up to two-thirds of all community college students being mandated into one or more remedial courses, most often in math (Bailey et al., 2009; Merisotis & Phipps, 2000).

The strategy of requiring remedial courses has experienced some level of success for reading and writing skills, with approximately two-thirds of students successfully completing their courses within a semester or two (Bailey, 2008; Merisotis & Phipps, 2000). For math however, the story is far different, with only about 30% of students ever completing their remedial math sequence, and for those students who start in the lowest level courses, fewer than 10% ever pass a college level math course (Bailey, 2008). The inability to remediate math skills for most students who require it is generally acknowledged by educators and policymakers to be the most vexing problem in American postsecondary education today, and is a worsening national problem given the stated goal of America producing more college graduates in order to remain competitive in a global economy (Adelman, 1998; American Association of Community Colleges, 2012; Bailey et al., 2009; Complete College America, 2012; Strong American Schools, 2008).

This study proposed that the missing element in successful math remediation may require attending to student psychosocial needs first, and in ways that are meaningful to the student. To examine this approach, this study focused on student psychosocial needs using Bandura's theoretical construct of self-efficacy (Bandura, 1986, 1993, 1997). It further explored the non-academic interventions that research has shown to be successful in improving remedial math success, and may do so by causing positive changes in student self-efficacy in some way. Bandura's self-efficacy theory holds that "students' beliefs in their efficacy to regulate their own learning and to master academic activities determines their aspirations, level of motivation, and academic accomplishments" (Bandura, 1993, p. 117). Therefore, the need for community colleges to shift attention from how remedial courses are delivered, to addressing the psychosocial factors that may be affecting student beliefs about their ability to learn, could contribute to improving student achievement in remedial education.

The social problem. Further exacerbating this math problem, and elevating it to a growing social problem, is the overrepresentation of minority and low-socioeconomic status (SES) students who are required to take remedial math coursework to prepare for Algebra, yet who never complete remedial math requirements, thus disproportionately blocking their path to a college education (Bailey et al., 2009; Complete College America, 2012; Strong American Schools, 2008). Adding to the sociopolitical problem are the ethnic minority populations in America that have increased dramatically in the

last few decades, with the Hispanic population growing the fastest of all (U. S. Census Bureau, 2011). Failure to educate these growing populations in an increasingly technological and knowledge based economy has elevated concerns that the United States will decline in competitiveness among the ranks of world economies, and undermine the social stability historically believed by many to be dependent upon a strong American middle-class (Lumina Foundation, 2012).

The political problem. Because of these educational and social problems, no other course in American postsecondary education is causing greater consternation and frustration among lawmakers and advocacy groups at the local, state, and national levels, who believe millions of taxpayer dollars are being squandered in providing remedial math courses for students who will likely never pass a college Algebra course (Adelman, 1998; Bailey et al., 2009; Complete College America, 2012; Li et al., 2010; Parker, Bustillos, & Behringer, 2010). This situation has resulted in something of a no-confidence vote by legislators aimed at the colleges and their faculties to address the remedial problem in meaningful ways. As a consequence, funding for remedial education is being limited; appropriations are being tied to successful outcomes rather than enrollments, and requirements to provide alternative instructional methods are being written into laws. All of these consequences place increased financial burdens on the community colleges by either reducing current funding for remedial education, or by mandating the creation of new instructional methods.

The psychosocial problem. Even if community colleges found a way to significantly improve success rates in remedial math for all students, the solution may go wanting if the growing populations of minority students do not perceive that their own ability (self-efficacy) to succeed in college level math prompts them to eliminate higher paying career choices in technological fields (Bandura, 1997). Bandura, citing Betz and Hackett (1987), stated "perceived mathematical self-efficacy contributes more significantly to educational and career choices making use of quantitative skills than does the amount of mathematical preparation in high school, level of mathematical ability and past achievement, and anxiety over mathematical activities" (Bandura, 1997, p. 423). He also observed that a large body of literature based on self-efficacy theory has consistently shown that psychosocial elements such as low math self-efficacy can be primarily responsible for many students in avoiding entire classes of occupations when making education and career decisions. The chronically high failure rates in remedial math education at community colleges may well be affirming inaccurate perceptions of the likelihood of success for millions of at-risk students.

Potential Solutions

In light of the national attention to the Algebra problem, and in support of this study, research has shown that non-academic interventions that affect the student psyche in ways that promote a sense of belonging in college, create the sense of a supportive environment, and build student confidence in their academic ability (self-efficacy), have

resulted in significant improvements in academic achievement (Bandura, 1997; Karp, 2011; Pascarella & Terenzini, 2005, p. 223; Tinto, 1993, p. 73; Walton & Cohen, 2011; Yeager & Dweck, 2012; Yeager & Walton, 2011).

These interventions have also shown to be effective in closing the achievement gaps between White students and African American, Hispanic, and low SES students. Braunstein, Lesser, and Pescatrice (2008) found that low SES students with lower entrance scores than the general student population where the study was conducted, and who received specialized case management services such as tutoring and mentoring, persisted over a 3-year period at nearly the same rate as students who were not low SES and who had higher entrance exam scores. Helmer and Blair (2010), in a study on high achieving workforce preparation programs, found that low SES community college students enrolled in a program specializing in intensive non-academic support services, and who required remedial courses, successfully completed remediation at an 80% rate, exceeding the national average of approximately 30% for students requiring remediation in community colleges (Bailey et al., 2009). In another study on social-psychological interventions, Yeager and Walton (2011) found that brief interventions directed at minority students' "thoughts, beliefs and feelings about school can result in increases in academic achievement, and sharply reduce achievement gaps, even months and years afterwards" (Yeager & Walton, 2011, p. 267).

Research from the emerging field of cognitive neuroscience also supported non-academic interventions that focus on student psychological factors. Mangels, Good, Whiteman, Maniscalco, and Dweck (2012) performed a neurological study using electroencephalograms (EEG), which measures voltage variations in the brain, to identify physiological responses to math stereotype threat (fear of fulfilling a stereotype of lower achievement in math), and found that negative emotions due to stereotype threat, literally blocked learning processes in the brain, and concluded that programmatic interventions that address negative emotional responses to stereotype threat can be effective in promoting learning. They noted that the findings of their study were consistent with findings in similar studies using functional magnetic resonance imaging (fMRI), which uses blood flow to measure brain activity while performing certain tasks. In another neuroscience study, Young, Wu, and Menon (2012) used fMRI to study math anxiety in young children. Math anxiety is a condition that triggers negative emotional responses in the brain when learning math, thus blocking the learning process. Their study found that math anxiety is due to an abnormality in brain development that results in a reduced ability to filter negative thoughts, resulting in negative emotions that trigger a fear response that shifts brain resources from areas that are required in the learning process to those that control psychomotor functions used to respond to danger. The study concluded with recommendations for early interventions that have been successful in treating other phobias.

These and similar studies suggested that improving success in remedial math programs may have little to do with curriculum and teaching methods, and may involve far more complex issues involving psychosocial and neurobiological effects that physically inhibit the learning processes of the brain, and that must be addressed through programmatic interventions designed to mitigate these effects, before learning in complex subjects like math can occur.

Purpose of the Study

The purpose of this study was to use the theoretical perspective of Bandura's social cognitive theory in order to gain a better understanding of whether or not there is a relationship between non-academic interventions and successful math remediation.

Much research today calls for a fundamental rethinking of remedial education (Bailey, 2008; Parker et al., 2010; Twigg, 2005; J. R. Young, 2012). To that end, and in support of the hypothesis of this study that failure to address student psychosocial needs plays a role in the lack of student success in remedial math, a case study was proposed that focused on remedial math students enrolled in a grant funded specialized workforce intermediary program known as Capital IDEA (Investing in Development and Employment of Adults) (CI) in Austin, Texas. The program is recognized as an effective and successful provider of non-academic interventions in the central Texas region (Braunstein et al., 2008; Conway, Blair, & Helmer, 2012; Giloth, 2003), and recruits low socioeconomic status students guiding them to a college degree in high paying fields

such as healthcare and information technology. The primary role of CI is to provide specific non-academic interventions for students while they matriculate through academic coursework at a large urban community college. For students requiring remedial math, CI requires an accelerated 12-week course of study called the College Prep Academy that prepares the students to pass a state examination that determines college readiness in math.

Research Questions

1. Which non-academic interventions are used to support students in remedial math?
2. Why are the interventions used to support students in remedial math?
3. How are the interventions used to support students in remedial math?
4. Do students perceive the non-academic interventions as useful?
5. Is there a difference in remedial math completion between students who participate in a prescribed program of non-academic interventions and those who do not?

Overarching Research Questions

The overarching research questions for this study were:

1. Is the effectiveness of the CI program due to the emphasis on non-academic support mechanisms?

2. Do the non-academic support mechanisms used by the CI program have student psychosocial needs, such as self-efficacy, as a basis for student success?

Brief Overview of Methodology

This study proposed a qualitative single-case study design, due to the superior ability of this method to explain phenomena at a deep level, and gain richer insight to address the "how and why" research questions posed (Yin, 2009, p. 9). Descriptive statistical data was gathered to add insight to the qualitative findings of the study, and addressed the research questions regarding perceptions of participants. While the proposed study gathered both qualitative and quantitative data, it was not considered a mixed methods study due to the difficulty of operationalizing certain concepts, the small sample sizes, and the inability to randomize participants. Therefore, the statistical data was used to add validity to the qualitative data.

The unit of study for the case was Capital IDEA (CI) of Austin, an organization classified as a workforce intermediary (Giloth, 2003), that provides the non-academic interventions which are the focus of this study. Data was collected from CI staff, and written documents were obtained through an interview process to determine which non-academic interventions CI provides to its students, and the reason it provides each intervention. The interventions identified were categorized according to the four factors defined in a recent meta-analysis of the research on non-academic interventions that was performed by the Community College Research Center, Teachers College, Columbia

University (Karp, 2011). To obtain data on student perceptions of non-academic interventions, CI students and staff were surveyed using a Likert-type instrument created to assess perceptions regarding the usefulness of CI's non-academic interventions. This researcher administered the Likert-type instrument as part of the interviews.

Academic enrollment and progress data on CI students was obtained from student records provided by CI. These same student records provided demographic data on self-reported ethnicity and gender. Student socioeconomic status was assumed to be low in this study, as it is a requirement for participation in the CI program.

The interview protocol focused on the students' and what they believe the program provided them that enabled them to be successful in acquiring college level math skills. The purpose of the qualitative component was to enrich and inform the study, and to provide one basis for suggesting additional research on the topic.

Definition of Key Terms

Social Learning Theory: Follows the social constructivist world-view, which holds that learning is inherently the result of social interactions that construct meaning, rather than learning being a separate phenomenon within the individual that is then applied to social interactions in the classroom.

Social Cognitive Theory: Holds that learning is a continuous reciprocal interaction between the individual, the environment, and other people, with a key

element being the contribution of the individual to the result of the process rather than as a passive recipient of external inputs.

Socio-Psychological/Psychosocial: Terms often used interchangeably to describe the effect of psychological and sociological interaction.

Self-efficacy: The concept of self-efficacy is an element of Bandura's Social-Cognitive Theory, and is described as an individual's "sense of personal efficacy to exercise some control over events that affect their lives" (Bandura, 1986, p. 391). With respect to academic achievement, the sense of self-efficacy of an individual is not generalized, but task specific. For example, a person may have high self-efficacy in some areas (e.g. reading skills), but low self-efficacy in others (e.g. mathematics). Bandura noted "students' beliefs in their efficacy to regulate their own learning and to master academic activities determines their aspirations, level of motivation, and academic accomplishments" (Bandura, 1993, p. 117).

Beginning CI remedial math students: Those that have been accepted to the program and have tested into remedial math, but have not started their coursework.

Former CI remedial math students: Those that have completed their math remediation and have passed the math portion of the Texas Success Initiative exam.

College Level: The level of basic academic skills in reading, writing, and mathematics deemed necessary to successfully complete college courses. The level of required skills to be considered "college level" is set by the Texas Higher Education

Coordinating Board by achieving a set score on assessment exams administered on a state required test.

Non-Academic Interventions: Defined as "services, interventions, and informal activities that help students address the social, cultural, and otherwise implicit demands of college" and "…are intended to help students navigate the academic world of higher education" (Karp, 2011, p. 3). This study defines the term broadly to include programmatic services other than direct classroom instruction by a faculty member who is qualified to teach that subject at an accredited postsecondary institution. For example, direct remedial math instruction recognized for credit at the community college would be classified as an academic intervention, but related mandatory tutoring sessions required by CI would be considered a non-academic intervention. Similarly, accelerating the same remedial course would be a non-academic intervention because the academic content of the course did not change, but mandating that CI students take the course as full-time students in a cohort, and in a compressed time period, would be classified as a non-academic intervention.

Remedial Education: Several terms are used interchangeably in the literature to denote coursework intended to prepare college age students for college level courses. Terms such as developmental, college preparatory, and basic skills, are also commonly found in the literature to describe these courses. For this study, the term "remedial" will be used consistently to denote the high school level (or less) math coursework intended

to prepare adult students for college Algebra. While many educational authors may consider the term "remedial" as somehow derogatory, this researcher considers the term "developmental" to be inappropriate for referring to adults in that it implies a deficit psychosocial condition in the person, whereas remedial implies a deficiency in certain academic skills that can be reacquired by the person. This study will use the term remedial for clarity as to the level of courses under study.

Student success/non-success: Student success is defined as passing the state remedial math exam with a score sufficient to enroll in a college level math course. Non-success is defined as a low score on the state assessment test that prohibits a student from enrolling in a college level math course, or withdrawal from the CI program.

Limitations and Delimitations

Limitations are influences on a study that the researcher cannot control, whereas delimitations are influences, conditions, or restrictions that the researcher has chosen for a study.

Limitations.

Participant selection. Participants in the study were those selected by CI for the summer 2014 remedial math cohort. Participants were selected based on eligibility for the CI program and may or may not have been representative of the general population. However, this selectivity provided assurance that participants were low SES status students and at-risk academically due to the eligibility requirements of the CI program.

Small sample size. Approximately 25 participants were anticipated based on class size criteria used by the CI program. This provided a sample size too small for statistical reliability, which is one reason a case study was chosen rather than a quantitative study.

Time limitations. The researcher was constrained as to the time and location of the CI program and willingness of its members to participate in the study. The CI program indicated a strong willingness to take part in this study. Although student participants were not required to participate, all agreed to be interviewed.

Correlation of program services with the assumptions of this study. The CI program does not intentionally provide its services based on the theoretical constructs used in this study, but rather they are based on the needs of its participants in obtaining success. Correlations between program services and theoretical constructs were based on the literature, interviews, and the judgment of the researcher based on the data gathered. The researcher attempted to minimize subjective judgment in making these correlations through use of current studies from the literature. However, the researcher chose the qualitative case study methodology due to its flexibility in interpreting the data, and interpreted it as needed to form conclusions.

Delimitations. The time frame for the study was necessarily limited by considerations related to the researcher's desired time frame for completing his doctoral program.

Limited scope. The researcher chose a single workforce intermediary organization for the study based on its availability and willingness to participate. This was not considered to be a significant threat to validity since the CI program was recognized in multiple independent studies as exemplary in its practices and verified in its success in providing the services that were the focus of this study.

Comparative data. Comparative data was obtained from the state agency that compiles remedial math results from all fifty community college districts in Texas. The college districts' results in remedial math were consistent with results typically found nationally in the literature, and were considered sufficiently comparable for the purposes of this study.

Assumptions. The researcher assumed, based on the literature, that there was strong evidence that socio-psychological factors were a major determinant of success or failure in remedial math instruction.

The researcher also assumed that the students in the program of interest, Capital IDEA, were adequately pre-screened and assessed for the program. The grant funders supporting the program required that the program admit only those students who can demonstrate low SES status (personal income below 200% of poverty level), and were pursing a college degree in an academic program of study leading to a skilled position in the workforce.

Finally, the researcher assumed that the students in the CI program were reasonably representative of the college's general population of low socioeconomic status students requiring remedial math instruction. While the CI program was selective of participants, the requirements related to commitment and ability to persevere in the program, rather than academic ability.

Significance of the Study

The findings of this study can have important benefits for students by showing that proactive attention by college educators to affective barriers that stem from student psychosocial needs are a potentially important element in improving remedial math success. Due to the pervasiveness and similarity of the remedial math problem across the nation, significant improvements in remedial math success could translate into increased postsecondary educational attainment and broadened career options for many more students, which could result in more of the societal benefits that stem from an educated populace, and a stronger middle class.

Summary

In summary, remedial math completion continues to be a primary obstacle for millions of students pursuing a college degree (Bailey, 2008), and this obstacle negatively affects low socioeconomic status and minority students in numbers disproportionate to the general student population (Bailey et al., 2009; College Board, 2012). Current efforts to address the issue by community colleges typically focus on

curricular issues, even though there is no lack of research from the field of psychology regarding the psychosocial needs of students, and how not meeting these needs can be an impediment to learning and success in academic endeavors, as research based on Bandura's oft studied social-cognitive theory demonstrates (Bandura, 1997; Paunonen & Hong, 2010; Roueche & Mink, 1976; Yeager & Walton, 2011; C. B. Young et al., 2012). And, there has been much research on non-academic interventions of various types that indicates these interventions can improve student academic success (Fast et al., 2010; Karp, 2011; Pascarella & Terenzini, 2005; Tinto, 1993). Yet, as Karp concluded based on an extensive review of the literature on non-academic interventions, research exploring student perceptions of non-academic interventions, and linking these perceptions to their own academic outcomes, is an area "ripe for research" (Karp, 2011, p. 22). Therefore, this study proposed to extend the literature and understanding of how attending to student psychosocial needs in a systematic way that is perceived as useful by the students may lead to greater completion of math requirements in college.

Overview of the Study

Chapter two of this study is devoted to reviewing relevant literature on the current status of remedial math education in the American community college, social-cognitive theory as applied to learning, and current literature in neuroscience related to how the brain learns.

Chapter three outlines the research methodology that will be used in conducting this research.

Chapter four will describe the results of the research, presenting the data collected.

Chapter five will present conclusions drawn about the composite and individual findings revealed during the research.

Chapter Two: Literature Review

A review of the literature for this study focuses on the following areas: Community colleges, because they teach the majority of remedial math students in America today; remedial math education, because it is often recognized as the single most problematic barrier to a college degree for students who require it; social psychology, because much theory and research indicates it may be a critically important element in academic achievement; neuroscientific studies related to development and learning, because these studies demonstrate a neurophysiological basis for learning and development that affirms much of the findings from social psychology; and non-academic interventions, because these interventions have a long and well documented history which shows that engaging and supporting students in non-cognitive ways improves their retention and success in college. While not exhaustive, a review of the literature shows that, while there has been a great deal of study and discussion on each of the elements of this study in the fields of education, psychology, and neuroscience, it is less common to find research that synthesizes the findings from these fields into research that may be applied to adult learners at the postsecondary level. It is also clear from a review of the literature that problems attendant to improved success in remedial math persist, and that solutions have remained elusive. This dearth of solutions confirms the need and purpose of this research, which is a case study on a highly successful

remedial math program that does work, and potentially increases understanding of why this program works.

In summary, this review of the literature provides context for the study, demonstrates that past research has not resolved the problems with student success in remedial math, and support a need for a broader understanding of the role student psychology may play in remedial math instruction.

American Community Colleges

History. The community college, a purely American invention, is a reflection of the populist notions of education that have dominated American educational policy for most of our nation's history. Thomas Jefferson, believing that there was both a natural and born aristocracy, advocated for a system of free public schooling to "diffuse knowledge more generally" (Peterson, 1984, p. 272) as a hedge against tyranny by the wealthy and powerful, and to "rake from the rubbish annually" (Peterson, 1984, p. 272) those students from poor families that could be developed into an elite for the benefit of democracy. While Jefferson assumed the natural existence of an elite class, he advocated for a system of education that accommodated all classes of citizens based on merit, rather than wealth alone (Peterson, 1984). This movement toward education for the grass roots was further enhanced by President Andrew Jackson (1829 to 1837), who also believed that education was not only for the elite, but was necessary for strengthening democracy by expanding education to the common people, who were increasingly vital

to the industrialization of America, and who were becoming a significant part of the voting populace of the nation (Higbee, Lundell, & Arendale, 2005). Jackson's educational policies dominated the landscape, and eventually led to the land-grant movement as a way to federally fund the broad dissemination of education, leading to the Morrill Acts of 1862, and 1890, whereby federal land was apportioned to the states for resale, with the proceeds used to establish universities "for real people, such as planters, farmers, and mechanics" (Higbee et al., 2005, p. 42). The land-grant university movement broadly transformed into actual brick and mortar the idea that higher education for all was an essential element of sustaining a free, industrialized democracy, and set the stage for the next evolution, the American community college.

By 1900, America's westward expansion, rapid industrialization, and burgeoning populations created a need for ever-more postsecondary education for a greater number of people, and in a broader variety of locations. America was growing rapidly, and not only in its historical centers of population in the East and Midwest. The population of California had been exploding since the discovery of gold in 1848, becoming the most populous state in the Union by 1964, and Texas' population surpassed the state of New York in the 1990s to become second only to California. As a result, by the early part of the 20th century, many states had begun to form junior colleges, later termed community colleges to more clearly identify their localized nature, to satisfy America's seemingly insatiable need for a more broadly distributed way to provide postsecondary education

(Roueche, Ely, & Roueche, 2001). The first public community college, Joliet Junior College near Chicago, was established in 1901 (A. M. Cohen & Brawer, 2009). The first publicly supported *system* of community colleges was created in 1906 by the State of California (Douglass, 2000). Throughout the 20th century, states followed the lead of Illinois and California, building community colleges at an astounding pace, until today there are over 1,100 community colleges located in all 50 states, and the District of Columbia (American Association of Community Colleges, 2012).

Mission. The mission of the community college has been discussed on many levels. On a social theory level, debate has raged nearly since the colleges' inception as to whether their true mission was to further the highest ideals of an egalitarian society as envisioned by Jefferson, Jackson, and all notable leaders since (Roueche & Baker, 1987), or was an insidious tool of both conservative and neoliberal hegemony that seeks to oppress the masses by tracking them into non-baccalaureate programs, thus maintaining the position of the wealthy and powerful (Ayers, 2005; Brint & Karabel, 1989; Pincus, 1989; Roueche & Baker, 1987; Roueche & Roueche, 1993). This level of debate was not explored further since the intent of this research was to contribute to the egalitarian effects of the community college mission, and thus logically assumed the former, rather than the latter, was the credible view of these colleges' missions.

The natural evolution of the land-grant university philosophy of providing education to the general population, the mission of community colleges in America has

historically been to extend public postsecondary education in a more geographically diverse and localized way. More specifically, most community colleges have a formal stated mission, usually mandated by both a state agency with oversight responsibilities for the colleges, and by the relevant regional accrediting agency as required by the federal government in order for them to receive student financial aid. These published missions are often somewhat boilerplate in nature (Abelman & Dalessandro, 2008), and consist of language authorizing the college to provide general academic education (including remedial education), defined as the basic courses required for transfer to a university such as English, history, math, etc., the training of workers to serve the skilled labor needs of employers, provide non-credit courses such as continuing education for all levels of adults employed in the workforce, and to provide community service in the form of hobby courses and the like (Douglass, 2000; Roueche & Baker, 1987).

Further refining their mission, most community colleges grew out of their local school districts, and while they may be subject to varying degrees of authority by state agencies, most community college were created to serve specific counties, cities, or citizens within the boundaries of a local school district. Given their localized nature, the mission of any particular community college is influenced by the educational and economic needs of the community it was created to serve (Pedersen, 2005).

Open door. The open door concept is likely the cornerstone of the community college mission (Abelman & Dalessandro, 2008; Roueche, Baker, & Roueche, 1984;

Roueche, Johnson, & Roueche, 1997). Unlike the elite and land grant universities that serve a national and even international student body, community colleges typically serve local communities. More importantly to the social weal as envisioned by Jefferson and Jackson, and unlike land-grant universities who are most often selective in their admission practices, the mission of the community colleges is specifically non-selective (aka open door) in the type of students they will admit to a course of study (Roueche & Baker, 1987). This non-selective aspect of community colleges can be said to be the crown jewel of the intent of Jacksonian democracy to provide postsecondary education for all, and ensures that all Americans, regardless of their situation in life, have the opportunity attend a community college for the reasons of their choice. This distinguishing feature of these colleges has often prompted the saying that community colleges are truly "democracy's college" (A. M. Cohen & Brawer, 2009). However, this open door policy has also brought increasing scrutiny to community colleges over the last several decades by legislators and taxpayer advocacy groups, questioning the amount of money spent attempting to educate students who may have little chance of completing a college degree due to a lack of basic academic skills (Bailey, 2008; Complete College America, 2012; Roueche & Baker, 1987; Roueche et al., 1984; Roueche et al., 1997; Roueche & Roueche, 1993).

Access versus success. The increasingly heated debate over the open door part of the community college mission is rooted in the concept of "access." This concept

assumes that more people would earn college degrees if they could just gain open and affordable access to college, and the rest would take care of itself (Roueche & Baker, 1987). The concept has proved hugely successful, with one only needing to look at the millions of soldiers coming home from World War II, and the Korean and Vietnam wars, who attended community colleges and universities under the GI Bill. This government program may be rightfully attributed to having changed the face of America by placing millions of returning veterans into the American middle-class via a college education (A. M. Cohen & Brawer, 2009).

More recently however, the luster seems to have worn off of the open door access concept, replaced by demands for a more quantitative outcome measured in college completions in the form of degrees and certifications in skill training. These demands have brought to light the fact that many community colleges have not kept data on student outcomes as well as they have tracked enrollments. In other words, they were unable to document the effectiveness of their efforts, or the taxpayer and student dollars that have been invested in them to produce college graduates. This shift in public focus, from inputs to outputs, has hit community colleges particularly hard. For 4-year institutions there has always been only one mission and one measurable outcome that matters: The Baccalaureate and higher degrees, while the community college typically has a myriad of roles specified in its mission, including non-selective open door access. The varied mission of the community college, and its non-selective nature, and the fact

that students do not need to earn a community college degree to transfer to a baccalaureate institution, virtually ensures that community colleges will measure poorly when evaluated in terms of college completion. Adding another volatile mission element to this dilemma is remedial education. Community colleges are the primary provider of remedial education in America, meaning that they enroll significant numbers of students who may not possess even the rudiments of a high school education, may well be functionally illiterate by any measure of illiteracy, and might not even speak English at all (A. M. Cohen & Brawer, 2009). The fact that community colleges welcome these students in great numbers through their open door illustrates that the finest tenets of American democracy are alive and well, but doing so has become the primary political tool of late with which to denigrate these colleges as failures in the continuum of public postsecondary education.

Remedial Education in Community Colleges

A brief history of remedial education. The literature on the history of remedial education showed that in the 1630s, Harvard University complained that its incoming students were unprepared for college level work. At Harvard, this meant that incoming students did not read Latin well enough to study the classics, which was the curriculum of the time. There was no way around this requirement, since final oral exams had to be taken in Latin to graduate. Mathematics was not even a requirement until Yale University added it 100 years later (Boylan, 1993). Since that time, colleges and

universities have continued to be critical of the preparation possessed by their incoming students, but have grudgingly accepted them anyway, mostly to remain competitive among the growing number of eleemosynary institutions in America, especially after the Morrill Acts had their intended effect of spreading universities from coast to coast. Over the ensuing centuries, students requiring remediation have been a consistent problem for postsecondary education, but one that has been grudgingly accepted as part of the job (Boylan, 1993; Parker et al., 2010; Roueche & Roueche, 1993). In fact, the need for remedial education was instrumental in spawning discussions about the need for junior colleges to relieve 4-year institutions of this burden, and serious discussions were held about letting the junior colleges teach the freshman and sophomore years of college altogether, since they were basically a rehash of the high school curriculum, freeing the university faculty to concern themselves with true higher learning at the junior, senior, and graduate level. While this idea never caught on, the junior colleges continued to flourish with their geographic distribution and open door policies (Douglass, 2000; Parker et al., 2010). Naturally, these open door policies were attractive to students who needed additional work on their basic skills in reading, writing, and math, or who otherwise could not attend a 4-year university due to finances or other life considerations.

While remedial education has always been an element of higher education in some form, state laws requiring pre-assessment tests to determine college level skills,

and mandatory remediation for students who didn't measure up, became pervasive among the states. Texas, for example, began requiring a standardized assessment test of basic academic skills in the fall of 1989, with students who did not exceed certain scores on these tests being directed into remedial courses. The law was repealed in 2003, and replaced with more flexible requirements to be determined at the local college level, but still required some form of remedial skills assessment. More recently, as Texas has turned more politically conservative, new laws have been passed to return to a state-wide assessment test, and this time with a state mandate to use a specified minimum cut-off score to determine basic skills levels (Texas Higher Education Coordinating Board, 2012). These actions being taken by the State of Texas exemplify the national trend of shortened tempers among legislators at the continued lack of success, and rising costs, of remedial education programs. From their viewpoint, lack of effectiveness in remedial education has been well documented by many for the last 50 years (American Association of Community Colleges, 2012; Bailey, 2008; Bailey et al., 2009; Complete College America, 2012; Roueche & Roueche, 1993, 1999; Rutschow et al., 2011), and calls to either substantially improve success rates, or eliminate remedial education altogether, are now being heard from legislators and influential political interests across the nation (Complete College America, 2012).

The current status of remedial math. According to ongoing assessment studies by the Community College Research Center (CCRC) at Teachers College, Columbia

University, remedial math education as it is currently practiced at community colleges is a confused, if not chaotic, hodgepodge of inconsistent assessments, curriculums, and interventions, few of which have been judged to work very well in getting remedial students prepared for college level work (Bailey, 2008). Worse, recent research has found that the majority of the attrition in remedial math courses is due to students dropping out and never completing their remedial sequence, rather than due to failing their courses (Bailey et al., 2009). The CCRC research used data gathered from community colleges that have participated in the Achieving the Dream (AtD) initiative, a large multi-state program that, according to its website:

> …conceived as an initiative in 2004, Achieving the Dream leads the most comprehensive, non-governmental reform network for student success in higher education history. With more than 200 colleges, 100 coaches and advisors, and 15 state policy teams - working throughout 34 states and the District of Columbia - Achieving the Dream helps 3.8 million community college students have a better chance of realizing greater economic opportunity and achieving their dreams. (Achieving the Dream, 2014About Us, para. 6)

The AtD data was not nationally representative according to CCRC, due to AtD having been comprised of a preponderance of urban schools with higher enrollments of minority students. These data were checked for validity by comparing them to the nationally representative National Education Longitudinal Study of 1988 (NELS88),

which tracked students from eighth grade through the year 2000. The CCRC researchers found that the AtD data coincided closely with the National Educational Longitudinal Study of 1988 regarding data relevant to remedial education, and therefore considered representative of national statistics (Bailey et al., 2009). The CCRC studies concluded that there were three main problems with the current state of remedial education: Assessment to determine who is college ready, the dichotomy of cut scores that determined who needed remediation and who did not, and the time it took to get those with the weakest skills through a remedial course sequence.

With regard to assessment, the research found a weak relationship between future success in college and test scores that indicated remedial courses were needed, noting that two students might have had the same test scores that placed them in remedial courses, but in actuality might have required completely different types of assistance to ultimately be successful in college. For example, one student may have needed more structure, study skills, and advisement to succeed, whereas the other student with the same score may have just been rusty on his or her math and could have succeeded if placed in a college level course initially. This finding indicated to CCRC researchers that determining college readiness based on a point in the curriculum may have been misguided, and assessment should have focused on skills a student needed to succeed in college generally, rather than using a subject based approach with cut scores determining college readiness for all students (Bailey et al., 2009).

With respect to the dichotomy of cut scores as a determinant of college success, little consensus was found on what college readiness meant among institutions, with multiple placement tests for it used, and institutions having set their own cut scores on the tests for determining whether remediation was needed on a seemingly arbitrary basis, given the disparity found in cut scores across institutions. The study also found that the number of courses in a remedial sequence was determined at the institutional or system level, with some institutions requiring up to four separate courses in lower math before the student was deemed ready for their first college level math course. However, the study found little relationship to future college success for students placed within a wide range on both sides of the cutoff scores, even though students judged to be remedial were required to spend additional time and money in a remedial course sequence that had doubtful future benefit (Bailey et al., 2009).

Lastly, the CCRC concluded that remedial education should be studied in terms of a sequence of courses, rather than whether a student passed a single course. This was determined based on the finding that more students failed to complete their entire remedial sequence because they never enrolled in the next course, rather than as a result of failing courses. This finding indicated that over half the students that did not complete remediation had the ability to pass their courses, but simply chose not to continue their remedial sequence. This finding surprised the CCRC researchers, and prompted the

conclusion that remedial education was ineffective in large part because schools were not retaining the students long enough to remediate them (Bailey et al., 2009).

In summary, the CCRC study found that remedial education as it has been defined and practiced was not a consistent standard across institutions, but a collection of local practices that have been based on a local determination of who is remedial and what should be done about it. The study also found high attrition rates, most often among students who demonstrated the ability to pass the courses, but for whatever reason chose not to persist in their remedial sequence. As a result of their study, the CCRC called for a fundamental rethinking of remedial education in its entirety, and concluded that current practice was not working for more than half of all students enrolled. However, the report also noted that increasing college success among students with weak academic skills, who make up the majority of community college enrollments, is a must in order to have an educated workforce and maintain national competitiveness in a global economy (Bailey, 2008; Bailey et al., 2009).

Remedial math and social disparity. While ways of measuring and publishing figures vary considerably depending on how they are derived, national and state statistics indicate persistent disparities in math achievement between White, African American, and Hispanic students. These disparities show up in the disproportionate assignment to remedial math sequences for these minorities, and lower success rates. According to one respected measure for community colleges, about 52% of White

students require at least one remedial course, while 61% of both African American and Hispanic students require at least one remedial course (Adelman, 1998; Bailey et al., 2009; College Board, 2012). Other sources, possibly more politicized, placed minority enrollments (and failures) in remedial education at up to 85% at community colleges (Alliance for Excellent Education, 2012; Complete College America, 2012; National Center for Public Policy & Southern Regional Education Board, 2010; Strong American Schools, 2008). Regardless of the exact figures, all sources indicated that some disproportionality exists between White students, and African American or Hispanic students in remedial math enrollments and success rates. The question is, what might be the cause of these disparities, and more importantly what might be done to mitigate or eliminate these disparities?

Current Innovations in Remedial Math

As previously discussed, analyses of major efforts to improve remedial math success have done little to "move the needle" towards remedial math success. However, the literature indicated certain innovations have shown significant promise.

Technology based innovations. Technology based innovations have redesigned remedial (and higher) math courses in such a way that content is broken down into software modules and delivered by computer in large open labs, ideally with faculty and tutors available for immediate assistance as needed by students. Students must master course material through practice, and passing quizzes, before moving on to the next

module. Often referred to as a "math emporium" (Bonham & Boylan, 2012; Hodges, 2009; Twigg, 1999), the emporium model has shown improvements in remedial math success with programs that had formerly experienced attrition rates of up to 90% for the lowest level math students, now reporting improvements in pass rates ranging anywhere from no change to 80% (Bishop, 2010; Kirwan, 2010; Squires, Faulkner, & Hite, 2009; Twigg, 2005, 2009).

The emporium model was first used by Virginia Tech University in 1997 as a budget reduction action, and has been increasingly adopted by universities to reduce instructional costs for large enrollment basic math courses (Toma, 2010; Twigg, 1999). Early university adopters of the emporium model were not typically concerned with remedial education, and converted large open spaces to emporiums in order to maximize cost savings by increasing the student to faculty ratio–filling in with hourly tutors (Toma, 2010). However, as less selective universities that admitted students with remedial math needs, and some community colleges, adopted the emporium model through grant funded programs, the results began to show significant improvements in remedial math success (Twigg, 2009).

In spite of more than a decade of promising results, rigorous independent research on the emporium model has been sparse, and virtually nonexistent for the community colleges, which are just now beginning to adopt the emporium model for remedial math in significant numbers. However, those colleges that have adopted are

reporting marked improvements in remedial math success rates, affirming the earlier reports discussed previously (Gonzalez, 2011). Notably, the community colleges are not following the university model of large open labs, but are opting to convert classroom size spaces into computer labs, and often doubling the faculty to student ratios over those used in the conventional lecture type remedial courses, potentially negating significant cost savings.

Workforce intermediaries. While math emporiums in community colleges seem ripe for further research, this researcher chose one other model demonstrating above average success in math remediation that has been well documented in multiple studies (Aspen Institute, 2013; Conway et al., 2012; Helmer & Blair, 2010; Zafft, Kallenbach, & Spohn, 2006). Various terms are used for this model, but it can be generally identified as the workforce intermediary model (Giloth, 2003). Workforce intermediaries are typically non-profit organizations that serve to better align local workforce employment needs with local workforce training providers. According to Giloth (2003), workforce "...intermediaries are on-the-ground partnerships that pursue results for specific groups of employers, workers, and job seekers" (p. 217). These organizations sprang from a growing concern that the many workforce development initiatives at national, state, and local levels were ineffective, highly fragmented, and served differing, often conflicting interests. As an example, local employers might need a steady supply of highly skilled workers in technical fields such as information

technology or the health professions, yet training for these skills requires rapidly changing high-expense programs that are increasingly difficult to fund for public community colleges. And more often than not, workforce training is just one of multiple missions assigned to community colleges by state and local authorities, and the community colleges expected to supply these workers are faced with declining state appropriations, an increasingly anti-tax environment, and growing populations of low-income students who often require remediation in multiple academic skills before they could hope to succeed in the skilled training programs the employers are demanding. Workforce intermediaries can mitigate these conflicts by facilitating coalitions of local business, governmental, and educational institutions that collectively may form synergies that better focus available resources while providing more alternatives to education and employment than could be achieved by any one organization acting alone (Giloth, 2003; Harvard Graduate School of Education, 2011). In addition, intermediaries often provide direct and customized services to students they recruit that are often beyond the capacity of many community colleges such as required specialized assessment for motivation and career aptitude, accelerated remedial programs, forming cohorts of entering students, mentoring, case management, childcare assistance, transportation assistance, and similar forms of physical and emotional supports. These supporting services are well known to be a critical element in student retention and completion in college for both traditional age students (18-24) and non-traditional

students (25+), and particularly in their first year attempted, because they provide essential psychosocial support to students engaged in an often unfamiliar, stressful, and cognitively difficult environment (Karp, 2011; Kuh, Schuh, & Whitt, 1991; Pascarella & Terenzini, 2005; Tinto, 1993; Upcraft & Gardner, 1989).

Education, Psychology, and Neuroscience

The fields of psychology, neuroscience, and education, have been merging in the literature due to the rapidly increasing sophistication in brain research (Adolphs, 2003; Daw & Shohamy, 2008; Immordino-Yang, 2011; Kelly, 2011; Ochsner & Lieberman, 2001; Schrag, 2011; Shimamura, 2000). To better understand the relationship of these fields to the present study in the field of education, past and present research in social psychology was linked to supporting neuroscientific research. This was done to illustrate the magnitude and depth that socio-psychological factors may play in learning, and as support for the focus of this study on the role non-academic interventions may play in remedial math education. Psychological factors are often deeply supported by powerful brain functions that have been biologically shaped by a multitude of factors over the course of a student's life. Underestimating the potency of the factors that at-risk students may have to contend with in challenging settings such as academia is no small matter.

While research from these fields is merging, applications (and misapplications) still tend to be confined within the borders of each field, with little cross-pollination from the other fields. Educators tend to focus on curricular changes and teaching

methods, while psychologists focus on socio-psychological theories that might identify interventions effective in addressing cognitive and affective barriers to learning. Another body of literature approached these disparities from a socioeconomic standpoint, suggesting that an accumulation of environmental factors during the early, elementary and high school years associated with lower socioeconomic status accounts for the disparities in math achievement (Crosnoe & Schneider, 2010; Jensen, 2009). The field of neuroscience is rapidly coming of age due to quickly advancing technological improvements, focusing on identifying the brain functions involved in learning and cognition, and which make up the "sub-serving neurobiological principles" (Bandura, 2008, p. 111) of psychological behaviors, and generally affirms much of the historical psychological theories with an increasing trove of neurophysiological evidence. Taken together, the research from these fields indicated that the cognitive factors typically focused upon in the classroom, may be a small part of what it takes to educate students, while affective factors such as social and emotional interactions may be the actual difference maker for many students, particularly at-risk students.

To illustrate the differences that attending to psychological factors can make, Crosnoe and Schneider (2010) found that low SES students who managed to maintain their math abilities at grade level during secondary school, did just as well as their peers from higher SES environments, while low SES students who had fallen behind in math tended to continue declining in their math skills, suggesting that the more successful

lower SES students had managed to tap into sources of support from teachers or mentors that nullified the effects of their low SES backgrounds (Crosnoe & Schneider, 2010, p. 103). Further, this same study noted that students from higher SES backgrounds who had not fared well in math, still succeeded at greater rates in college math than their lower SES counterparts despite what their math skills would have predicted, indicating that success in math may have an important socio-psychological component.

Research has also long shown that innovations in remedial education must include additional support to be effective in improving persistence and retention among low socioeconomic status students (Jenkins & Weiss, 2011). Tinto noted two decades ago that many remedial students often required additional support to overcome the effects of a disadvantaged background, including careful course advisement, social support, and an understanding of the effects social class can have on educational outcomes (Tinto, 1993). More recent research studied the impact formal programs designed for disadvantaged students can have on student success, and found that programs that incorporated sensitivity and understanding of past negative social, cultural, and educational experiences could all but eliminate differences in student retention rates between disadvantaged students and the general student population (Braunstein et al., 2008).

These findings indicated that improving remedial math programs should not only focus on delivery of course content, but should also provide psychosocial support for

students from diverse backgrounds in a culturally informed way to be successful. Psychologists Sue and Sue (2008) advised that different cultural groups might hold different world-views regarding social interaction and group dynamics in a diverse society. Ethnocentric mono-culturalism, defined by the psychologists as the assumption that all cultures must adhere to the dominant culture's ways, could have a negative impact on many students by assuming that one way of course delivery (i.e. lecture and isolated study) was best regardless of cultural background, ways of learning, and ways of interacting with others. Their research indicates that learning styles can vary, and that students from varying cultural and socioeconomic backgrounds (i.e. individualistic versus collectivist cultures) could be more successful when the learning environment was adaptable to variances in learning styles, such as a greater degree of real time interaction with faculty, and a more active learning environment (Sue & Sue, 2008).

In further support of the importance of psychological factors in remedial education, Yeager and Walton (2011) performed a survey of recent prominent research that found brief interventions focusing on students' psychological beliefs regarding their ability to learn (self-efficacy), and their sense of belonging in college, could produce profound improvements with a lasting effect in student achievement among minorities, women, and low socioeconomic status students that appeared to be "magical" (p. 267). Finally, Steele and Aronson (1995) demonstrated that psychological measures taken to mitigate stereotype threat, defined as the fear that an academic test might confirm

negative stereotypes, resulted in significantly improved scores in a study with African American students. The findings from these studies, and myriads like them, suggest that much is known about affective barriers that may be in play for at-risk students, yet there is little evidence that sustained use of this knowledge is at work in the community college classrooms today.

Social learning theory and neuroscience. How people learn has been a source of intrigue for centuries, and there have been numerous theories proffered by psychologists, philosophers, educators, and scientists, that attempt to explain what learning is, how it occurs, and even whether it occurs in the individual mind or not. What seems self-evident is that all learning theories are an attempt to explain the product of neurophysiological processes in the brain that result in the development of knowledge and skills of some sort. While an examination of the many learning theories is beyond the scope of the present study, one generally accepted learning theory, social learning, was exposited in support of the use of social cognitive theory in this study as a conceptual framework, and a viable explanation of the cognitive and affective processes of learning.

Social learning theory has many nuanced and related sub-fields but generally follows the social constructivist worldview which holds that learning is inherently the result of social interactions that construct meaning, rather than learning being a separate phenomenon in the individual that is then applied to social interactions in the classroom

and elsewhere (Learning Theories, 2013; Palincsar, 1998). Social learning theory, and its many theoretical derivatives, has a long history dating back to Plato and Aristotle according to social psychologists and learning theorists (Barab & Plucker, 2002, p. 168). Modern theorists often credit Vygotsky with fostering an ever more sophisticated theoretical treatment of social learning (Palincsar, 1998), while Bandura's social cognitive theory is often viewed as the culmination of social psychology and learning theory work over the years into a conceptual framework of how people learn (Evans, 1989). Thus, social learning theory has become generally accepted as a workable explanation of the complex psychology of human learning. Accepting this theory of learning begets the question of how the human brain actually transforms social interactions into knowledge that can then be applied to the multitude of situations and tasks that life brings to human beings, and which require specific and general knowledge to deal with effectively–or not.

Over the past several decades, technology has enabled an increasingly more sophisticated study of the brain and how it learns from a physiological perspective. Brain research in earlier less technological times had been limited to studies of persons with brain damage, noting what cognitive/affective abilities had been retained or lost due to a brain injury, and linking the missing area to types of affect or cognition. More recently, non-invasive techniques such as functional magnetic resonance imaging (fMRI) has permitted researchers to record images of the brain performing certain

functions such as working math problems, or playing musical instruments. The fMRI equipment then takes images of the brain which reveal areas that "light up" when tasks are being performed due to increased blood flow that brings increased neuronal activity (Geake, 2009), thus identifying which areas of the brain were called upon to perform the tasks. This ability to watch the brain at work has provided great insights into cognitive and affective activity, and has profound implications for educational theorists as a new tool for tailoring instructional activities that leverage brain processes in learning, or at least does not thwart them.

Given the wide acceptance of social learning theory as a viable explanation of the learning process, and the increasing application of neuroscientific research to educational matters, the following synthesis of the literature examines the neuroscientific basis of social learning theory to gain a better understanding of what brain processes are at work during social learning activities, and how these brain processes result in learning.

> Vygotsky (1978), apparently not the social constructivist, presciently observed: Any investigation explores some sphere of reality. An aim of the psychological analysis of development is to describe the internal relations of the intellectual processes awakened by school learning. In this respect, such analysis will be directed inward and is analogous to the use of x-rays. If successful, it should reveal to the teacher how developmental processes stimulated by the course of

> school learning are carried through inside the head of each individual child. The revelation of this internal, subterranean developmental network of school subjects is a task of primary importance for psychological and educational analysis. (Vygotsky, 1978, p. 35)

Most likely, Vygotsky did not anticipate neuroscience and the fMRI (he died in 1934), but the field has certainly fulfilled the research aim he prescribed. Indeed, neuroscience reveals the neurophysiological areas stimulated in the brain of the learner, and how the brain wires itself to retain things in memory for later use, i.e. learning. However, neuroscience admittedly cannot tell exactly what the brain is doing with the stimuli, which leads us back to social learning theory for an explanation. In other words, researchers must still rely on psychological research to formulate theories on the "how" of complex processes of cognition, while neuroscience can only illuminate the "what" of brain areas doing the work.

Philosophy and learning theory. Historically, there appears to have been a noticeable hierarchical relationship down through the ages between philosophers, psychologists, and learning theorists, with philosophy trickling down to psychology, and learning theories forming a subset of psychology (L. M. Cohen, 1999). This fact alone is a most compelling argument for the social constructivism prevalent today in these and other fields of social inquiry. What is different today is the emerging field of neuroscience, which is taking its place among these aforementioned fields by providing

actual images of the brain processing stimuli, and biologically constructing representations of that stimuli within itself. Presumably, with sufficient sophistication, neuroscience can inform learning theorists, which will also inform psychologists, which may even inform philosophers. This section of the literature review provides a brief history of social learning theory and how it proposes that the brain learns, followed by a brief description of how the field of neuroscience believes the brain learns.

With respect to theories of learning, Western culture and its supporting philosophies have been strongly individualistic, with rights and responsibilities firmly attributed to the individual. This attitude was self-evidently correct according to 18th century British philosophers and the framers of the U.S. Constitution (Morgan, 2005). Relatedly, the field of Western psychology developed theories of normality, abnormality, and causation according to these individualistic tenets as well, with behaviors emanating within the individual mind, and abnormalities being the result of misplaced biological (natural) drives therein. Meaning was a given, and most certainly not made up by people, while theories of learning mostly consisted of teachers teaching and students who could benefit receiving that knowledge.

In the 19th and 20th centuries, Western philosophers began to question the nature of this reality, producing such philosophies as existentialism, pragmatism, nihilism, and postmodernism, all of which to some extent question the existence of an absolute truth, metaphysics, or a fixed reality to be discovered. As these philosophies took hold, the

fields of psychology and educational theory followed along accordingly for the most part, forming the foundations of social constructivism, and social learning theory.

The beginnings of formal social learning theory as we know it today, or learning as a social process rather than an individual process, has generally been attributed to Vygotsky (Palincsar, 1998), who identified three major theoretical positions on child development in his time. The first held that processes of development are independent of learning, the second that learning *is* development, and the third being Vygotsky's own theory that combines the first two (Vygotsky, 1978, pp. 29-30). He pointed out that simply being able to combine the extremes of the first two positions shows they have significant common ground between them, and therefore learning and development must be a social iterative process. Vygotsky gave a critique, and a nod, to Piaget's position that developmental stages must occur before learning can occur, by positing the existence of a zone of proximal development, where development has occurred sufficiently in the child and then must be further developed through a process of interacting with the environment and others, i.e. social learning (Vygotsky, 1978). It should be noted that Dewey (1944), a contemporary of Vygotsky, also considered learning an inherently social process, which would seem indicative of a gradual but major philosophical shift away from the individual as the focus and locus of knowledge to a more socially constructed view of learning.

Minter (2011) identified 27 current theories of learning, and advised that the list is not meant to be exhaustive. He conveniently provided an appendix describing the theories and the philosophical backgrounds that spawned them, and suggested that the list be further distilled into those theories suitable for teaching adults (based on maturity) and those only suitable for the K-12 spectrum (Minter, 2011, p. 9). This article is mentioned to illustrate the varied nature of theorizing on how to best instill learning in the brain. Interestingly, all the theories mentioned by Minter appear to parse social learning theory in some way directly or indirectly.

Neuroscience of learning. While the brain remains a mysterious and complex organ, it tends to process an almost infinite variety of inputs into relatively few responses that naturally coincide with the built-in functions of the brain, and the parameters of the human body. For example, while there are any number of things in the environment that may cause the brain to register fear or anxiety, or negative perceptions such as stereotype threat, the normal physiological response will be a signal to the psychomotor "fight or flight" elements of the brain and body that are needed for self-preservation (Mangels et al., 2012). In a supposedly more positive environment such as the classroom, inputs can be widely varied, but all are received by the brain through the five senses, given emotional tags, certain neurons excite, and connections are established between these neurons to form the stuff memories are made of; hopefully the ones the teacher intended (Geake, 2009, p. 116). When needed, these memory structures are

activated to reconstruct what was learned and built upon through repetition to form more complex memories of a subject, any subject. This capacity of the brain to receive any input imaginable, and process it to produce relatively few responses in generally predictable ways, enables the formation of learning theories and also the ability to relate aspects of these theories to specific brain functions through neuroscience studies.

Donald Hebb first proposed how the brain learns in 1949 (Geake, 2009; Tokuhoma-Espinosa, 2011, p. 46). Known as Hebb's Law, he theorized that incoming stimuli caused certain neurons in the brain to respond by emitting biochemically produced electrical signals. When a stimulus occurs repeatedly, the firing neurons form physical connections (synapses) between themselves to form a network, which in turn causes other neurons to fire and physically join the network. This process was described in lay terms as "neurons that fire together, wire together," (Tokuhoma-Espinosa, 2011, p. 46) and was subsequently proven in the 1970s as a factual description of the brain process that form increasingly sophisticated and efficient responses to a given stimulus (Geake, 2009; Tokuhoma-Espinosa, 2011). The Hebbian process just described accounts for the "adaptive plasticity" (Geake, 2009, p. 45), that provides the brain with a continuous ability to adapt to changing cognitive environments, and confirmed the link between the external environment and physiological changes in the brain. Furthermore, the process of forming synapses is further expanded by processes that cause the neuronal clusters to interconnect with other areas of the brain that result in the ability of the entire

human organism to respond both mentally and physically to the world as it is experienced throughout life.

Geake noted that the strength of the connections between the modular areas of the brain is critical in enabling the brain to use the knowledge it gains. The stronger these connections, the faster processing can occur. This processing speed is thought to be the difference between a "slow" learner and one who is normal or exceptional. Another critical aspect of brain operation is the quality of regulation in brain processing, whereby the brain filters extraneous information not useful to the task at hand, and also inhibits emotional responses that may accompany thinking and become problematic.

Often, an inability to regulate thinking is due to abnormal physiological formation of brain areas, or the connectivity between them. An example is the phenomenon of math anxiety, which has been traced to lack of development in the amygdala of the brain, and results in a lowered ability to suppress negative emotions. Research shows that math anxiety can be predicted in a child by the age of seven through fMRI studies, and is treatable as a phobia (C. B. Young et al., 2012). Another example is Attention Deficit Hyperactivity Disorder (ADHD), which research has shown is due to an inability to normally regulate uptake of the brain chemical dopamine, impairing the ability to focus attention on a task. ADHD can be treated with a dopamine transporter inhibitor such as Ritalin (Geake, 2009, pp. 122-123). A third example is dyslexia, which is thought to result from a lowered ability of the brain to regulate visual

control, resulting in problems interpreting symbols because they appear to "move around" and not appear the same way twice. Dyslexia has been treated through eye exercises and even diet supplements (Geake, 2009, p. 137). Each of these conditions can have significant and long-term effects on a person's ability to learn, and thus impacts their psychosocial perceptions of their academic capabilities. Once understood from a neurobiological perspective, these conditions can all be treated chemically, or through psychological interventions that use the brain's own plasticity to wire around the problem (Geake, 2009).

Bandura's Social Cognitive Theory

Bandura's social cognitive theory was not specifically aimed at learning in particular, but to describe human nature in terms of its broad underlying psychological functioning. His research efforts were directed at providing an increasing array of rigorous experimental evidence that validated his theory, and show that it was predictive in its application in virtually any area requiring human cognition (Grusec, 1992). Over the years, Bandura's research has continued to reveal valuable evidence that social-cognitive theory not only worked for the therapist, but also had profound implications for education at any level (Bandura, 2004; Evans, 1989; Grusec, 1992).

In summary, Bandura's social cognitive theory holds that learning and development is a continuous reciprocal interaction between the individual, the environment, and other people, with a key element over other learning theories being the

contribution of the individual to the result of the process rather than as a passive recipient of external inputs. This effectively combines social learning and cognition into a single learning process. It also means that the individual, the environment, and other people are all coequal elements in whatever learning takes place, with no single element driving the process in a determinative way. In other words, whatever situation an individual finds themselves in, that individual has something to do with it, but not everything to do with it as the notion of rugged individualism would have it, since others and the general environment combine to form the conditions of the individual, the environment, and other people. Thus, social cognitive theory is an elegant combination of all other social theories that accounts for individualism, social constructivism, positivism, and any other derivative-ism one can reasonably construe from the world around them. Therefore, this researcher concluded with reasonable assurance that social cognitive theory, as a theory of learning, is a firm foundation upon which to base a worldview of how learning occurs. With this foundational social theory in place, one may proceed to examine whether this theory is supported from current understanding of how the brain functions provided by the field of neuroscience.

Neuroscience and learning theory. As Turner (2007) asked, "What goes on in the brain that allows us to make enough sense of one another and the world to make social learning work?" (p. 364). Can neuroscience be the technological answer key in the back of the textbook where we can finally see how close social theory conjecturing came

to the "truth"? Interestingly, brain science was a part of social learning theory from the beginning (Jordan, 1998; Turner, 2007). In his reflexive arc concept published in 1896, Dewey described the social learning theory process similarly to the way Bandura did nearly 100 years later in his social cognitive theory, as a continuous circuitous process of the individual brain interpreting its environment to produce a picture of reality, rather than a more linear process of stimulus and response (Jordan, 1998). Likewise, in 1896, Patten proposed a neuroscience model that suggested the brain itself was social in nature, and described the brain as a network of currents composed of functional areas connected by an even more important secondary network of currents that allowed the brain to function as a whole (Turner, 2007, p. 362). This explanation turned out to be surprisingly accurate based on current neuroscience literature. In fact, most of the original social learning theorists of the late 1800s proposed similar brain function ideas, and it might be said that social learning theory was initially an attempt to describe brain processes, but these early versions of social learning theory were discredited by behaviorist theories of the day, and socialistic political philosophies in Europe that were trending towards collectivist notions of the nature of man (Turner, 2007).

The advent of brain imaging, and particularly functional magnetic resonance imaging (fMRI), which shows areas of exceptional activation in the brain while performing certain tasks, has now illustrated a great deal about what the brain does in response to various types of stimuli, and which parts of the brain do it. Some of this was

already known from research on subjects with brain damage, but modern imaging can affirm and refine prior knowledge, or debunk what was thought to be known. As more and more sophisticated brain research is conducted, we can be increasingly sure of how the brain works, and provide a standard by which to judge theories of learning. Bandura was cognizant of the emerging neuroscience behind his social cognitive theory:

> The plasticity which is intrinsic to the nature of humans depends on the neurophysiological mechanisms and structures that have evolved over time. These advanced neural systems for processing, retaining, and using coded information provide the capacity for the very characteristics that are distinctly human – generative symbolization, forethought, evaluative self-regulation, reflective self-consciousness, and symbolic communication. (Bandura, 1986, p. 21)

Later in his career, Bandura synthesized neurophysiology and social cognitive theory in defending against neurophysiological based theories that attempted to reduce human psychological behavior to biologically programmed responses generated by genetically produced brain function alone. In addressing this issue, Bandura argued that the brain uses a combination of bottom-up and top-down processing to produce both learning and human behavior. The bottom-up processing involves the various functional areas of the brain being orchestrated from the top-down by the higher order areas of the brain involving the pre-fontal cortex, resulting in social cognitive behavior (Bandura, 2008,

2011). With respect to learning theory, Bandura reaffirmed his understanding that psychology and neuroscience are inextricably linked when he observed that: "A full explanation of human learning must, therefore, encompass both the psychosocial principles and the sub-serving neurobiological principles" (Bandura, 2008, p. 111). Given its pedigree of being closely tied to theories of brain function since the early days, it should be no surprise that social learning theory and related brain functions, now confirmed by neuroscience, have once again found each other and turn out to be quite compatible.

Neuroscience and social cognitive theory. As a caveat, inherent in this discussion of the neurobiological link to social cognitive theory, it should be understood that social cognitive theory addresses the most complex psychology of human nature, and the brain that performs this complex psychology is generally acknowledged as the most complex organ in the known universe. Therefore, an exhaustive discussion of either is well beyond the parameters of this review, however a summary discussion of both is provided. In addition, the reader will be spared an overly technical description of brain parts and medical terminology, which can be found in the literature.

Bandura's model of the "nature of persons" with respect to social cognitive theory was used (Bandura, 1986, pp. 18-21). Bandura defined this nature of persons in terms of five capabilities, to wit:

The Required Capabilities of Social Cognitive Theory

1. Symbolizing Capability
2. Forethought Capability
3. Vicarious Capability
4. Self Regulatory Capability
5. Self-Reflective Capability

Each of these capabilities will be discussed in turn, with the neuroscientific support regarding brain functions that potentially support these capabilities identified.

Symbolizing capacity. Bandura defined symbolizing capacity broadly as not only including such things as graphic representation of things such as words, numbers, and other notations, but as the conversion of thoughts and knowledge into representations that can then be applied to many cognitive situations (Bandura, 1986, p. 455). Creative art comes to mind as an analogy whereby multiple elements are combined to express the thoughts of the artist, but those thoughts are also interpreted by the beholder in ways that match the product of his or her own multiple cognitive processes at any given time. The ability to symbolize forms the foundation for abstract thought and the formation of judgment that can be applied to novel situations.

Neuroscience research indicates that the ability to learn and use symbols involves multiple brain areas, but the ability to learn and use language (make symbolic sounds) is built-in, whereas learning to read and write draws upon synaptic connections formed over time. More involved symbolic usage, such as mathematics, really lights things up in the brain (Geake, 2009), and might be described as an unnatural act when getting beyond small numbers and simple concepts. Research shows that many animals (monkeys, crows, humans, etc.) have the capacity to immediately grasp numbers up to five or six objects without counting (Cantlon & Brannon, 2007), but must actually count objects after that; and abstract concepts such as manipulating fractions is well known as the initial breakpoint in learning math that unhorses the mathematical careers of many students. For the broader symbolic concepts identified by Bandura, symbolizing capacity is supported in the brain through Hebbian plasticity, and dependent on repeated exposure to stimuli sufficient to form connectivity in the brain to form higher order symbolic concepts.

Forethought capability. Bandura classified forethought capability as an element of intentions and goals, which are defined as the ability to sustain behavior toward anticipated outcomes over a long period of time without immediate external inducements (Bandura, 1986, p. 467). An example is giving up current free time in pursuit of a graduate degree, or foregoing current pleasures to save money to buy a

home, or similar forms of delayed gratification in anticipation of future benefits. It can also mean resisting temptations in order to avoid negative consequences.

Neuroscience has potentially identified this powerful force by linking forethought capability, or motivation, to one of the most powerful and primitive areas of the brain, namely the amygdala, which controls the regulation of emotions. The functions of the brain that control emotions are also stacked in favor of negative emotions; particularly fear (Geake, 2009, p. 115). It is thought that stimuli entering the brain are first processed to detect threats, and then given an emotional tag that stays with the stimulus as it is further processed into thought, memory, and symbolic concepts. If the negative stimulus triggers strong enough emotions, such as anxiety, fear or anger, the brain can even bypass conscious thought processes and shut down areas of the brain that involve logic, reason, and self-regulation, by redirecting brain activity to the psychomotor response functions in preparation for fight or flight (Geake, 2009, pp. 116-117). While it is almost counter-intuitive that such a primitive process plays a role in what is typically thought of as higher order behaviors such as forethought, intentions, and goals, it also makes sense that these behaviors would be related to hopes and fears that are significant enough to an individual to overcome similarly powerful brain functions such as the dopamine limbic system, which makes us feel good when we do something we like (Heatherton, 2011). The dopamine system is also a potential factor in forethought capability if the achievement of goals would give us enough pleasure or

satisfaction that is sufficient to delay short-term gratification for long-term outcomes. In summary, we might conclude that forethought capabilities represent the use of symbolic capabilities toward anticipated outcomes that require judgment and higher order behaviors, and are supported in the brain by a powerful combination of feeling good and fear, with fear being the more powerful emotion (Geake, 2009).

Vicarious capability. Social cognitive theory holds that the majority of learning occurs through observation, rather than by the direct experience and participation of the learner. This is an important ability, since far more learning can occur through observation than could ever be accomplished if everything that needed to be learned had to be acquired through direct experience. Observational learning also permits a far more efficient mode of instruction where many learners can benefit at the same time from observing a single event, such as happens in the classroom, or even asynchronously through recorded media (Bandura, 1986, pp. 47, 283). While earlier theorists variously labeled observational learning as imitation, or identification with the observed, Bandura suggested that observational learning initiates a broad array of psychological processes that incorporate many of the benefits of direct experience, but also permits the learner to pay greater attention to the action, and on a more conceptual basis than if they were learning the same thing through hands on activity. Bandura called this modeling (Bandura, 1986, pp. 20, 47), and successful modeling provides vicarious learning abilities because not only is the learner seeing something done, he or she also brings into

the event his or her own symbolic capacities to apply judgment of incentives or disincentives, self-efficacy, and other motivational elements unique to the learner. Further, according to Bandura (1986), if the learner sees the actor receive positive rewards, he or she is more likely to do likewise, but if the learner sees negative rewards come to the actor, he or she is less likely do the same thing (p. 283).

Neuroscience strongly supports social cognitive theory's modeling and vicarious capability. Rizzolatti, Fadiga, Gallese, and Fogassi (1996), performed research on monkeys with electrodes inserted into their brains and found that certain motor neurons fired when a monkey being fed reached for food, and they accidentally found that the same motor neurons in another monkey also fired when it just observed the feeding, although the observing monkey did not actually reach when no food was being offered to it. This discovery showed that neurons in an observing individual would mirror the neurons activated in another individual, and fire and wire together through mere observation, and so were named mirror neurons. Of even greater interest, further research showed that monkey mirror neurons would not fire if they just saw another monkey reach out for nothing, but would fire if the other were reaching out for some food. This established that whether the neurons fired or not depended on the observer's inferred intent of what was happening (Rizzolatti et al., 1996). Later research using fMRI found that humans also have mirror neurons that fire or not based on the observer's inferred intent of the action, and these neurons are located in multiple areas of

the brain (Geake, 2009). The discovery of mirror neurons was powerful evidence of a built in capacity for observational learning, and the vicarious capabilities indicated by social cognitive theory.

Interestingly, Bandura (1986) discussed theorists that believed infants could only mimic things they had seen before, and took issue with their position because they assumed imitation developed in unitary stages. He goes on to mention research by Meltzoff and Moore published in 1977 and 1983, that predicted something innate in newborn infants that enabled them to mimic facial expressions they had never seen before (p. 84). While not dismissive of the idea that innate neurophysiological sub-functions (i.e. mirror neurons) may already exist in neonates, Bandura wondered why infants only imitated certain things and not others despite researchers efforts to get them to do so. He concluded the passage by commenting that the underlying reasons for imitation in infants were still "unsettled" (Bandura, 1986, p. 84). Another 10 years would pass before mirror neurons were discovered in primates, and even longer before they were found in multiple areas of the human brain. This later research may have answered Bandura's question about why infants imitated some things and not others; apparently mirror neurons may fire vicariously, but the related psychomotor response asks: What is in it for me?

Self-regulatory capability. Social cognitive theory gives the ability to regulate one's behavior a central role without which there could be little or no ability to benefit

from establishing the previous capabilities discussed. Bandura (1986) explained the ability to self-regulate as a complex interaction of internal influences, such as personal values and standards, by which a judgment is made and a response formulated in interactions with the environment. Previous theorists had attributed response behavior to simple judgments of reward and punishment, but Bandura believed self-regulation went much deeper into the self, and resulted in a social interaction creating its own environment that affected both the self and others involved (Bandura, 1986, pp. 336-337).

Neuroscientific research affirms Bandura's concepts through studies which indicate that the brain holds a concept of the self, and a sense of self awareness, separate from the concept of others, and that related self-regulatory capacity is generally localized in interactions whereby the highly sophisticated prefrontal cortex coordinates and regulates the responses of other brain areas. An example would be an event triggering a response generated by the primitive amygdala, which produces gut level emotional responses. In this case, the amygdala produces a basic emotional response to a given stimulus that involves the self, and the prefrontal cortex decides what it will do, or will not do, with the amygdala's suggestion (Heatherton, 2011). The converse has also been shown in neuroscience studies where people with damaged or diseased areas in the prefrontal cortex no longer had the ability to self-regulate their behavior, proving rather decisively that self-regulation is a biological function (Heatherton & Wagner, 2011).

Self-reflective capability. Bandura (1986) put the capacity for self-reflection at the top of his elements of social cognitive theory by stating that, above all else, self reflection is what distinguishes us as human (Bandura, 1986, pp. 21, 354). The ability to be self-conscious, and to analyze our thoughts and change them upon further review, is the lynch pin of social cognitive theory. This metacognitive capacity makes us both the agent and the object of our thoughts and behavior at once, and does not require us to create multiple selves in doing so (Bandura, 1986, p. 21).

Neuroscience may prove Bandura wrong regarding self-reflection; there is evidence now that animals are capable of metacognition as well as humans, and can use it to change their responses just like humans (Terrace & Son, 2009). Regardless of the brilliance of neuronal monkeyshines, according to numerous fMRI studies self-reflection/metacognition is a product of the prefrontal cortex area, and involves many of the same executive function processes as self-regulation. This cortical area is connected to all areas of the brain and is considered command central in all things to do with thought, regulation of behavior, and learning. So we may conclude once again that there is strong and growing evidence of the neurophysiological basis of social cognitive theory.

The review of the literature has addressed the history of social learning theory, tracing its evolution to Bandura's social cognitive theory, and related major areas of brain function from the field of neuroscience to the five capabilities of social cognitive

theory as identified by Bandura. While far from exhaustive, there seems to be little, if any, conflict between the findings in neuroscience and the main elements of social cognitive theory. As previously addressed, Bandura noted that his theory was/is a psychological explanation of human nature, and that there must be neurophysiological sub-functions that supported the psychology. Furthermore, while it seems self-evident that these connections must exist, it is also noteworthy that nothing from the findings in neuroscience has lessened the eminence of social cognitive theory as an explanation of human nature, learning, and behavior.

To narrow the focus of this broad review of social psychology and related neuroscience to the present study on remedial education of adults who find themselves in community college due to lack of college level skills in math, Bandura suggested that part of the problem is a widely-held simplistic notion which views social factors as a lesser element in learning (Bandura, 1986, p. 501). In this case, Bandura was referring to language acquisition, which many theorists viewed as simple mimicry, but he claims is actually an exercise in abstract modeling. As the earlier discussion of vicarious capability and its use of mirror neurons illustrated, abstract modeling is foundational to learning. Combine this with the fact that mirror neurons may fire, but do not necessarily trigger actions unless a result has been inferred, and we now have a problem in a teaching situation that only considers the cognitive aspects of learning a given subject while ignoring the psychosocial condition of the student. That this is an issue can be

seen in the large and growing body of literature decrying the chronic inability of community colleges to achieve more than marginal success (approximately 30%) with remedial math students in ever getting them into college level work (Bailey et al., 2009). When this data is disaggregated by race, ethnicity, and socioeconomic status (SES), it shows a disproportionate nationwide disparity between the success rates of White, African American, Hispanic, and low SES students nationwide (Bailey, 2008). Should the blame for this disparity be placed on the schools, colleges, teachers, students, or perhaps the negative-oriented amygdala in the brain of some or all of these stakeholders?

Psychologists and teachers have been aware for years that the student's psyche needs to be receptive in order to learn. Bandura identified the critical role of the individual's psyche to achievement in his social-cognitive theory (Bandura, 1986, 1993, 1997), and Dweck continues to gain recognition for mind-set theory and its effect on learning (Dweck, 2006; Yeager & Dweck, 2012). In addition, research on brief psychological interventions (such as explaining Hebbian plasticity) with remedial students has resulted in significant improvements in achievement over an extended period of time (Yeager & Walton, 2011). Still, as Bailey (2008) noted, remedial education remains a veritable hodgepodge at community colleges across the nation in its administration and course delivery, while the dismal results are universally similar in student outcomes, and across ethnicities. This should be strong evidence that it is not about the math, but more likely the psychosocial condition of the students, and the

underlying brain functions that have been shaped by those conditions, and that are now affecting their learning outcomes.

If the lack of progress in remedial math education is due to the psychosocial condition of students, what can be done to remedy the situation? Simply put, address the psychosocial conditions directly as the priority educational issue, rather than tinkering with course content and delivery as if that were the problem. After all one may ask, what are you going to do to a math course to negate the effects that racial discrimination, gender bias, poverty, class, or other factors may have wrought in the development of a student's brain?

Non-Academic Interventions

For the purposes of this study, the literature on non-academic interventions was reviewed from two sources: research from the field of education performed by educators (typically non-psychologists), and research from the field of psychology performed by psychologists. This approach was adopted for the present study based on graduate coursework taken by this researcher that provided broad exposure to scholarly research from both fields, past and present. During the course of study it was noted anecdotally that research performed by educators examined programs, while research performed by psychologists examined students. While this difference in focus is obviously due to the respective competencies and credentialing associated with each field such that most teachers are unlikely to be qualified to psychoanalyze students, it would seem that they

often still do, and then formulate programs that may be only loosely based on well-researched psychological theory. This may explain Karp's frustration with research on non-academic intervention in that it focuses on programs rather than processes, and ignores the student's view on the efficacy of such programs (Karp, 2011, p. 24).

While it may be unfair to look askance at interventions developed by educators, such as remedial math; itself an academic intervention, it is difficult to understand how decades of research on the psychology of at-risk students could be so totally ignored when educators designed both academic and non-academic interventions for these students, especially in light of the decades of chronic failure with the majority of remedial math students attending community colleges.

Non-academic interventions from education. Non-academic interventions, also called non-academic student supports, that have been explored in the field of education by educators (non-psychologists), include a myriad of programs developed by colleges and universities with the intention of improving student retention and success in the college environment by addressing factors outside the classroom. These programs have theoretical foundations in research that found student retention and success could be improved by engaging students in ways that improved their sense of belonging in college, and a sense that they could succeed in that new and challenging environment (Tinto, 1993). The research on non-academic interventions is quite robust, and consistently finds a correlation between student participation in these programs and

improved retention and success, but randomized studies are rare, and effect sizes tend to be small (Pascarella & Terenzini, 2005; Tinto, 1993). Karp (2011) noted in a recent meta-analysis of 128 publications on non-academic interventions focused on community colleges that includes the major theorists such as Tinto, up through some of the most recent work in 2011, that little has changed in the literature. The latest works continue to show mostly positive correlations, few rigorous randomized studies, and little guidance on how and why non-academic interventions might be working. Karp considered the evidence in most (but not all) of these studies weak due to the large variability of elements in the many programs found in community colleges, and "methodological challenges" in the studies themselves (Karp, 2011, p. 4).

In a fortuitous windfall for the present study, Karp proposed to restore order in the literature on non-academic interventions by re-categorizing these studies into four "processes or mechanisms" found to be the most beneficial in promoting student success: (a) creating social relationships, (b) clarifying aspirations and enhancing commitment, (c) developing college know-how, and (d) making college life feasible (Karp, 2011, p. 6). These four categories aligned well with the services provided by this research's unit of study, and were also well suited for relating back to the psychological constructs identified by social cognitive theory's required capabilities for learning and development: forethought, vicarious, self-regulatory, and self-reflective capability. Karp concluded her analysis of the literature on non-academic interventions by noting the

dearth of research on these interventions from a *process* perspective, and goes on to say that even less is known about student perceptions regarding the efficacy of various non-academic interventions, suggesting that further research in these areas would be an important theoretical step forward (Karp, 2011, p. 23).

In summary, the literature on non-academic interventions has a long history and is rich with findings that these interventions support improvements in student retention and success. However, as Karp (2011) concluded, the field is ripe for a deeper interrogation of how these interventions work, and whether these interventions are perceived as useful by students. The present study attempts to address both of these questions by adopting Karp's four categories in the methodology, and constructing data gathering questions aimed at processes and student perceptions of non-academic interventions.

Non-academic interventions from psychology. Another longstanding, and far more rigorous, source of literature on non-academic interventions comes from the field of psychology. While the premise of the present study is that all interventions must necessarily have some psychological effect in order to be effective, psychological interventions based on social psychology's attribution theory are directly aimed at changing the perceptions held by students that attribute cause to events that affect them (Yeager & Dweck, 2012). Studies in this area have found that brief sessions with minority students in college that addressed challenges common to all students, such as

initially lower grades as freshman that typically improve in sophomore and later years, had a significant and long-term effect on improved retention and grades by redirecting the student's attribution of cause for low grades from a personal issue, to one that affects most students. Similar studies use brief sessions with at-risk students explaining how the brain learns to redirect their attribution that intelligence is fixed and can't be changed (i.e. "I can't learn math") to one that believes that the brain is malleable (recall Hebbian plasticity discussed earlier) and can learn how to do increasingly difficult academic tasks if sufficient effort is supplied (Dweck, 2006; Walton & Cohen, 2007, 2011; Yeager & Walton, 2011).

These interventions from the field of psychology have shown to hold tremendous promise for improving the results in remedial math at scale if generally adopted and presented well. The present study did not incorporate these types of interventions because the purpose of the study was to examine what is currently happening in the unit of study, which is already producing superior results with remedial math students. However they are included in this review of the literature because the hypothesis of this study is based upon the idea that the non-academic interventions do have a positive effect on student psychology first and foremost, which in turn removes affective barriers to academic achievement that result in improved performance in remedial math.

The Unit of Study

A review of the literature regarding the focus of the present study indicated that it is recognized as a successful example of a workforce intermediary program. The organization is called Capital IDEA (CI) and is located in Austin, Texas. This grant-funded organization recruits low SES adults into high paying workforce education programs at a local community college, and provides non-academic interventions that have shown to be effective in the educational literature (Karp, 2011). Recent studies have shown that CI, among other similar programs, has proven far more effective (80% versus 20%) than the average community college in guiding low SES students through math and other remediation as needed, and on to high paying workforce degrees such as nursing and other allied health professions (Conway et al., 2012; Helmer & Blair, 2010; Smith, Christensen, & Schroeder, 2013; Zafft et al., 2006, pp. 28-29).

Chapter Three: Research Methodology

This chapter describes the research design and methodology used for this study. The chapter begins with a brief review of the purpose of the study and the research questions, then discusses in detail the research design and related specifics of the research method chosen, strengths and limitations of the method, site selection, document gathering, sampling techniques, validity concerns, and data analysis.

Restatement of the Purpose of the Study

The purpose of this study was to use the psychosocial perspective of Bandura's social cognitive theory in order to gain a better understanding of whether or not there was a relationship between intrusive and intentional non-academic interventions and successful math remediation.

Research Questions

1. Which non-academic interventions are used to support students in remedial math?
2. Why are the interventions used to support students in remedial math?
3. How are the interventions used to support students in remedial math?
4. Do students perceive the non-academic interventions as useful?
5. Is there a difference in remedial math completion between students who participate in a prescribed program of non-academic interventions and those who do not?

Overarching Research Questions

The overarching research questions for this study were:

1. Is the effectiveness of the CI program due to the emphasis on non-academic support mechanisms?
2. Do the academic support mechanisms used by the CI program have student psychosocial needs such as self-efficacy as a basis for student success?

Overview of Methodology

The case study method was used for this study. Data was collected from CI staff, and written documents were obtained through an interview process to determine which non-academic interventions CI provides to its students, and the reason it provides each intervention. The interventions identified were categorized according to four factors defined in a recent meta-analysis of the research on non-academic interventions that was performed by the Community College Research Center, Teachers College, Columbia University (Karp, 2011). To obtain data on student perceptions of non-academic interventions, CI students and staff were surveyed using a Likert-type instrument created for the purpose to assess perceptions regarding the usefulness of CI's non-academic interventions.

Academic enrollment and progress data on CI students was obtained from student records provided by CI and the community college, as CI student records are part of the student enrollment data kept by the community college. For the purposes of

this study, CI students were identified in the general student population records of the community college from CI provided data and other administrative records kept by the college. These same student records provided student demographic data on self-reported ethnicity and gender. Student socioeconomic status was assumed to be low, less than 200% of poverty level, as it is a requirement for participation in the CI program.

The qualitative data used in this study was obtained through interviews conducted with a sample of CI staff and students. The interview protocol focused on the students' backgrounds, previous educational experiences, attitudes toward math, and what they believe this program provided them that enabled them to be successful in acquiring college level math skills. The interview component was to enrich and further inform the study and to provide one basis for suggesting additional research on the topic.

How the questions address study goals. The research questions attempted to identify the psychosocial aspects of the non-academic interventions used by the unit of study, the intent with which they were designed and implemented, and whether students and staff perceive them as useful in achieving the purpose for which they were intended.

How the questions relate to the conceptual framework. The research questions related back to the conceptual framework of this study in that they were intended to reveal and gain an understanding of how and why the psychosocial elements of the non-academic interventions used by the unit of study improve student success in college.

Research Methodology

Method selected. This study was a qualitative single-case study design due to the superior ability of this method to explain phenomena at a deep level, and gain richer insight to address the "how and why" research questions posed in this study (Yin, 2009, p. 9).

The case study method was also selected to take advantage of several factors that influenced the topic of this study. First, was the local availability of an organization (the unit of study) that was specifically created to provide the non-academic interventions to at-risk postsecondary students, and their agreement to participate. The organization was also pre-qualified as an exemplar of its kind by independent studies from reputable research organizations, as discussed in the literature review. Second, the unit of study has a mission that is sensitive to, and intentionally addresses, the student psychology of at-risk students as a matter of course. The third factor was the ready availability of data in multiple forms that could be used to address the research questions. And finally, the unit of study partners with a large urban community college that provides all of the academic coursework to the unit of study at its campuses, and agreed to participate.

While other forms of qualitative methods were considered, such as Interactive Qualitative Analysis (IQA), the conceptual framework of this study utilized a relationship between existing psychological theory, recent findings from neuroscience, and student academic success, to formulate the study's hypotheses. While IQA and other

methods are well suited to elicit emerging theories from participants, the researcher sought to ensure that the integrity of the proposed relationships were maintained throughout the study, rather than ask participants to help formulate a grounded theory for the study.

Quantitative methods were initially considered, but difficulty in operationalizing difficult to measure concepts used in the study, and the researcher's insufficient depth of knowledge in statistical methods, precluded pursuing a quantitative design.

Strengths and limitations of the case study method. The strengths of the case study method were its focus on a defined unit, flexibility to weave a combination of source materials such as relevant current and historical documents, statistical data, and empirical data gathered through interviews into a comprehensive report that addresses the research questions posed, and supports the theoretical basis for the study, or that provides information leading to alternative explanations and theoretical constructs for the events studied (Lincoln & Denzin, 2011; Yin, 2009).

Limitations often cited for the case study method are typically centered around lack of rigor and insufficiency in data gathering, subjectivity of the researcher in drawing conclusions not supported by the data, lack of attention to possible alternative explanations, and insufficient attention to validity and reflexivity concerns inherent in the interview process (Lincoln & Denzin, 2011; Maxwell, 2005; Yin, 2009). However,

these same limitations can be problematic in any research methodology, and can be addressed in systematic ways through careful research design (Lincoln & Denzin, 2011). The research design for this study addressed the limitations noted by adherence to Yin's six sources of evidence: documentation, archival records, interviews, direct observations, participant-observation, and physical artifacts (2009, pp. 98-125), and Yin's three principles of data collection: multiple sources of evidence, a case study database, and a chain of evidence (2009, pp. 114-125). The safeguards incorporated into this study to address the limitations of the case study method are discussed below.

Research Relationships

Required relationships and why they are necessary. The study involved the direct participation of two organizations. The primary relationship involved the unit of study, which is necessary to provide the documentation, interview participants, and program data necessary to answer the research questions. The second relationship was with the community college partner of the unit of study, which was necessary because the study was conducted partly at the college's facilities.

Permission to proceed with the multiple sources of data collection was obtained from the University of Texas at Austin Internal Review Board (IRB), approving the research proposal in its entirety before any data collection began. Additional permissions were obtained from appropriate authorities of the Capital IDEA organization. Permission to collect the data onsite was obtained from the Research Review Committee of the

college, according to the college's administrative rules. Permissions from actual participants was obtained through IRB approved waivers advising participants of the nature of the study, their rights under the study, and how privacy was protected.

Documentary data was collected directly from Capital IDEA through site visits and from online resources provided to the public. Data where confidentiality was a matter of concern was collected directly through site visits and consultation with Capital IDEA administrative staff that were familiar with the data and knowledgeable regarding privacy laws regarding students.

How the relationships were established. The researcher had pre-existing and long established professional relationships with both the unit of study and the community college. Both entities agreed to participate in the study.

Current relationships with the entities. The researcher is a senior administrator at the community college with 12 years of service as the Chief Financial Officer. The researcher also works on behalf of the college as a liaison with the unit of study in financial matters related to student tuition and fee collection, and in providing facility space for the unit of study with respect to course related activities such as classroom space and tutoring labs.

Site and Participant Selection

The organization selected for this study was chosen due to its representative nature for organizations of its type and therefore considered generalizable as to methods

and outcomes for all or most cases that are constructed similarly (Lincoln & Denzin, 2011, p. 307). The organization is Capital IDEA, (Investing in Development and Employment of Adults) in Austin, Texas. Capital IDEA is fairly typical of a recognized type of organization known as a workforce intermediary, and has been one of the most successful programs of its kind in the U.S. for transitioning low socioeconomic status (SES) adults into high paying workforce jobs (Conway et al., 2012; Smith et al., 2013; Zafft et al., 2006).

Approximately 80% of the Capital IDEA students are Hispanic and African American (Conway et al., 2012). The program enrolls its students in customized, accelerated remedial education courses to get them to college level in reading, writing, and math, then guides them through a standard college-level set of prerequisite courses and a college workforce program leading to an associate degree in high paying fields such as those in the Allied Health professions (e.g. Nursing), or in the Information Technology field (programming, network analyst, etc.). Capital IDEA has been operating since 1998, and at the time the study was conducted, had approximately 800 students enrolled in various stages of the program (Capital IDEA, 2011; Conway et al., 2012). The embedded unit within the Capital IDEA organization is the remedial education program known as the "College Prep Academy" (Capital IDEA, 2011). The College Prep Academy offers remediation in reading, writing, and math through the community college.

The benefits to this study of selecting Capital IDEA were several from a data gathering perspective. First, Capital IDEA maintains, thorough documentation of its students' academic outcomes, and pre-entry assessments, providing a rich source of data from which to draw a sample for the student interview and survey portions of this study. For example, selecting a representative pool of students who required math remediation, and went on to pass a college level math course, was a simple and documentable matter. Second, Capital IDEA students must meet certain low socioeconomic criteria in order to be admitted to the program, and are typically recruited from demographic populations representative of the disproportionate number of ethnic minorities typically found in many community college remedial programs nationally, and who do not complete the typical remedial math programs at the same rate as their White peers. Third, Capital IDEA's verifiable success with its remedial students qualified it as a unique case to study what it does differently relative to typical remedial programs at community colleges. Lastly, Capital IDEA uses the curriculum and faculty of local community colleges, for its remedial math courses. The use of the college's faculty and curriculum added credibility to the study by providing comparison data of the success of Capital IDEA's methods with the success rate of Texas community colleges in the same courses.

Data Collection

Personal interviews. Individual interviews with current Capital IDEA staff and students were conducted. The questions used in the interview were based on the research

questions, but tended to be open-ended in order to foster free and flowing discussion to guard against researcher bias, defined as the researcher drawing conclusions from the data based on the pre-determined theoretical conceptions of the researcher, and as a guard against reflexivity, defined as the interviewees telling the researcher what they believe the researcher wants to hear (Maxwell, 2005).

One set of interviews was conducted. The interviews consisted of ten of the 20 students accepted by Capital IDEA to participate in the summer 2014 Capital Prep Academy, as well as nine Capital IDEA staff members. The participants were interviewed upon completion of the 12-week, summer 2014, College Prep Academy. The interviews consisted of a set of questions regarding the perceptions of the usefulness of the non-academic interventions performed by Capital IDEA. Their perceptions were rated on a Likert-type scale developed by the researcher in consultation with Capital IDEA staff, after gaining a sufficient understanding of the non-academic interventions used by Capital IDEA.

Personal observations. The researcher observed the summer 2014 College Prep Academy students in their actual classroom, tutoring lab, and study skill sessions. Observing students in their remedial math courses assisted in gathering important background information on the processes typical students experience in the Capital IDEA program, and provided observational information that added depth and description in addressing the research questions.

Survey instruments. Customized interview guides and questions specific to the research questions for this study were created in consultation with staff of the unit of study. The interview questions are included as Appendix A. The intent of customized guides and questions is to promote exploratory and explanatory discourse that reveals the experiences of study participants without preconceptions that may be inherent in more formal survey instruments (Yin, 2009).

Publications. Capital IDEA publishes annual reports, data on enrollments and outcomes, and has been noted for its successes in two independent studies performed by both Harvard University, and more recently by the Aspen Institute (Conway et al., 2012; Smith et al., 2013; Zafft et al., 2006). These data and studies were incorporated into the documentation of this study to demonstrate the worthiness of the Capital IDEA program as a unique and independently verified subject for this case study. Recent newspaper reports on the success of Capital IDEA, including student commentary on how the program substantially changed their academic success and career options was also included in the chain of evidence supporting the selection of the program for the present study. Additionally, for comparative purposes, data on success rates of remedial math students at Texas community colleges was available from public sources, and was obtained as a representation of typical remedial results obtained by community colleges nationally.

Document gathering protocol consisted of a checklist determined in collaboration with the researcher, and the Capital IDEA staff. The checklist guided document gathering to ensure that all relevant documents were considered and made a part of the research evidence. Items that were used were locally produced documents such as annual reports and reports to grant funders, internal records and student data, newspaper accounts, local television news coverage, and external reports and studies performed by third parties such as the aforementioned Harvard study and the Aspen institute study (Conway et al., 2012; Smith et al., 2013; Zafft et al., 2006).

Physical data. Physical data collection was gathered in the documentation efforts previously discussed in this chapter. Additional physical data was in the form of photographs, evidence from graduation ceremonies such as organizationally produced videos and printed programs, transcripts of proceedings, or other items of opportunity that may arise.

Relationship of data to research questions. The following listing shows the research questions and which data sources were used to address them.

1. Which non-academic interventions are used to support students in remedial math?
    a. Interviews
    b. Publications
2. Why are the interventions used to support students in remedial math?

a. Staff interviews

3. How are the interventions used to support students in remedial math?
    a. Staff interviews
    b. Student interviews
4. Do students perceive the non-academic interventions as useful?
    a. Student interviews
    b. Likert-type scale
5. Is there a statistically significant difference in remedial math completion between students who participate in a prescribed program of non-academic interventions and those who do not?
    a. Capital IDEA documents
    b. State publications

Data Analysis

Analysis process. The primary data was gathered through the individual interview process due to its customized nature in answering the research questions posed by the study. The interviews were transcribed and coded to correspond to the research questions. The results of the Likert-type perception instrument gathered in the interviews were analyzed for descriptive data using statistical software.

Technology used. The researcher used a Computer Assisted/Aided Qualitative Data Analysis (CAQDAS) software program to aid in organizing and analyzing

qualitative data. Statistical descriptive analyses were performed using statistical software.

Other technology used was a laptop computer for writing, data storage, and web access. A tablet computer was used for mobile note taking and web access, and a digital voice recorder was used for interview recording and transcription.

Calendar of Activities

Approval of the research proposal was acquired in the spring of 2014. Research activity began in May of 2014, with completion of the study presented to the dissertation committee in the spring of 2015.

Reliability and Validity

The concepts of reliability and validity in qualitative research refer to the potential that the conclusions drawn by the researcher could be wrong, and that an alternative hypothesis may better explain the findings of the research. To guard against this potential for error, Maxwell (2005) advised that sufficient and multiple sources of evidence be gathered that would make an alternative explanation "implausible" (Maxwell, 2005, p. 105). This study addressed problems of reliability and validity as follows.

The analysis of published data verified remedial student success rates over time for both Texas community colleges and Capital IDEA. This data is publicly available through reports and the records, and a recent study on Capital IDEA performed by the

Aspen Institute (Conway et al., 2012). The data gathered was intended to illustrate any differences in remedial student success rates between Capital IDEA and a Texas community colleges that achieves fairly typical success rates on both a state and national basis with remedial students. This level of data analysis for the project was straightforward, and the consistency of the data validated the information gathered, thus the validity of the published data was not an issue.

The interview data, and its validity, were paramount to the study, and care was taken to provide ample evidence supporting the interview data provided by the students, and the conclusions of the researcher. Threats to validity come from two major areas, researcher bias and reflexivity (Maxwell, 2005; Yin, 2009). Researcher bias is often an integral part of qualitative research; the researcher has an idea of what is going on and embarks on research that will add support to his or her hypothesis in a particular setting, or find something else is going on altogether. The threat to validity from researcher bias is that the researcher will draw the desired conclusion from the data without considering alternative explanations that might also be present in the data, or worse, lead the interviewees to the desired conclusion through interview protocols such as leading questions. Reflexivity is a validity threat whereby the interviewees' responses are influenced by the presence of the researcher in some way, and provide responses that support the research hypothesis when in fact they may not actually hold such beliefs and perceptions (Maxwell, 2005).

Of the two threats to validity just discussed, researcher bias was the most serious in the study. The researcher's pre-existing professional familiarity with the Capital IDEA organization, and his position as an executive administrator with the local community college, which provides instructional services to the Capital IDEA organization, combined with his existing familiarity with local and national research on student success among low SES students, all combined to form the researcher's belief that the primary difference in the improved academic success of Capital IDEA students and the results achieved nationally by students who are not involved with programs like Capital IDEA (Bailey, 2008; Bailey et al., 2009) is almost certainly due to psychosocial effects. Indeed, this preexisting knowledge formed the researcher's basis for the importance of this research.

The declared bias of the researcher was addressed in the following ways. First, the researcher spent a considerable amount of time as an on-site observer with Capital IDEA to gain a deeper understanding of the program and its students. This commitment provided a more in-depth understanding of the organization. The researcher also carefully constructed the interview protocol to avoid leading or self-serving questions that contribute to bias toward a predetermined result. The interviews also provided sufficient time with the research subjects (Glesne, 2011) to address short-term conclusions and the threat of reflexivity, and provided thick and rich data gathering. The interviews were recorded and transcribed to provide documentation of the results, and

descriptive data. Combined with the longitudinal (historical and archival) data discussed earlier, these measures provided a substantial degree of triangulation that supported the hypothesis.

Lastly, the researcher had access to data from state sources, which provided direct comparison data on student achievement. This comparison data assisted in providing credible evidence supporting findings and conclusions in the study that something was different between conventional offerings and what was going on in the Capital IDEA program of interest. The researcher was also an observer, as well as interviewer, which provided extensive field-notes from observing the daily routine of the program and its students. In the past, the researcher has briefly observed students in the Capital IDEA program during a study skills session, a remedial math course session, and in a group interview. In those observation experiences the researcher found that the students ignored the presence of the researcher in the classroom settings in short order, and the researcher's perception of the effects of reflexivity in the group interview seemed negligible due to the candidness and diversity of responses.

Summary

In this chapter, a detailed description of the research method and design was presented along with rationale for each element of the research as proposed. The chapter began with a brief review of the purpose of the study and the research questions, then discussed in detail the research design and related specifics of research method,

strengths and limitations of the method, site selection, document gathering, sampling techniques, validity concerns, and data analysis. The researcher believes that the methods, rationale, sample selection criteria, and the logic for their selection resulted in a thorough and comprehensive case study that contributes valuable information to the literature on the key components required to improving remedial math success in public community colleges.

Chapter Four: Findings

The findings presented in this chapter consist of data gathered in a case study on Capital IDEA (CI) (Investing in Development and Employment of Adults) in Austin, Texas. As discussed in chapter three, the data consist of archival documents, personal interviews, and the researcher's observations of CI's operations during the summer and fall of 2014.

Ten students were selected for this study from the summer 2014 remedial math class conducted by CI. There were eight females and two males. Their ethnicity was eight Hispanics, one African American, and one Asian. Ages ranged from 18 to 49, with an average age of 27. All students were considered as low-income, or low socioeconomic status, defined as below 200% of the federal poverty guidelines, in order to qualify for the CI Program.

The students were selected by CI staff as representative of the program at the request of the researcher. In addition to the students, nine CI staff members were chosen for interviews by the researcher based on their roles in the organization that most directly related to the interventions studied.

The interviews consisted of a series of questions designed to gather data that would be used to answer the research questions, which included ratings on a Likert-type scale of one to five, with one meaning Not Useful, and five meaning Very Useful.

Software was used to organize the data and perform descriptive calculations. In addition to Microsoft Office for Mac 2011®, Dedoose® online software was used to mange the data gathered. Wizard® and SPSS® were used for descriptive analysis.

Restatement of the Purpose of the Study

The purpose of this study is to use the psychosocial perspective of Bandura's social cognitive theory in order to gain a better understanding of whether or not there is a relationship between intrusive and intentional non-academic interventions and successful math remediation.

Restatement of Research Questions

1. Which non-academic interventions are used to support students in remedial math?
2. Why are the interventions used to support students in remedial math?
3. How are the interventions used to support students in remedial math?
4. Do students perceive the non-academic interventions as useful?
5. Is there a difference in remedial math completion between students who participate in a prescribed program of non-academic interventions and those who do not?

Organization of the Findings

The CI organization incorporates a program of interventions, which for the purposes of this study are identified as non-academic interventions because they are

directed at supporting students through a college level workforce program leading to a credential or Associate's degree, rather than providing the academic program itself. All academic programs are provided by area community colleges, and in some cases training programs provided by local labor union affiliates. These interventions are categorized for the purpose of this study according to those interventions found to be the most beneficial as identified by Karp (2011) and that were discussed more thoroughly in chapter three. The order of Karp's interventions have been modified to better align with CI's order of intervention processes as follows:

I. Clarifying Aspirations and Commitment;

II. Developing College Know-How and Creating Social Relationships;

III. Making College Life Feasible.

Each intervention category, and its associated CI interventions, will first be described based on findings from staff interviews, archival documents, published information, and personal observation by the researcher. Following a description of the intervention, CI staff perspectives on the intervention will be presented, followed by the students' perceptions. A discussion of the findings will be presented in chapter five of this study.

Staff Identification and Ratings of Non-Academic Interventions

The questions used in the staff interviews were different from the student interviews in that each staff member was first asked to identify the non-academic interventions used by CI, explain why they were used, and then how they were used.

Staff were then asked to rate student perceptions of the usefulness of the non-academic interventions CI provides, and then rate their own perceptions as staff members on the usefulness of the same non-academic interventions. The staff interview questionnaire is attached as Appendix A.

From the staff interviews and published documents CI identified five specific interventions used with its students that included: recruitment and assessment, the College Preparation Academy (College Prep) which includes remedial math, reading and writing, and study skills classes, student cohorts, individual case management, and financial support for tuition, fees, textbooks, school supplies, childcare vouchers, emergency loans, and transportation.

The ratings provided by staff from the interviews are presented next, while the excerpts from the staff interviews are presented in the following section according to the non-academic intervention category to which they are related. The staff Likert-type ratings will be presented only once in this chapter since no variance in the staff ratings was found, all interventions receiving the highest rating on the scale. In the words of one CI staff member, "if we didn't think the interventions were critical for the students' success we would not do them." Due to the small sample size, only descriptive data are used.

Staff interview rating 1. Do students perceive the non-academic interventions as useful? Staff responses were unanimous in perceiving that students perceived all CI interventions as useful (*Mdn* = 5, *SD* = 0, *SE* = 0).

Staff interview rating 2. Do staff perceive the non-academic interventions as useful? Staff responses were unanimous in perceiving all CI interventions as useful (*Mdn* = 5, *SD* = 0, *SE* = 0).

Staff Excerpts and Student Excerpts from the Interviews

The staff and student excerpts used throughout this chapter are from transcriptions of interview recordings, and presented with a high degree of fidelity to the actual words spoken in the interviews in order to preserve each respondent's voice. The excerpts have been paraphrased in some instances for clarity or context, and to preserve anonymity for interviewees and any local organizations mentioned in the responses. In general, the staff excerpts address the which, why, and how of research questions 1 - 3, while the student excerpts reveal the students' perceptions of the interventions in response to research question 4.

Findings: Research Questions 1 – 4, Staff Perspectives and Student Perceptions

I. Clarifying aspirations and commitment. The initial interventions used by the CI program consist of recruiting students for the next academic term, and then assessing those recruited to aid in clarification of the students career goals, and ascertaining the student's level of commitment towards reaching his or her career goals.

The intent of these interventions is to identify low-income students who are sufficiently motivated to enter into a rigorous college-level workforce degree program, and who are able to commit the time required to focus on their academic program. This motivation and time commitment is especially important in the initial phase of the CI program, which requires 12 weeks of full time college preparatory courses for most CI students. Students who are unable to make this commitment in time and financial means are advised to postpone their application to the CI program until they are in a position to do so. Each of these initial interventions will be discussed in turn.

Recruitment. The initial step in the recruitment process is conducted through recruitment visits to area non-profit organizations by CI staff, and advertisements for orientation sessions that present information on how the CI program works, who qualifies, how to apply, and answers frequently asked questions. The orientation sessions last approximately one hour, and are usually offered in several locations on different dates during the same month. The timing for offering the orientation sessions is aligned with the fall, spring, and summer academic terms at the organizations providing education and training services to CI such as the local community college, non-profit training organizations, or craft training provided by local labor unions. The advertisements take the form of multi-color brochures that invite interested persons to attend an orientation session. The brochures identify the date and location of upcoming orientation sessions, which are typically held in the early evenings at locations such as

state, county, city, non-profit, or church facilities. Included in the advertisements are listings of the career programs offered, basic qualifications required to qualify for CI support services, and the non-academic interventions offered to students. The interventions listed include paying the costs of tuition and books, provision of case management services, financial support for childcare services, job placement services, and classes to prepare for college level work if necessary. Potential participants are not required to pre-register for the orientations, but are advised to arrive ten or 15 minutes early to sign in and pick up an information packet, and bring something to write with.

The winnowing of potential applicants starts early, with latecomers to an orientation advised that they will not be admitted to that session, and should either attend the next scheduled orientation session, or wait until orientations for the next semester are offered. The CI program intentionally structures the recruitment process as an initial exercise in self-selection in order to determine which students are ready to make the commitment to the program. Showing up on time to an orientation is considered indicative of a potential student's motivation to do something different with his or her life. The information packet provided at the orientation contains all the forms necessary to apply to the program, and is formidable in its own right. The forms cover a range of information for and about the applicant including how to make an appointment for assessment, a math practice sheet, documents concerning identification and citizenship, and a ten page application form covering living arrangements, criminal history, personal

finances, previous college transcripts or financial aid awards, job history, and career interests. The forms are to be filled out at home and turned in along with all required documentation when the applicant arrives for their assessment appointment.

CI staff estimate that approximately 15% of those attending an orientation will decide not to pursue the application process any further, at least for the time being, and of those who do only about 15% will eventually persist in the process long enough to actually be admitted to the program. This is an interesting nuance in that the program does not select from a large pool of applicants; the process is designed so that students self-select by choosing not to complete the process.

Staff perspectives on the recruitment process. The following excerpts from staff interviews describe the recruitment process, and why and how it is a critical intervention for the CI program.

- In terms of outreach, we conduct orientations 3 times a year. We distribute our orientation flyer to almost every nonprofit in the city, and nearby counties via email. Also, we work very closely with [a local ecumenical religious organization] who helps spread the word and distributes orientation flyers in their congregations. In addition, the community college refers applicants to us. We also use social media such as Facebook, Twitter, and LinkedIn. From time to time, we have used radio and TV, but have not had great successes through those outlets. Word of mouth is the way most of our applicants hear about us.

- The application process is all about self-selection. They go to orientation to hear about our services and we put those orientations on our website. We only do that three times per year, after that they come to the office for an assessment sign up and they pick up an application. It is all about self-selection. Our other partners have asked CI staff if we would be willing to combine some of these steps, but we would not be willing to combine the steps. Because, this is the way the students select themselves, or say this is not the right time for me. They are about to make a big investment with their lives and we are about to do the same for them, so we intentionally want to see if they will go to all these meetings and be on time. That also tells us if they are really ready to commit. And if this was their job would they be on time and won't make excuses. We are big on commitment.
- There are five steps, orientation, assessment, sign-up, actual assessment day when they come and take it, the career guidance session, and then the commitment interview. So if they miss any of those they can call and reschedule, but we cannot guarantee that we will reschedule in time for the next semester, it may be the semester after that. It depends on how many we are working with, but it also sends them a message, you need to be ready. Most of the time we reschedule them right away because they really want this, and we take into consideration their circumstances, but if they went on vacation, no. Hey, I was on vacation, we say fine take another few weeks and we will see you in the spring.

But that is part of the non-academic interventions to not select them before they really get serious about school.

- From orientation to those who actually get into the program, it's about one out of seven. There is a drop out at every point. We may have 200 people come to orientation, and just from that they may see they can't do the program, and they say you know what, I'm just going to go on financial aid. Or they have kids and aren't going to be able to take three classes a semester. There are all kinds of stuff. So then, that's a drop off right there. So out of the original 200, maybe 170 will sign up for testing, but they won't all show up. And then for testing there's a drop off, so by the time they get to me four out of five will go through the program, but from beginning to end maybe one out of seven actually last through every phase and start the program.
- We do a lot better than the average community college, but if we could just figure out the men. Most of our students are women, 75%, actually a little more than that right now. That's something that we try to figure out now and then, but that is not just CI, it's a national issue. Men don't come to the orientations as much, they're not as interested in the careers, and when they are they are interested in the lower paying ones. These two guys are our lowest paid starting students. They are in automotive, and they start out lower, they work their way up, but this female in nursing started out way up here. CI is starting a program of

targeted outreach to get men interested in higher paying careers, so we can see how that goes.

- I will be starting to do that kind of work, I am going to be focusing a lot on intake, and one of my goals is to recruit students for particular fields, but we have been short of manpower. We are looking for ways to find people who want to do something besides nursing. Some fields are not as populated, so we want to start focusing on other fields. Whenever I talk to potential people who are in the career schools, they contact me and want to talk about sending students to them. So first thing I ask is are they accredited? Then I ask if there program can lead to a four year degree in case the student wants to progress in that career? The career has to be able to provide good benefits to employees, a minimum amount of salary, and so. If you study a program and you end up making $9 an hour, and no benefits, then what is the good of that for the student? We tell our students that this career pays a decent salary, has benefits, and provides an opportunity for growth in the field. The opportunity to go on to the university, to grow in the field, is critical.
- When someone wants something that we don't have a program for, there is a lot of that. But, we can only sponsor certain programs, those that result in an Associates Degree or certificate. We don't want to steer them into something they don't want, but if they want to be a pilot or something that calls for

advanced education, then we can't sponsor them in this program. I don't try to talk them out of aviation and say hey, automotive is similar; you should try that.

- The labor market can change quickly, and by the time you have spent two years in a course you may find that course may not be as relevant to the job market as it once was, and that's just a structural tendency of an educational institution is to do what it knows to do, which is deliver this curriculum. It needs an outside agent, and that's where CI comes in, that sort of keeps assessing whether this curriculum is relevant, is what these people are learning relevant, what do we need to do to make sure it is.

Student perceptions of the recruitment process. The students interviewed were asked to respond to the following questions: What brought you to CI? How did you hear about CI? What about CI seemed most interesting to you? What kinds of things does CI do that you find useful to you? How did you decide to become part of the CI program? On a scale from 1 to 5, with 5 being the most useful, has this program affected your perception of your ability to be successful in college level math (StuQ_1), and in what way?

Due to the small sample size, only descriptive statistics are provided for student ratings.

Student Rating 1. Has this program (recruitment) affected your perception of your ability to be successful in college level math? The students perceived the

recruitment process as having a positive effect on their perceptions of being successful in college ($M = 4.9$, $Mdn = 5.0$, $SD = .316$, $SE = .1$). No student rated the recruitment process less than a 4, indicating that students perceived this intervention as useful in bolstering their confidence for being successful in college math.

Along with this high rating, the student interview responses on the recruitment process indicated that word of mouth was an important factor in how students were recruited into the program despite CI's recruitment efforts through extensive distribution of brochures to numerous non-profit agencies about upcoming orientation sessions. Students also indicated that an initial perception was that the CI program was "too good to be true," and some were skeptical at first of the program's motivations in recruiting them.

Student responses to the interview questions regarding the recruitment process are shown below.

- A friend told me about CI, and it sounded too good to be true; I was like okay, I ain't going to lose anything.
- I was wondering a lot about CI. There has to be something wrong; it's too good to be true. So I went to the first meeting and thought this sounds so good. I told my mom there is something weird with CI. Why do they pay a lot for you? They don't even know you. But mom said, well go ahead. Now that I'm here I see this is not a joke.

- I was working at [a local proprietary school], it is like a private school, and we were getting students from CI, so my boss told me about it.
- CI has pamphlets on the programs they offer, and I was interested in something with computers.
- I have a teacher from high school, so he was following me through college and I wanted to go to [a proprietary school] and then he told me that that was a bad idea because it was too much money and I'm only going to get just a certificate and it's not going to be a great thing to do, so he convinced me to go to Capital Idea and check it out and go to this orientation.
- My sister told me about CI because I came here [to the U.S.] and couldn't find a job, so she said I probably needed to improve myself in academic ways.
- I was going to a school to get my GED, and a CI staffer came by and talked to us and was like, I work for CI and we want to help you with these trades, and if you're interested, he was really encouraging and said, try it, try it, try it, so I tried it and I liked it.
- I heard about CI, my husband actually found out about it two years ago, and I think he read about it on Reddit.com. My husband told me I should really go to college so that's how we came to CI.

- Actually I didn't know exactly what they provided initially, so when I joined I saw that they allow us to take classes that they pay for us so it's not a burden for me since I'm migrating from [a foreign country].
- It was hard for me to find the direction of my life because I gave up my job [in the foreign country]. It was a good job. But then I came here and start for entry-level and cannot get the job. So I started to apply for this to improve myself to get a better job.
- The opportunities that they were giving stood out, and the way he made it feel so welcome.
- The most interesting thing about CI, I will say they just focus on certain careers, the ones that are the most in demand, which is a good thing because a lot of people choose careers that are not going to get them anywhere. So, I think if they are going to help someone get a degree it's better if it's one that is worth it.
- The other thing that is good about it is they help you get a job after; it's not that you graduate and they say goodbye. They help you get a job.
- The requirements are really based on your income; you need to be low-income. I don't think it's based on what you already know, because we pretty much start from the basics with everything, so it's pretty much just income. I guess if you're willing and really want to go to college and do it, they look for that too.

- Like I have been living here in the United States for 11 years, and I just heard about something like this two years ago.
- I knew there was something like that, and I didn't know how easy it was to get into a program like this, people say oh no, you gotta' be like super special or super genius or that sort of thing, and it's not like that. Anybody can apply and get in if they are willing to study and they are low-income family.
- They told me I couldn't actually go back to the community college because I had messed up something and didn't have enough credits to actually go back. So I had to get some studies through CI, they would help me out with funding. So I was scared of that, but I just believed, and I called them and got my orientation and testing and all that.
- I attempted that, but they referred me to CI, because I didn't have enough credit, or couldn't get financial aid, or something.
- I went to an orientation at [a local community college] campus, and then we took a little math test, about 60 questions. I was just our of high school so it was pretty fresh and I knew quite a bit, and I thought I did pretty good. I finished in about an hour. At the orientation they give the test, and tell us what we are expected to do and what is expected of us, like to get done because they are paying for it. And they want you to be here all the time, they don't want you to be missing and stuff.

- So I went to the Pleasant Valley location (CI headquarters), because that was actually the closest location to me, so I went through the orientation and the process there. I took the testing, and gave them my transcript and everything. They told me I would be going to the community college, but not be an official college student yet, I would be CI, or something like that.
- I felt comfortable going to Capital Idea and I knew it was going to be a lot of things to accomplish through the process to get into Capital Idea, so I made myself achieve those.
- First you go to an orientation, and that's where they explain what the program really is about. Then you do a test to see what level of math and reading you are. After that you just have to bring all the paperwork they ask for and that's when you start. Well, you have an interview to see if you are qualified, and after that you start the program.
- I went to the orientation, listened, and started to apply.
- Like they were really trying to help. I found that interesting.
- I liked the way they were so nice and so willing to help.

A summary of the themes in the student comments reveals that word of mouth was the way many prospective students heard about the CI program, indicating people (other than the student) had heard about CI, and had a positive perception of the program. Skepticism about the motives behind the program was another revelation that indicated

students were curious as to why such a program would be interested in them and willing to pay their way through college. Another important theme found in the responses was that students who had attempted college before and not fared well were academically blocked by the college, or had lost their federal financial aid eligibility and needed a way to finance a second chance at college. As for the strong rating connecting the recruitment process to increased confidence in passing college math, further exploration seems warranted as to how and why the student's confidence for success in college math was bolstered by the recruitment process.

Assessment. After the orientation session, interested applicants sign up for an assessment appointment, referred to as testing by CI. The assessment takes approximately three and one half hours. Applicants are given a reading, writing, and math assessment test customized by CI, to ascertain whether the applicant requires remedial course work in any of those areas to attain college level skills. The applicant must achieve reading and math scores at a minimum fifth grade level to qualify for the program. Applicants are also given the System for Assessment and Group Evaluation (SAGE) Skills Assessment test, to ascertain the applicant's aptitudes, interests, and suitability for the various career programs offered by CI.

After testing, an appointment is scheduled with the applicant and a CI Career Guidance Specialist to conduct a first interview on how the applicant plans to balance work, life, and going back to school full-time. Also, discussed are the applicant's income

qualification, test results, career goals, budget, and potential challenges the applicant may be aware of that might interfere with his or her ability to complete the program. After discussing the results of these assessments with the applicant, an educational plan is developed that is tailored to the applicant's skills, abilities, personality, and ability to maintain a commitment to completion of a college degree or certificate in their chosen field. If all goes well, the applicant is then scheduled for a final "commitment" interview.

In the commitment interview, a CI Director meets with the applicant to discuss his or her commitment to finishing the academic program, and also CI's requirement that successful applicants commit to a written plan to give back to the community through volunteer service to an organization of the applicant's choice. After the final interview, a decision is made on whether to accept the applicant to the CI program. Upon acceptance to the program, the applicant is required to sign a contract committing to completion of his or her academic program, and to giving back to the community through volunteer service, in return for CI's financial and other support. This contractual arrangement has been described by CI staff, only mildly facetiously, as a "Catholic marriage, there is only one way out."

The CI program views acceptance into the program as an investment in the applicant that is sponsored by monetary contributions from various organizations with an interest in assisting low-income adults in achieving a college credential in long-term

careers that pay a living wage, and that are in high demand by area employers. The recruitment and assessment process used by CI is necessarily rigorous to satisfy the restrictions placed upon funding by contributors, and to ensure that applicants accepted to the program have a high likelihood of success through their commitment to completing the program.

Staff perspectives on the assessment process.

- The assessments are done pre-enrollment, and pre-acceptance to the CI program. It helps us with the decision-making.
- And honestly, even assessment, they might not like it because it takes three hours of their time and they don't even know if they are in the program or not, but I did a survey of the students that were coming in, and I wanted to see if the assessments were helpful, and the length of time. And the students said the assessments were very important to them. They say it gave me the opportunity to really think about what I am going to get myself involved in, and do my research, talk to my family. It didn't seem like I was rushed into the CI program. They all said they needed to really think things through.
- There's certain functions that CI does that are important, such as really working with someone to discern the decision they're making about their goal, and what it's going to take to get to that goal. That's what the program is about a lot, and it's something both of us can do together so that students have a clear idea of

what they're going for, what it's going to take financially, in time schedule, their priorities and family's needs.

- Well, good solid defined on-ramps, which is the assessment process where you don't just show up, but you work with someone to get a clear goal. We support a clear goal, and you get on at a specific place and you understand that nurses do some icky things too, and not everyone should be a nurse, or is cut out to be a nurse, and that you really kind of choose what is your passion because you are really going to have to work to get it. So it's not a casual decision, and you work through first the choice; have a realistic assessment of what you are starting with. What [are] your reading and math and aptitudes? What does that mean in the amount of time you should expect to devote to it? Because a 2-year degree doesn't happen in two year, especially a technical degree one. Once you know how long it takes you also know what sacrifices it is going to take from you, your family, in financial support from Career Expressway, from CI, from the community college and others that care about your goals.
- The assessment process is my main thing here. I assess all the participants. The first one is called the TABE. Texas Adult Basic Education assessment. We do the survey test, which is just a snapshot of the person's skills. The regular TABE takes about four hours, so we do the shorter version just to get some idea of where they are. The test is basic math and reading. What I'm looking for is for

them to score above a fifth grade level education on that in order to receive services from us. If the person is at a fifth grade level and never attended college, they can score up to 12.9, which is the exit level for high school level math or reading. If they score from 5 to 12, or 10.5, that means they are above the 5th but below the 10th. Usually I send those students to the college prep academy, which replaces developmental course work. If they score above 10.5, I consider them college ready, and they can start taking college courses, the prerequisites. For those who already have gone to college and score on that same scale, and they are TSI not complete, then you go to college prep. What I am mainly looking for in this assessment is where their start point is going to be with CI. Are they going to college prep, or start college courses? The TABE tells us that, it is an indication. If they score below a fifth grade level we refer them to Lifeworks or the literacy coalition who can help them with more of the basic education (ABE). The college prep academy is an accelerated program, and we need for them to be really able to do well in that class, and someone below the fifth grade level is going to have a really hard time in college prep because it goes fast. So we don't want to set them up for failure, so we tell them to go get some basics and then retest. We want to be as realistic as possible. If they score below the average, how are they going to compete with applicants that have 4.0 GPAs?

- The second assessment they take is called the SAGE (Student Assessment of Growth and Excellence), and it basically is a personality type assessment, where we look at whether or not they are compatible with the kind of career they want to go into. So the TABE is about the basic academics, and the SAGE is whether they are compatible with the career they want to go into. Because as an investor, I want to invest knowing to some extent if you are going into the right field. This gives us an indication of that. Then in the SAGE there are different things we look at. The first is their reasoning skills, the reasoning skills tell me about their problem solving, and logic. The test scales them from one to six. I tell them if you score a three or above, you are in regardless of why you want to study that career. But if you score three, I'm not going to say no to you, but I am going to question your career choices. There are other things we look at in the SAGE, which is their learning style, their personality traits, their vocational interests, so I am able to see all those traits of the person, and say you know, you are not really much of a people person, and to be a nurse you need to interact with all sorts of people from all sorts of backgrounds. You need to like people. Or, it shows you study best by yourself, or a better visual learner rather than an auditory, or you express yourself best in writing, or verbally, and I learn all of these things about the student and we go over those things with them. Basically

at the end what the assessment gives me is a list of all those compatibility matches.

- We don't give our applicants the Myers-Briggs. We've all taken it, but we don't. I used to teach that when I was in management, so sometimes that comes into play in my discussions with the applicant. I think we don't give it because it is expensive, but we have been looking into some free online tests, but we've been so busy. We test 100 to 150 people every cycle, so that could get very costly. And you would have be certified to interpret the MB.
- They will opt out, because we give them a lot of information. Criminal history plays a major, major part. Practically every career we offer, you know in health care you have to be licensed, and we are realistic about that. If you have a criminal history you really need to talk to the licensing board to see if you can get licensed, because that is definitely out of our hands. Even for some of our other careers like electrician union, you have to be licensed. For solar energy you have to be a licensed electrician to install those panels. So we tell them to go to the licensing board first before you go through this whole process. I need to know if they can be licensed before I can work with them. This happens about four to five times per month.
- But the major reasons for people dropping off are they don't qualify, they have a criminal history they have to work out, and they can't take time off from work.

Some think they can take all their courses at night, but as you know at the community college, the professors want to work 7 to 5, just like we all do, so there are very few science classes that you can pick up at night. And once you get into the program, now you are doing clinicals and going to class, so a lot of times they say, right now I have to work full time, so what do I need to do to go to half-time, pay off the car, cheaper apartment, do I have to move back home? Do I have to go to the AG and aggressively pursue child support? So those are reasons people don't come into this program.

- They also have to qualify financially; they have to meet the federal poverty guideline, 200% of that. I also have to do math. It's a good thing I took accounting in my past life. In fact, at the community college many years ago I had to take accounting 1, 2,and 3. Back then it was for my managerial job, and I also had to take statistics, hello, but it has come in handy. You have to review their income. If they say self-employed that is tricky. We have to review their income tax returns. I worked for the IRS for 27 years so I can do that. I do the financial first thing, because if they don't meet the financial qualifications they can't come into this program. But, I'll call them and tell them if they want to come in even if they don't qualify, and I will send them their results, but I also don't want them to have to drive all the way over here just to learn they don't qualify financially.

- Or maybe they have been to college before, and they have a string of academic warnings, probations, etc. My suggestion is for them to prove academic stability before we spend thousands on them. You've already taken money from financial aid; you've already taken money from your parents, and you haven't been able to make this work. Why am I to believe you are going to make schoolwork now? So, go do a semester on your own, come back with Bs or better and we'll talk. You have to be realistic about these things. I feel very strongly about being a good steward of our monies, because it's not our monies, it's City money, or personal grants, people are investing in us and I take that seriously.
- I get a lot of students that are right out of high school, and they did this dual credit thing, and they are already on academic alert, because they were trying to go to high school with all the stuff that high school involves, all the football games and all the drama, and they were taking dual credit, and they don't pass. I don't think at 16 or 17 years old they understand the severity of blowing these classes off. They will take History or U.S. Government, because in their head they are thinking 4-year college. Then when I talk to them I go, why did you do this if you really weren't serious about it? They say, well, my counselor really pushed me to do that, and my parents really pushed me. Now those we might give a second chance, I went through that with my son, I get it. But those classes follow them if they were unsuccessful too. I'm not a proponent of dual credit; I

have seen it in my own family. You are a kid, you are taking on the responsibility of being in college and you're not even out of high school. It takes such discipline. My niece took dual credit and made Ds. Thank God she was able to work them off and is at a university now, but she had no clue. I don't think you are mature enough to know how that is going to impact you. I see that almost every other day. So we want to push these kids through school but are we doing that at the expense of how it's going to hurt them if they are not emotionally and academically disciplined enough to do this [dual credit]. It's on their transcripts because they were enrolled at the community college. They come in at 19 with this stuff on their transcripts and I say when did you take this class? Oh that was my junior year in high school, they may have been in honors classes and they are really smart, but that doesn't mean they are mature enough to do it.

- We don't want to set anyone [up] for failure, so if they score below three on the reasoning I tell them I don't think you are going to do well on those really difficult classes, such as Anatomy and Physiology; you have to get an A or B to be considered for acceptance into the nursing program. The community college has limited slots in those courses, so you have to have a 3.8 to be considered for the nursing program.
- We use them a lot. It doesn't exclude them, but we just want to explore that, as investors we want to put them in the right place. In orientation it's them doing all

these sacrifices, and they want a change in their life, and they are here because they have heard that they can change their life. Most of them live paycheck to paycheck, and they want to change that. We tell them we want you to find a career. You probably don't like your job right now; why would we put you in the same situation. We want you to like your job, as opposed from one job you don't like to another job you don't like. That's not what we want. The assessments help us determine that.

- So we explore alternatives, they want to be nurses like I wanted to be a psychologist, they like the idea more than, some of them haven't done their research, they don't know what a nurse really does. You have to perform. They are thinking I can work anywhere in the country, it's well seen by society, and I am going to get paid well, have stability, which are all good things, but they aren't looking at the job specifically. When they are already in someone's caseload it's different, because they are already taking courses, but when I see them, I just try to tell them the truth when they have all these high hopes an dreams.
- It makes my work easier when they have been working in the field, as Certified Nursing Assistants (CNAs) or dental assistants, whatever may be the case. Those people know what they are getting themselves into. Now they want career advancement. Others don't know much at all about the fields they are thinking

about getting into, so I have to try and provide that information. I never want to tell someone to give up on his or her dreams. If they explore other options and programs, and still want to be a nurse, I say okay let's give it a go.

- If they score poor or fair on work attitude we have to have some important conversations because this tells us how they are going to be as an employee. We are not just about an education; we are about getting you employed, so this is kind of a flag. Our employer coordinator may have some work to do with them. Not just academia but the soft skills, so that is a good resource that they hear about. A lot of times I find that if someone was fired or had a bad experience in their past employment, they are going to score very low here, because they are brining those attitudes into those answers. And that is not necessarily bad, but we have to talk to them and find out why they scored so poorly, what's been going on? What happened? And that opens the door to conversations about what they are going to be in the future, here's what you are going to have to learn, just going through this can be very time consuming, but I think it is very enlightening. I've had many people tell me the assessment was very enlightening, even if they are not a good match for our program.
- Lots of times people who come out with plants and animals come out humanitarian. Like, for example, there are 15 different vocational categories, and as you are answering these questions your answers are hitting on these 15

different categories. But only the top three where you have the most hits, those are the top three that print out. So for example yours says you would like office settings, business is a broad category, and scientific is definitely liking the world of medicine and liking science. I came out plants and animals, and came out selling. I like selling because I love retail, I did retail back in the day. I just like it because I like talking to people, not necessarily selling them stuff; I just like the social aspect of it. And then I came out humanitarian, which definitely tells me that the position I'm in is a good fit for me because I like to minister to people. I like to help them. And that comes back from my being in management forever, and being the HR director, and all of that stuff. So all through my life I'm glad to know I've been in the right environment.

- So what I do is interview them, it takes approximately one and half to two hours, and we talk about the results of the assessment that we give them, and it's not an academic assessment. We do test for math and reading because we have to have a baseline, they have to score at least fifth grade level, but the other part of the assessment is all vocational interest, personality traits, work attitudes, reasoning, critical thinking skills, learning styles, so I interpret all of that for them. So that sort of a free service that we provide that helps them and helps us, because even if they don't come into this program, they've got a whole lot of information.

- And how I explain it to our applicants is, I don't know you, but this tells both the applicants and myself what kind of jobs you can be successful at, because if you can match up your temperaments with your vocational interests the probability of your being successful goes way up. You're aiming for something that fits you, and you are going to find job satisfaction in it. And that's what we are aiming for. Are you really a fit for this job or are you just money motivated. We hash all of that out.
- The students are often surprise; they say that's me! How can that assessment tell all that about me? They are surprised at the accuracy of the assessments most of the time. They are surprised that something like that exists. I even sometimes tell them, you don't have a lot of work experience in the field, why don't you take this test and learn about yourself. Maybe soft skills, or you didn't even know how to word it, take some of the words on this test and put it into your resume. It is going to help you with getting experience in that field. I also gear them to that.
- The initial assessment that we do at CI, sometimes it's scary for them, like the reading and writing. They are scared to see where they are when they thought they were at a higher level. They want to know about the personality and how they can match. It's interesting to see if they believe what the assessments say. Those are your answers; we don't have the crystal ball. It says I can be a nurse. Someone believes I can do that. So it is very effective for those, and for the ones

that are not clear about what they want to do. So it is helpful for them to see what they can do according to the assessments.

- And also in the interview process I explain about our childcare assistance. The interview is of course geared to those who want to come into the program, but even if I have seen that they are not going to come into this program, for lots of different reasons, they may opt out. Oh no I don't want to go to school after all. Then I do referrals out. Like this organization might help you if you need childcare maybe you should go here. If you are looking for free computer training maybe you should go here. If you have a learning disability that you have disclosed to me I can help you, so those are non-academic services that it's my role to provide. Even if they are not going into our program you want them to go away with some kind of service, some kind of help.
- We go over it with them, what they think they are going to be doing, what they actually are going to be doing, we compare, and then they start making their minds up as to what they want to do. Some of them I don't have to struggle with them, they know they are very career oriented. They've done their research, but the kind of population that we serve we have to inform them as much information, but we are also dealing with adults. You have to go out there and do this yourself. Yes, we are known to be handholding the students, but at the beginning they have to be very much self motivated. You prove to me that you

want this, and that you are going to make the most of this opportunity. That, in a nutshell, is how I use those assessments pre-enrollment.

- We discuss their academic plan, it doesn't always fit into what they want to study, but most of the time it does. We then have to talk about going to school. I pull the time management plan out and go over it with them. Okay, you've got four kids, and you think you can work, raise four kids and go to school. Let's see how you are going to do that. I pull out the timeline line and say, okay, when do y'all get up, you're going to be in class all this time, oops, when are you going to work? You know. What time do you have to pick the kids up from day care? And once they see it in black and white, it's like okay; I'm not ready for this. And that's okay; you know now what the expectations are for what you want to study. You want to work another year, build up your support systems, save some money, what's your plan, because it's all about having a plan. Life goes on, you still have to pay your bills, and you have to make Bs or better. Surprisingly enough a lot of people do come back. I get these calls from people, and we keep them in our database, so I pull them and say okay, here's what we talked about in 2012 and decided it wasn't the right time, so we plan all of that out.
- The community college is the primary place we send students too, but we have other places we send them to, like the labor unions. If someone doesn't really want the school setting, but wants to pursue a trade, I send them to the unions.

The unions will put them into a job right away, with pay increments every six months. So it helps the family out, but I tell them okay, if you want to go through the unions, if you want to be a carpenter, or an electrician, then you will start a job and be co-enrolled. We provide them services such as a career navigator, child care maybe, but they don't deal with tuition or all that. The unions have their own school, as an apprentice. They go to a job site and work, but they also go to class a couple of days a week to get the theory and classroom training, but mainly they are an apprentice and learn the trade on the jobsite. The union offices have classrooms, and each one has their own schedule. They are not accredited, but they train the workers and teach them a trade. They don't have to take remedial work or any of that. It is not a lot of people, very few to the unions. There are other schools we work with as well, such as [another] college with their health careers, and [another] college also. That's essentially our main goal, to work. We do a lot with education, but our main goal is get them to work. Get employed and earn a living, get better benefits, that's our job.

- We used to have a federal grant that gave me the ability to see the students first hand, and knew they didn't have the work experience, so I would refer them to the Certified Nurse Assistant (CNA) program to get some experience. It is a ladder: CNA, then Certified Medical Assistant (CMA), or skip right to the RN, it gives you a ladder into the field. If you have two people graduating from the

community college, and one has experience in the field, one has a 4.0 but no experience, and one with 2.5 and experience, I am almost convinced they will always hire the one with experience first. That's the world we live in, the employers want that experience. We are not feeding that grant program any more, but we still refer them to CNA. Right now they are phlebotomists, and they start working, as opposed to that other student who doesn't have that certification. And what if they don't finish the program? They have nothing, whereas the CNA still has a job. If we had more programs like that, it benefits the students, and us, because it is much easier for them to find employment. They can use the training while they are going to school too, and earn while they learn. The CNA is more hands on, and the CMA is more clerical. The employers like knowing they have the experience.

- A lot of times when they say you're right, I've exhausted all my options, I can still refer them to [a local workforce program]. Go take a computer class, go take a free CNA class, demonstrate that you can commit to finishing what you start. Give me something to show me you are ready to make that turn here. It doesn't necessarily have to be the community college, because we don't want to present unnecessary barriers, but it really depends on how it looks.
- We talk a lot about commitment also, because we want them to understand that besides the financial investment we are making in them, it is all about them and

we want them to stay committed. They came to us to fulfill a goal, so it takes commitment to do that. We also work with them to have a plan, so when Steve or I interview them when they start, one of the things we want is for them to complete their goals. So completing college prep is important, but their biggest goal is graduation, and then moving into employment. At the end of the day our goal is employment, and they know that.

- Again, the most important thing in all this is the person's commitment, because that's the key. They've never been through college before; they don't know what's going to happen. They don't know the surprises, but we do. Our commitment has to be that we will get you through all the surprises. Even the ones that surprise us. We're going to get to the end of it.

Student perceptions of the assessment process. The students interviewed were asked to respond to the following questions:

- Did you go through an assessment and testing program when you first became involved with the CI program?
- What types of assessments and testing did you go through? How did they provide these assessments to you (tests, career guidance, budgeting expenses, etc.)?
- What did you learn from the assessments?
- Were you surprised at any of the results?
- Did the assessments help you focus on a career goal?

- Did the assessments help with committing to getting a college degree?
- Did you find the assessments useful to you?
- Has this service affected your perception of your ability to earn a college degree? If so, in what way?

Student Rating 4. Did you find the assessments useful to you? The students indicated that the assessment process was useful to them (M = 4.8, Mdn = 5.0, SD = .422, SE = .1). The assessment process was administered before the students were accepted to the CI program, and some did not recall much about the process. The researcher also took the assessment tests and found them to be fast paced (timed) and exhausting. The researcher, like some students, also found it difficult to recall the numerous elements of the tests until memory was refreshed by interviews with the assessment staff.

Student Rating 5. Have the assessments affected your perception of your ability to earn a college degree? Students rated the assessments as helpful in bolstering their confidence in earning a college degree. However, half of the students rated this question a 4, which indicates a slightly greater degree of uncertainty than found in most of the other categories (Mdn = 4.5, SD = .527, SE = .2). However, the sample size was too small to draw any statistical conclusions as to the significance of this difference. Still, the sample's rating was on the high side of the scale, and student comments supported the rating.

The student comments regarding the assessment process show that some students were a bit hazy in their recollections of the assessment process at first, but memories were jogged as their interviews with the researcher wore on. The interviews revealed that the students typically learned a lot about themselves with respect to personality traits, academic skills, and vocational aptitude. Some were surprised at how well the tests identified what they already knew about themselves. Few were surprised at their low math assessments, and indicated that they knew their math was quite rusty, or that they had never learned much of it in high school. A few telling comments revealed that the assessments made them feel like they were in college, and were developing their college career goals. In all, the student comments on the assessment process indicated an increased confidence in college going by clarifying student perceptions of themselves, and focusing on specific goals.

The following are the student excerpts on the assessment process.

- I had already decided I wanted to be an RN. I have an aunt that's going for an RN. I would rate the assessments as very useful because they went with what I wanted to do.
- It was pretty intense because I didn't go to school for a couple years, so I didn't really remember a lot of this stuff so, I basically had to start from the bottom.

- I learned a lot from math-- a lot of stuff I missed from high school and just going over it refreshes my mind and makes me learn more, now that I'm more interested in it. In high school I wasn't.
- I'm not sure. I forgot. I know it was another thing. I remember her telling me that billing and coding would be more useful to me since I already know most of the stuff.
- Before I came here I already took a class in computers, information technology. But because I got the job in the bank, so I just... Part of it I did use in the work, since I came here and took this class for Information Technologies. So it is in line with what I wanted to do before I joined.
- My math, I'm not good. So when I found the class, I found the confidence to study my associate's degree. So there is the direction of life.
- I took a test here but I don't know what test. They just told me I passed at a very low level because I haven't done math for long so I think my math is not good. Now it is. I can pass the TSI so it's good enough.
- The tests really told me how far I am behind.
- On the assessment, I thought that was really interesting because I actually got to know myself.
- He went over it with me and he told me this is what it says about you, which I thought was very interesting, because I thought that life and plants was actually

like planting outside, but he said it meant that I am very loving and [nurturing], and that made more sense to me, so it was interesting to know your personality and stuff.

- All that stuff, it was like, wow, very interesting to know.
- I only remember a few things about it. It was long, the test.
- I've always struggled in math, so I am going to have to take the remedial math. I know I didn't pass the math assessment test. You have to really know your way up from the bottom in math, you can't just start in the middle.
- When I did the assessment, I was having doubts about what I wanted to do, and he said this actually fits you a little better, so we looked through the assessment and figured out what I should do.
- I didn't see myself going to college, not even in high school, so when they put me in that class [prep] and told us we were in college, I started feeling like I can go to college.
- First you go to an orientation, and that's where they explain what the program really is about. Then you do a test to see what level of math and reading you are. After that you just have to bring all the paperwork they ask for and that's when you start. Well, you have an interview to see if you are qualified, and after that you start the program.

- The requirements are really based on your income; you need to be low-income. I don't think it's based on what you already know, because we pretty much start from the basics with everything, so it's pretty much just income. I guess if you're willing and really want to go to college and do it, they look for that too.
- Besides the math and reading, they do a vocational test, to see what career would be good for you. I did have a high score on health careers and computer careers I remember. But, that's a good thing too; I always wanted to do something like that to see what I should study. It's kind of hard like when someone asks you what you want to be when you grow up, and every time someone asked me that I would have to say I don't really know.
- So it's good to have the guidance to help you choose what career you should go for. I chose Health Information Technology, which is both health and computers.
- I didn't score that well on the math, so it wasn't great, so I knew I had to take a math class before starting, but I already kind of knew that, because it's been too long since I graduated from high school. So it was better for me just to take the math class.
- But reading and writing I did better, so it was good to know what I needed help with to enter college. No surprises though, not really.
- So I went to the Pleasant Valley location (CI HQ), because that was actually the closest location to me, so I went through the orientation and the process there. I

took the testing, and gave them my transcript and everything. They told me I would be going to the community college, but not be an official community college student yet, I would be CI, or something like that.

- On the testing they set us up for test day, and it was actually about two to three hours. I got there early, and I was working with [the testing specialist]. He's very cool. It was a small room, and we had to bring our transcript and our registration and a lot of other forms. While we were testing he was looking through the stuff, our income, all our information in a folder. The testing was pretty easy, but kind of hard. It was to see where you at. Just like the TSI.
- The math got to me. We took the math, and then a test to see, like a strength test, to see if you were in the right field. My field is medical billing coding, and they wanted to see if that major was right for you, or do we have to look around for more majors that fit you. More like a personality test, that's what it is.
- He said you are a people person, and I said what? I am kind of shy, and that's why I say CI really changed me as a person.
- They were testing me, and I was nervous, but I couldn't remember most of the things because I have been out of high school for five years.
- I don't remember what I got on the tests; I think it was okay. [The interviewer] went over the tests with me. No surprises, I know myself already.

- For one, they made me do an essay on why I wanted to come to CI and what was my career and I had to talk to the main guy that runs CI so that was one thing. The other was taking a test on the computer to see if what you want to go for, say I wanted to go for billing and coding, no, I wanted to go for something else, but the test showed that I had more ability in the other field, so that's what it was about.
- The assessments increased my confidence about being successful in college because it makes me think I am there.
- At the beginning I wanted to go into nursing, but in the assessment it looked like nursing didn't fit my personality, the assessment said I would be good in medical coding, so I went for it.
- I did all the orientations and took the next steps, and I got in the program. The first time I didn't qualify, because I was getting too much money, but I tried again.
- Assessment. It was fine, a little bit, a lot of thinking.
- It ask you a question, what would you do in this situation, and you had to really put your personality into that question, and to answer it you have to really look into yourself and ask what would I do. So I think that is a good thing so they can find out if you are good for that career or not.

- I don't remember whether there were any surprises, but since I didn't qualify for the career I was trying for, I thought that I would be good for that career, but it looks like I'm not. To be an RN they said you have to have a strong personality, and sometimes I'm sort of weak, probably. I didn't really want to do registered nurse, but my boss told me to do RN. I didn't really know what CI offered, and I matched with medical coding, so I did some research on it and said, well I liked it, so I decided to do it. I decided to do it not because it said I would be good at it, but I because I liked it.
- I've taken part of that test once before, and that was just in high school, they wanted to know what career we'd be good at. Taking it a second time, I thought really? It was funny, and got down to detail in the type [of] person I am. So, I'm like uhhh, and the CI person said has your husband ever told you that you are bossy (laughs), it says that too? I thought it was hilarious.
- I never thought a test would actually determine that. It's kind of hard for a computer to tell who you really are instead of a person getting to know who you are. But yes, the test was spot on! I thought okay, the test knows me!
- I was surprised about how spot on the test was, like the type of worker I am and what I would be good at, it was saying that I would good as a manager type, or an advisor, someone to give orders and do the job right I guess. I already knew what I wanted to do, but the assessment gave me a lot of other things I would be

good at, and they all had something to do with electronics, or if not electronics then cars.

- It was very much helpful in learning what my strengths, but also my weaknesses were. Cause it also showed that as well. Now that I have seen that I can probably adjust it, make it better.
- I heard about CI when I went to [a local workforce program], but they told me I had to go to (a local workforce program), and they mentioned CI. They thought CI would work better than [a local workforce program], and then he asked what was my career goal. First I said it was to be an airplane pilot, but he started saying it came out to automotive, and started saying that CI would help me toward an automotive career. He gave me the details, and I liked it because it would help me with math and reading.
- To be honest, I don't remember the assessment. I was sleepy and it was in the morning, and thirty minutes before that I had gotten out of work from a 14-hour shift, so I don't really remember the questions. But I believe it's like, it asked me if I get along with people, or am I an individual, or something like that. As soon as I finished it I went to my car and I slept (laughs).
- I learned that I can't be by myself, that I had to be with someone else, that I like being with people. A people person. It helped me out in what kind of job I should look for, or where at.

- On the test, I knew the stuff, but didn't really know how to put it all together, so I was like, CI helped me choose a program, well, I can do this. The assessment helped me think about what I did in high school. I had thrown those years away and forgot about them.
- I went to an orientation at one of the community college campuses, and then we took a little math test, about 60 questions. I was just out of high school so it was pretty fresh and I knew quite a bit, and I thought I did pretty good. I finished in about an hour. At the orientation they give the test, and tell us what we are expected to do and what is expected of us, like to get done because they are paying for it. And they want you to be here all the time, they don't want you to be missing and stuff.
- Yeah they go over results because they say like you know, a whole bunch of hospitals because they do a lot of nursing. They said they prefer people from CI more than the university to go work over there.
- Actually I didn't learn anything I didn't already know.

A summary of the themes running through the student comments regarding the assessment process show that students typically learned a lot about themselves with respect to personality traits, academic skills, and vocational aptitude. Some were surprised at how well the tests identified what they already knew about themselves. Few were surprised at their low math assessments, and indicated that they knew their math

was quite rusty, or that they had never learned much of it in high school. A few telling comments revealed that the assessments made them feel like they were in college, and were developing their college career goals. In all, the student comments on the assessment process indicated an increased confidence in college going by clarifying student perceptions of themselves, and focusing on specific goals.

II. Developing college know-how and creating social relationships. The CI program uses specific and intentional interventions to simultaneously develop college know-how and create social relationships. These interventions include remedial (also referred to as developmental) reading, writing, math, study skills, accelerated coursework, student cohorts that take all remedial coursework together, and individual case management. The remedial coursework is considered a non-academic intervention for the purposes of this study because the courses prepare students for college level academics, but are not college level academic material. These interventions are bundled into what CI calls the College Preparation Academy (or College Prep), which is the primary focus of this study. Findings include a description of these interventions and related student perceptions as follows.

The college preparation academy. Established in 1999 in partnership with the community college, the College Prep Academy is a customized series of interventions developed by the CI organization. The Prep Academy is an intensive 12-week program, consisting of four days per week (Monday-Thursday) of math in the morning (8:00 AM-

11:00 AM), and reading or writing on alternate days in the afternoons (1:00 PM - 2:30PM). Fridays are given over to sessions known as Vision, Initiative, Perseverance (VIP) consisting of study skills such as time management and note-taking, motivational sessions, group discussion, and orientations to various college processes such as financial aid, library use, registration, and the like. College Prep classes are held on campus at the community college, which provides a dedicated classroom and other academic facilities such as computer labs, library, and other student services such as registration and financial aid processing.

While not all students admitted to the CI program require remedial courses, approximately one-third do, and mostly in math (Conway & Helmer, 2012). When it is determined in the assessment phase of the CI program that a student requires remedial course work, the student is enrolled in an accelerated 12-week program of intensive math instruction provided by CI. This math course is designed to prepare students to pass the math portion of the Texas Success Initiative Assessment (TSI), which is mandated by the State of Texas to determine whether a student is prepared for college level courses. The TSI assesses reading, writing, and math skill levels, and students pursuing a college degree must pass the TSI in order to enroll in the required college level math courses, usually college Algebra. The Prep Academy is often referred to by CI staff as "boot camp," and the "deal breaker" for students to get them ready for college.

College prep math. The CI remedial math course starts at the beginning with addition and subtraction, and progresses through the specific elements of math that students will be tested on in the TSI exam. Unlike most remedial math course sequences provided by community colleges that typically consist of three or four semester-long progressively more advanced courses, the beginner's approach of CI ensures that students do not miss any key mathematical concepts due to starting in the middle of a remedial sequence of courses. The CI math course also omits the highest level of remedial math required by most community colleges, and focuses specifically on the TSI exam requirements.

CI divides its incoming math students into separate tiers during the longer fall and spring terms based on their math assessment scores so that more time can be spent on the basics for students that need it, without slowing down progress for those with higher assessment scores that need less review.

The math course observed for this study was fairly conventional in its approach to teaching math, with lecture, examples, and homework, but it was also much more. Multiple interventions were woven into the course that encouraged the development of a strong academic work ethic, a sense of self-confidence in math ability, and a sense that the student belonged in college and could succeed in a collegiate setting.

The intensity and rapid pace of the course, with homework normally due the next morning, served to create a college boot-camp type environment that acclimated

students to a high academic workload in a difficult and exacting subject. Students reported feeling overwhelmed at first, and then suddenly finding that they had become used to the workload and pace. According to subsequent interviews, students reported a growing sense of confidence in not only their math skills, but also a sense of confidence in their ability to succeed in college.

CI carefully selects the teachers in the Prep Academy. The teachers must not only have the academic credentials, but they must have a strong desire to work with the type of students that CI recruits, who are required to be from low-income backgrounds, and consist mostly of Hispanic and African American ethnicities. CI is particularly guarded against teachers that have a "sink or swim" attitude about college students in general, or that do not understand the negative effects poverty, social class, and minority group status can have on students.

The math teacher observed in this study appeared to excel in both math teaching and deep personal understanding of her students' hopes and fears in attempting college. From the first day of class she shared her own background with the students, and assured them that whatever obstacles and challenges they might face, she could match it from her own experiences. She described her upbringing as a low-income Hispanic female who was the first in her family to attend college, the prejudices she faced along the way both socially and academically. Her account included being recruited in high school for a program that encouraged Hispanic students to attend college, and how majoring in

math was not seen as an appropriate field of study for a female "because girls don't do well in math." For added emphasis she discussed her divorce, which brought a radical downward change in financial status, being a single mother with children, and going back to college where she is currently working toward a doctoral degree. The stories the teacher shared with the class were offered as encouragement to the students, and delivered as evidence that motivation and hard work were all that was required for them to be successful in their career paths, and to not be deterred.

The math course was delivered each day with passion, exuberance, and motivational anecdotes to go along with the intensity of the math lessons. The teacher was masterful in gaining and holding the students' attention for three solid hours each day, which included calling everyone to the board to work problems. The teaching strategies seemed quite effective in strengthening the social bonds between the teacher and the students, and between the students themselves.

Staff perspectives on the college prep academy and math course.

- The College Prep Academy is our support service to help with developmental math. We've been very fortunate to have some really good teachers there. We do tutoring; we try to get budget money. We make them go four days a week, and now we have them go on Friday too.
- So the non-academic interventions, one of the things we started doing when we created it in the spring of 1999, it was a community college ABE representative

and I who said okay, make it happen. We were only given two or three weeks, so all we knew is the focus had to be math because that is the one area where students were having difficulty.

- What we found out though, we started with a schedule that we didn't know if it was going to be the most dynamic schedule for the student, it was Monday through Friday, 8-3 PM. But the math was taught some days in the morning, some days in the afternoon. And what happened after two semesters of doing that, we saw a problem.
- We said well there is no formal telling us that math is better in the morning, or is better in the afternoon. What we did was survey the students, and they said look, this is a completely different language for us, so if you want us to be successful, you first have to give us a very set schedule. Treat us like even high school students, secondly make sure math is first thing in the morning because by the time you get to us in the afternoon, you want to teach us math? That is not what they wanted to hear, so that was our first initial intervention with the students help. Finding out what was going to work for them, even though it was all academics. And they said, if you want us to be successful, do it.
- The teachers start at zero. I think that is why the prep academy is effective. When you start with a placement test, the teacher starts at the point where you tested. They don't revise their material. But if the student doesn't know decimals they

can't do anything. They may understand the formula, but if they have a gap with decimals, they cannot do it if you don't know where the dot goes. So the way we do it [starting from the beginning] instead of thinking that they already know everything up to a point. Like the writing teacher, she doesn't say you should already know the structure of an essay, no, she starts from the beginning with the grammar etc., and then start writing the essays. It's crazy how many hours they are here for the prep academy, but it's very effective. It's not only the contact hours [compressed into 12 weeks], but also the content of the classes. Regardless of you scores, we are going to revise [and start from the beginning and build up].

- I know the focus here is math, and that is the one area where we have at CI, more of an effort of okay, are the students passing, how many students are not completing, what are the outcomes? Every semester the Navigator works on a report of how many students were in class, how many passed the test, and they go back to step one and say okay, for the next semester we need to implement all these things. We know every group is different; age can play a big factor on how the outcomes we are going to get. If they are too young sometimes the outcomes are not that good. If we have a good mix the outcomes may be better. If we have older people it may be just better, the same with attendance. We notice that we get a little bit of everything.

- We just had a survey where the students evaluated themselves, and also our services. They rated themselves on their own commitment and performance at about 80%, but rated our services at 95%. But everybody's different, and capital prep academy is sort of the deal breaker. That's their first experience with us where they really like us or they don't like us, there is not really that middle ground.
- The non-academic interventions, we do all of that. This summer they were all in one class, but typically we level the classes, and have one with lower level math and one with those who tested higher. We use the TED test to assess their math skills. I told them we should give them the TSI instead, to give them a better idea of what it is like before they take the prep course, and it is a better diagnostic of where the gaps are. Also, the ALEKS software gives them an assessment, but that's a new thing. I don't know what else they use for assessments. I think it is a good way to let the student get some idea of their skills and interests.
- Something else, I gave them grades in the class because they thought they were getting a grade in the class. They are, but it doesn't count for anything. But the fact that they were getting a grade was a big motivator, because they like seeing that A, and when stuff was missing. The grades are a motivator because they can see what they need to do to improve, homework to make up etc.

- Another thing CI does is the compressed prep academy, so the student doesn't feel like they are in developmental classes, but feel like they are preparing for college. Another thing is the teachers. The teachers we have LIKE to support the students. That is why they get those students who are not 100% and say let's do it together. It is the teachers that are selected for those classes are willing to work with those students. The student wants it and the teacher is willing to give it. He is not expecting them to know everything about English Comp. I know you are lacking some things so let's work towards getting you there.
- Then reducing the cycle time that someone is expected to be in those classes as much as possible, and may involve some compressing like the College Prep Academy where we've taken a developmental sequence of five or six courses and compressed them into 12 weeks in some cases. It's pretty intense, but we've put people through a process to prepare them to do it so they're ready, they know what it's about.
- So, that element of purposely choosing not only the right instructors who [are] understanding of the needs of the students and understanding of CI's mission, that was the primary objective of ours. The community college liaison and I had that objective and also making sure we were meeting the needs of the students through the teachers. So those were some of the dynamics that took place.

- The teacher brings in a lot of learning theory to the class, and she cares about the students. She is passionate about making sure they succeed. They not only learn the math but they succeed and move to the next level. And that is also what we are interested in, moving them to the next level. She is good.
- [The other teacher] had the lower students because he did more one on one, he will do the lecture but also the one on one, and that's what a lot of students say as the benefit, having that person not only come to their level but just—I guess doing it more individual for them at that point.
- Again, the classroom experience is important, because math can be hard. It can make or break a student. That's why the students I work with at UT. I do intrusive advising there. We talk about how important it is to choose a teacher that is working for you. You have to be smart about it and shop around. Don't just go for the one that is an easy A, that's not it. It's one that you can relate to and understand, if you have a choice. If you don't have a choice, then what do you do? So in success skills class we talk about what you can do when you don't relate to the teacher, but if you have a choice, shop first. Use the Internet tools (RATE MY PROF, etc.).
- If you recall the first day when they were saying they hated math, I hoped that they would at least stop hating it and stop letting it be the barrier. You don't have to love it like I love it, but at least realize that it is a tool to advance to something

else they want to do, and that's what ended up happening. That's what I was trying to do, get them to a place where they were not fearing math.

- Even the younger folks, we had four younger folks this last time, and I know that another teacher didn't have a positive experience with them and wanted to get rid of them. But I'm like, no, we need, they are here, they are coming, so maybe they are not coming on time, and so what does that mean and what can we do to encourage with that? But they are here, they are giving up their time, and they are putting forth some effort, and so how can we take them to the next level? And again, I'm about access, not giving up on students. I don't give up on students. You know, the biggest heartbreak is when they give up on themselves, and that's what's hard. They are the ones, I tell them that your biggest adversary is yourself; you talk yourself out of it. You talk yourself that you can't do it. I go we have already shown you that we want you here, that we believe you belong in here, so now you have to convince yourself that that's the case, it's fighting their personal dragon.
- But I love the program, and I had to talk about it. The community college liaison, brought my favorite teacher from [a university], and he asked me to talk about the students, and I can't talk about the students because they just touch my heart in so many ways because they overcome so many things and so for me they motivate me and they inspire me, and I love waking up and knowing I am going

to be with them. So it's that, knowing we are going to be with each other, and they say, so I don't know if I could have done that without you, and I say the same thing. I don't know if I would have wanted to get up this morning after having a late night last night without knowing I was going to be here with you. So it was that mutual we were happy to see each other everyday. That's pretty cool that we felt that and we had that experience. I don't think it happens everywhere.

- I feel like a make a difference every day, and they make a difference on me. It is a mutual thing. I just love what I get to do for a living.
- I think it is about who you hire, I want to say this for a reason. When I started the program at a high school, there was a need for an ESL class with the math classes, and I just said let me just do it. I did it during my off hours. Let me just try it, I wasn't getting paid for it. I didn't know what I was doing. I have my passion. I just want to try this. So, it worked great, the data was there to prove they were successful, so I got more classes, I got my ESL math, geometry Algebra II, and math models, so I had four preps, but okay let me do it. Again they were successful. I went off to district, left it with somebody that was very capable, didn't do well. So, that's why I'm saying it is about who you hire. Because they have to be bought into that vision. They have to be believing, and passionate and excited, you know. Those types are out there, but how do you get

them here? Sometimes they are in a place where they want to stay, or whatever. And you have to have administrative support. I had a principal that said okay, just do it. That was a big deal. It is a team effort to make it happen.

Student perceptions of the college prep academy and math course. The students interviewed were asked to respond to the following questions:

- How did you like the College Prep Academy?
- What did you like most about the Academy?
- What did you like least about the Academy?
- Was learning the math tough?
- The Prep Academy was time intensive, how did you feel about the way it was offered?
- What are your thoughts about the tutoring sessions, and were they helpful to you?
- How would you rate your confidence in taking your future math courses?
- Has this service affected your perception of your ability to earn a college degree? If so, in what way?

Student Rating. Were the tutoring sessions helpful to you? All but one student rated the tutoring sessions as a 5 (M = 4.6, Mdn = 5, SD = 1.265, SE = .4). The student that rated tutoring as a 1 indicated in the interview that the classes were sufficient, and they did not use the tutoring sessions.

Student Rating. How would you rate your confidence in taking future math courses? The students indicated increased confidence in taking future math courses (M = 4.5, Mdn = 5, SD = .707, SE = .2). One student rated confidence in future math courses as a result of the college prep math course as a 3 indicating uncertainty in future math courses. In the interview she indicated that the she enjoyed the course, and had passed the math portion of the TSI exam afterwards indicating college math readiness, but still felt unsure of herself taking college Algebra in the future.

Student Rating. Was College Prep math useful to your ability to earn a college degree? The responses indicated that the College Prep math course was very useful in in supporting their confidence in college (M = 4.9, Mdn = 5, SD = .316, SE = .1).

Taken together these high ratings indicate that the students were bolstered in both their math confidence and college confidence through the math prep course experience.

As the student comments supporting these ratings show, the students bonded with the math teacher, learned that they were capable of intense math coursework. They also learned what being successful in college level coursework felt like, and that they could do it.

The following are student excerpts regarding the College Prep Academy and math course.

- I began to really appreciate math and really like it, and made me even want to try it even more.
- I loved it because I don't like math but the way the teacher taught it, I could understand better than anybody else and that's what made me like it.
- I guess I liked going in the mornings and learning math because of the teacher.
- At first I didn't spend a lot of time on it until the teacher got on me, so I started using it and I thought, this isn't really that bad.
- I really enjoyed the way the teachers were really engaged, both of them weren't there because that was their job, they actually enjoyed what they were doing, and you can tell.
- I was real bad at math before. I think whenever she would teach something, she would give an example of how she remembered it. She would try to help students remember how to do the problem, the formulas. She would try to make an example.
- I will always get up and not want to go but remember that I'm going to miss a lot of stuff if I don't go because it was very intense learning something new every day so I forced myself to go everyday. I learned a lot.
- It was hard but at the same time the way she taught it was easier to understand so if I needed to ask a question, she would answer it to me in a way that I could understand.

- I didn't really like it but it was okay to a certain point to where I could still get it and I wasn't behind on a lot of stuff. I still learned a little bit of it so it wasn't that intense. If it were me, I would want it to be longer just because I'm kind of a slow learner so I know what I need to learn and I know I needed more time. There's a lot of different ways to learn.
- I think everything, the instructor, I like the way they do it daily. They compressed three semesters into one. For my age, I think it's good for me because I like to go fast rather than split it up into three. Then it would be almost a joke.
- If you didn't do the homework it wouldn't work. She gave us a lot of homework. A lot, a lot. It kept me up until 1, 2, 3 o'clock.
- I needed to practice. She guided us in such a way, she gave us the classes, then she gave us the homework of whatever she taught. So if you go back and do all the homework, it's really important to stay there.
- Some of the things that increased my confidence [were] just getting to know the math more.
- We learned about when you're taking a test to prepare for it. Prepare to be nervous.
- You need to calm your nerves before, because a lot of people, when they get nervous, they're not focused on it.

- They were trying to prepare us for the test, prepare for future classes, to study a lot.
- It was very useful.
- Actually, for me, it's very good because I forget everything. And the teacher she started from the very basic then slowly everything flashed back. Then of course to practice and use the book.
- I spend a lot of time doing that math and my reading slacks a bit. I think she got us very well but we just didn't have much time since the semesters were compressed but I tried as much as I can.
- I feel that this is a strong foundation for me to go for them. If I went direct to the class, and my foundation was not that good, I would be struggling.
- Only thing is I think they should have split the class into two parts because some may not be able to follow the class because they need more time, I observed. When they leave, when we come back the next day, we spend a lot of time doing whatever they have done yesterday.
- That class (College Prep) was hard, it was fast paced, but it was good.
- I didn't see myself going to college, not even in high school, so when they put me in that class and told us we were in college, I started feeling like I can go to college.

- That was pretty cool too; they made us think that we were in college, and that kind of prepared us. Because if you can do this, you can do college, because that class was pretty intense. That class helped out a lot.
- I always had a fear of going to the board, fear of getting it wrong, but the teacher made you go up there, and every other day that your name wasn't called, she would get you up there.
- The prep academy was a great experience, and I like how they have people who really do care, and understand what you're going through.
- I like the math academy a lot. The teacher was a great teacher and she helped us like math, because a lot of people don't like math but she makes it fun, and you really enjoy being in the class and learning.
- That class was great. I wish I had her again for my other classes. She was a really good teacher, and she had different ways of explaining things that like sometimes people don't really think about it, but the fact that she cares about her students, and really cares about whether your learning or not, and she really tries to help you if you are not learning it. That makes it even better.
- The thing I liked most about the academy was the teacher. The least, I don't think there was anything I didn't like about the academy.
- Most of the things that I saw there were things that I already knew and learned in high school, but I was remembering it and learning to do it in a different way.

- I think she took a little too long to teach fractions and such at the beginning. But I think if she hadn't taking too long for the fraction part, I think we would have had enough time at the end. (The summer class was not split into skill level like fall and spring typically are).
- I am not good at math at all. But, from the first day, I loved the teacher and the way she explains stuff. She is really helpful, and she explains it well.
- It didn't even take me a week to get confident at the board. After I got up there and the teacher praised me, I gained a lot of confidence up there. When I get up to the board I look over at the teacher to make sure I'm doing everything right, because I don't want to get up there and do something crazy, but I'm confident now.
- But now I'm going to get up there, and I don't care if I get it wrong, I'm going to get up there and show at least what I know. And, you teach me what I don't know, so that's why I feel confident. It's like the more I learn the more confident I got. At first I'd think why I got to go up there, but now I'm confident.
- I loved the prep academy because of the teachers; they were really into it and helped you a lot.
- I liked the accelerated pace, it goes fast and then your done.
- At first I thought, I already knew this, but it came back pretty good. I love math. So I was okay with it. Just a little rusty with it.

- The prep academy was great, if I had not had those classes I would not have been able to pass the math test. That's the best thing you guys (CI) do. I passed the (TSI) math test.
- And the teacher helped, she was really great. You get to learn a lot, and for math the class was three hours, and was very intense, so I learned to handle it.
- Because at the beginning the teacher was giving us a lot of homework, and I thought this is so much, I used to spend five hours doing homework at night, so I was getting exhausted, but then I got used to it!
- And then when we told her she was giving us a lot of homework, she thought she was only giving us two hours, and then when we told her she said on no! I don't want you guys to be doing six hours of homework! So she gave us less, and then I was finishing in two hours and thought oh my god what do I do next, because I was so used to a lot of homework. So thanks to that I learned how to do things very well. I like the intensity, it's tough, but I like it because I know it is for our own good benefit.
- I used to be bad in math. I like math but I came here [to the U.S.] when I was in 9th grade, and whatever they teach elementary through 9th grade I didn't see it because in my country we see different things, so it was hard for me to see different things. But since we began at the beginning in math, now I understand it more.

- Math, I learned a lot of things, my first time learning it actually. I have taken math courses in high school but it wasn't Algebra, it was just basic math. And every day math you just use basic math. I never learned Geometry, never fractions and that kind of stuff. Everything the teacher taught I'd never learned most of it. So it was my first time learning it and I was a little scared because it wasn't getting into my head that well, but after taking the TSI I said, you know what, this isn't that bad!
- The teacher always helped us, like she would give us an hour before we leave. She'll have us work on homework or she'll help us out if we don't understand it still. She would always make sure that we understood it before she had us leave. She always wanted to help us, wanted us to succeed.
- It was pretty fast paced. I honestly had a hard time keeping up a little bit. Thursday, I don't do homework because Friday was the college prep 101. I don't know what it was (skills), that one class, so I would relax since my brain was so overloaded, but on the weekends on Sunday I would do the homework for Monday and the homework I needed to catch up on. And sometimes I never actually caught up, but most of the time I did catch up. It was a little frustrating because the things I never really got caught up on were the things I had trouble with. I always hated that. I was like, this is way too fast! But everybody made it through so.

- One time we learned a whole chapter in one day, and we had homework for the whole chapter! I was like, oh my God, this is very much intense. I think a regular semester of 16 weeks it would still be cramming. It would have helped a little bit more every day, but I couldn't do 16 weeks (laughs). It depends on the students, because it felt like half our class knew what they were doing while the other class was uhhhhh, oh my God, I don't know (laughs). I was one of the, I don't knows!
- Math is complicated. Doing math for the 12 weeks real fast I noticed it's a pattern. You learn this, and to do this you have to learn this. It's like added on steps but they are all the same steps. You just add a step to the same steps you already know, so it's a pattern.
- Honestly, I passed the TSI, and that means I'm ready for college Algebra, and that's really hard. I don't know, even my father-in-law suggested I take elementary Algebra to get more background before I take college Algebra next semester. I was a little hesitant, but I thought no I'm going to take it, but then I know he's right. So I'm going to take an extra developmental math. In my career I know I'm going to need a lot of math, and I just want to make sure I got it down. When I get to college math I want to think it's easy.
- The geometry part, that was my first time learning it. When we took our geometry test I passed it with a 91. I was so happy, even the teacher was happy. This is awesome! I actually took the whole class a little bit into lunch to study it,

trying to see if there was other ways to do it (geometry). There are formulas you have to follow, and I always mess with the formula to see if I got the right answer, to see if it was correct.

- I always like math, but in the beginning I was nervous because I didn't know no one. It was like almost two, three, almost four years without going to school so I was like what am I supposed to do? How was it going to be, all those type of questions. But as time flew, I talked to everybody, and I was the only guy, but I am pretty used to that so, the math was good. It helped me get my steps back.
- I liked the intensity because it wasn't slow, but it was not too fast, it was a good pace to catch up, because I had known the stuff but had left it out of my mind. It was a good pace just, the problem that I had was the homework. We had a lot of homework, and I just don't have that much time, which is my problem, but I did what I could.
- I feel confident with math now, even if I didn't already know the stuff I am a fast learner with math, not writing that much. I caught up pretty fast, I love math so that won't be no problem [later on]. I have a lot of confidence in math, but getting up in front of everybody, not so much, that will take awhile (laughs). She chooses you to come up to the board, and you got no way out of it (laughs).
- We get homework every day, and it's due tomorrow, so I'm going to have to do it and stay up late.

- My confidence has been improved because of the prep academy. There are times when I just burst out crying saying I'm doing this! I'm in college!

In summary, the student comments show several major themes arising regarding the remedial math course. The comments indicated that the teacher was a major element in making the math prep course both useful and increasing students' confidence in being successful in college. The intensity of the accelerated course was also notable in the students' experience, and they often mentioned the difficulty in keeping up, but also surprise at their own ability to adapt to the pace. The students also mentioned fear of math, but learned that fear and nerves were to be expected, and could be conquered. Lastly, the students indicated that the idea that they were in college proved that they were capable of college work, a notion some had not imagined possible before.

Creating social relationships. The schedule for the math course, three hours per day, four days per week, for 12 weeks, served as a natural venue for developing close social bonds between the students, and between the students and the teacher. This social dynamic was not left to chance. The teacher interspersed math instruction with personal anecdotes was intended to motivate and encourage the students. All of the 20 students in the class were minorities, with 17 Hispanics, two African Americans, and one Asian. The teacher, herself a Hispanic, regularly and occasionally tearfully, recounted the experiences and feelings of self-doubt encountered in her own upbringing and academic

career. These anecdotes resonated strongly with the class. The teacher's experiences and their affect on the class were fortified on Friday mornings, which were dedicated to a study skills course. For the second skills class meeting, the students had been assigned to prepare a brief presentation to the class on their motivation to enter the CI program, and share a song, quote, movie, or the like that they used for motivation and encouragement when dealing with challenges in their personal lives. When the class commenced that Friday, each student presented in turn. Most of the students went up to a lectern that contained a computer connected to a projector, and either played a YouTube clip of a song performed by well-known entertainer, or showed a picture of their child. The students told why their choice for the presentation motivated them. As the presentations unfolded, candid stories emerged of unsupportive family members, lives of poverty, minimum wage dead end jobs, and most of all stories about wanting a better life for their children, along with their desire to be a better role model for them. The stories were heart-felt, and soon everyone in the room was overcome with emotion and empathy for the speaker. Tears flowed freely. With each presentation, the next speaker was moved to share her own story candidly, and by the end of the class all were emotionally drained due to the wrenching stories they had told or heard. From my personal observation of the class, the beginnings of strong social connections were formed that day, and the cohort soon transformed from a classroom full of guarded strangers in a remedial math class to a mutually supporting band of scholars with the common goal of changing their lives.

Staff perspectives on social relationships.

- And they created this learning community concept, we were just calling it a cohort back then, but everyone said, no you are a creating a learning community. So that just happened as of the fall I guess, because all the students were in the CI. Really, the community college provided us with the opportunity by giving us two classrooms where they could just be there all day long. They didn't have to go move around and that really worked well for them. So that was the starting of setting the tone for our college prep academy. One for lower level math and one for higher level math. And we are still doing that.
- I think the competency-based courses ignore the social psychology aspects of learning.
- Certainly for CI adult learners, this is going to be their first college credit, not their 91st. And what they need around them are other people. And they will want subject matter experts in the form of faculty and other folks there, as well as other adults there that care about them, which might be the faculty, other students. All that has to turn into a system that doesn't leave anyone behind, doesn't let anyone either fake it or just struggle on their own until they drown.
- The college prep class, we made it a "place," it's a family, and they were helping each other, and I think that is powerful, and that's why I love this job. You have all these students that have had all these negative experiences for all these years,

and all of a sudden because we established that yes it's okay to make mistakes, and yes you have to get up to the board, don't be afraid- get up there. I tell them I learn more from the things I have done wrong that those done right, so don't be afraid. And I make mistakes, sometimes on purpose, and I love it when they catch me. I made it a safe place. I loved it because they were learning, building confidence in their knowledge to catch the teacher's mistakes, and we were growing together.

- The cohort obviously is a big deal, because immediately they have a group to be with, and they really bond. In this last time we had these students who shared their last papers, I didn't make them do it, they just wanted to. They were so proud that they had gone this far in their writing and it was powerful, even the gentlemen were crying. They wrote about how they were tired of living in poverty, and one that said it was so hard having to wear sweat pants to class because that's all they had. Anyway, it was just some sad stories and they were all like in the same place with the money so they could relate, and how they are doing something to get out of the situation and get to something better. That's very important, and I say I hope you remember these feelings, and I try to reiterate that this is important, that you have each other and you are not alone in this. Having that cohort and having this academic family is a key to success in the program, because otherwise, if they are by themselves it is easy to get lost

and no one cares about me, it's not worth it. Having this accountability, having someone check on them, and listening when they are having a bad day, and them providing the gas card if they run out of money. The childcare is also very important as it is a barrier for many, especially the women, but there are men that need it too.

- I also help them with their writing, use transitions, don't put so many I's, etc. And I use peer grading sometimes, so I tell them this one is going to be shared so don't put anything you don't want to share, but it's amazing what some of them will disclose, and really put their heart out there. I think it is a cleansing for them and therapeutic, they can write it and see it; oh my God this is where I was at. Now I am doing something different. So, the papers I have them write are like, what is you educational journey, who is your mentor, who helped you along the way, what were some barriers you had to face and how did you overcome them, what are you going to do differently when the barriers come again. So those, I tell them this is for you so you can see where you were at so you can progress, if you don't face where you were at how can you change so it doesn't happen again.
- The cohorts let them know they are not in it by themselves, and that they have an academic family, and encouraging them along the way. And it provides more resources for them. I tell them get yourself a critical friend, have them look at

your paper before you turn it in, if you're not here for a class ask that friend for the notes and assignments. So I have them exchange e-mails with two or three other people so they have someone.

- Having worked in both programs I am seeing it, it does make a difference to have the constant accountability and the grades. The differences are important because it is the same kind of audiences, but the CI students get the extra support and rarely drop out, but the other has a significant drop out rate. I think it is because we saw each other every day, and everyday it was who's not there, why aren't they here, has someone called them? And that was an important part, and even though I try to have the same camaraderie in the ABE, it is more difficult and even though they text each other they may not respond because they are not as close with each other.
- Most of my students seem to have gone through college prep, and it really seems to help them ramp up to college work. They get to start off slow and as a group, which helps them get use to college work. I have some students that didn't go through that, and they seem to be alone. In college prep you are not alone and figuring this whole thing out by themselves. And it really gives them confidence. They still check on each other long after the prep academy is over.
- And I always said, that is the power of the CI program because there are so many avenues to build that successful experience as a student. And I think that is the

difference. We were talking about it at our math meeting and someone said maybe we should just do it like the community college math lab, everyone at their own pace, and she said she asked the students if they wanted to do it that way, and the students said no, we want to stay together. And the benefit of that was, yes they could advance to different parts of the pie in the ALEKS software, but since they were in similar areas together, they could help each other and again, building that community of learners, and that's where the power is.

- At the math lab, everyone is independent, which is great for those independent learners, and great for that learning style, but not everyone is like that, and most of our students are not like that, and so what motivates them is each other. And when they help somebody else, they are getting better at the concepts also. It's kind of selfish. You help yourself and you help someone else; so don't hold back. It is the community of learners that makes the power of CI
- That's the central unit of CI, and even the fact that I was a student too, and I had my personal struggles, and as each person has their story and they share it, oh my God, they have all these reasons why they shouldn't be there. And I always tell them look at all the reasons you shouldn't be here, yet your are all here together. All these experiences brought us together and here we are in the same place. And we are having a plan of how we are going to get out of our poverty, or out of our

situations, and that's part of it, always ingraining it as part of the math conversations even, we always talk about it like isn't this great.

- When she felt that she was valued and respected, then she came to class. In another class she felt that she was picked on and there was some friction with the teacher, so she did not want to go to that class. Apparently there were a lot of issues in that class like that and things didn't go well in it, so the experience is very important, how they are feeling in the classroom.
- You have this opportunity; it is going to change your life. I dreamt as a kid to be a nurse and finally it's going to happen. It's powerful to hear those things, and here I am complaining about cutting my finger this morning. They hear about the other person's challenges, and say I didn't do my homework, but this person has a job and three kids and they did their homework, so they realize that if that person can do it, I can do it. One said they didn't know if they could do this program, but then they see the other plights and feel like they don't really have problems compared to the others here, so they are motivated. That person came here from [a state agency], so I guess I can do at least as well.
- And the other thing that we intentionally did is we brought them all together every Friday for the peer session so that they could all meet each other regardless of level of math and just be together. The other thing we also did, the students don't know why some are in this level and some in the other. We don't want

them thinking that those other students are smarter, so we don't want the to start thinking that way. They have no idea what's going on, so they don't have that added influence. We worry a lot about that because these are adults looking for that second chance that they didn't have before.

- Yeah, and there is not a stigma or a label on that so we talk among ourselves the teachers, how do we make sure that, we all know where they are, but they don't need to know among themselves. All they need to know is that everybody's gonna' make it happen and move on. That's the goal that we are looking for.
- And you probably saw the dynamics in the class. Well, in that I used you as an example, none of them know who you are. They know you are a UT student, that's all they know. And we did that on purpose, if we had said this is the community college CFO, they would have gasped.
- We have students with no kids and they don't finish, we have students with ten kids, and they do finish. So it is not what is in their lives, it is the power they get, going through as a group, let's go together, I don't know if it would be different on their own.
- Cohorts, I believe it is a great opportunity for people coming back to school, or for first generation, first time in college, because they are very afraid.
- When I say go to admissions, it's like I am sending them to jail. So we say just take this paper to this office. So they help each other, or if someone is falling

behind they go, let me do the tutor one on one if they are going to be out of classes. I tell them to call me, give them rides, whatever they need. They tell me I can take the TSI, but I don't have a ride and someone will say where do you need to go. I will give you a ride and you go and test.

- Everyone know they have to pass a test and so they feel kind of part of something. They all know they are here now, and if someone has a better car or something, then they learn from each other and feel better about getting to where someone like them has become better off through the program. They feel that they can do it too.
- I see the benefits this way, they help each other, they encourage each other, they feel comfortable with each other, not like they didn't know the obvious, questions that maybe, like, go to admissions, they think what is admissions? So having someone that says let's go together, let's do it together, or I already did that here's how, or I don't know let's go and ask together. It's very helpful to them.
- Giving general information is very helpful. I say, alright you have to do this and these are the steps you need to take to do this. Even though they can get the information from the community college online, but having them get it online is different from hearing it from each other. The cohort is very helpful for them to go together through whatever process.

- I see a faster transformation with the cohorts. The others still progress, but they often feel isolated. They don't use all the benefits that the community college is offering, because they don't know about them. They come take your class and leave, so don't see everything else that they get to see as a group, or that they learn as a group. The cohort talks to each other and say do this, or do that, or I did this and it really helped. The ones who are on their own don't have the luxury of that [support]. They discover that after about a year in college that those services were offered.
- Someone asked me from the community college, how did all of them finish? So I told them, they start missing class, the teachers call me; the other class members let us know when someone starts missing or struggling. They call each other, or know that one of them is going through some difficulties at home. And the person says, oh my God! Call the students after two absences! She immediately said, we need to start doing that! Putting students to work together, but that was a revelation to her. So before withdrawing the student, find out what is the problem. We (CI) are so used to doing things this way, that when I see another department not doing that I think, why are they not? It takes more paperwork to withdraw them, so it's even easier to just find out what's going on with them and try to help them. I don't know if the community college people even know about [the effectiveness of this type of intervention], it works out for us when they are

falling behind to help each other, to see them even trying to schedule their classes together, let's take psychology together and like that. Bonding and helping each other, I see all the benefits of that.

- The fact that someone worries if I'm here or not, so it had an impact. And they worry about each other, I can't be there every day, but they are and help each other, so it is very powerful in that regard when they are in a group.
- The teachers care, if it wasn't a student stepping in it would be the teacher.
- So going together through all the processes that it takes to get into college, it's amazing.

Student perceptions of creating social relationships. Students interviewed were asked the following questions about going through the Prep Academy as a group:

- How did you like going through the course as a group?
- What did you like most about the group experience?
- What did you like least about the group experience? Was it helpful to go through the course as a group?
- Has being in a group affected your perception of your ability to earn a college degree? If so, in what way?

Student Rating. Was it useful to go through the course as a group? The responses indicate that students found the cohort experience very useful (M = 4.9, Mdn = 5, SD = .316, SE = .1).

Student Rating. Has being in a group affected your perception of your ability to earn a college degree? Responses were the most varied of any question in this study (*M* = 4.3, *Mdn* = 5, *SD* = 1.337, *SE* = .4), with one rating as not useful (1), and another as neutral (3). The students that rated this item low indicated that while they enjoyed the group experience very much, they were already confident of being successful in college.

The Friday study skills classes (VIP sessions) were also taught by the math teacher, and in addition to study skills such as time management and note taking, included ample discussions on staying motivated while bolstering self-esteem as well as math self-efficacy. The study skills class included time each week for the Navigator to advise students on actions necessary to get enrolled for their college courses, obtain financial aid, get their books, and similar tasks that are part of college going. The interviews included questions regarding the study skills class as follows:

- Tell me about the college skills sessions you attended, what did they cover?
- What did you learn from them?
- Did you find these sessions useful?
- Which ones did you find the most useful to you?
- How did these skills make you feel about your ability to navigate college?
- Has this service affected your perception of your ability to earn a college degree? If so, in what way?

Student Rating. Did you find the study skills sessions useful? The responses indicate that the students found the study skills sessions useful (M = 4.9, Mdn = 5, SD = .316, SE = .1). The results appear to reflect the positive responses to being in a cohort. Much of the positive cohort experiences of the students occurred in the study skills sessions.

Student Rating. Were the Study Skills sessions useful to the perception of your ability to earn a college degree? The responses indicate the study skills sessions supported student confidence in earning a college degree (M = 5.0, Mdn = 5, SD = 0, SE = 0).

As the ratings would indicate, student interview responses were quite positive about the cohort intervention and the study skills class that was the primary conveyance intervention to initiate and capitalize on the cohort experience. While the data appears merely positive, the supporting comments from the students give a sense of the emotion, camaraderie, and pride, the cohort method instilled in the students. The comments reveal a sense of common cause, united front, cultural sensitivity, and emotional security for the students that amply confirm the premises of this study.

The student interview responses about both cohorts and study skills class have been combined since they were blended into the Prep Academy as self-reinforcing elements, and student interview responses did not strongly differentiate between the two.

The student excerpts are presented below.

- I feel good about going through with the group. We were very united, we got to know each other, and that helps.
- I like that, we actually got close over the 12 weeks. CI was my family outside my family. I felt comfortable going to class every day, going to school at CI motivated me a lot.
- I enjoy being around positive people, and they were very positive people. We knew what we wanted out of life and we went for it. It ain't done yet, but 2016…
- Sometimes when you don't know each other, you don't ask questions or feel that you belong to the group. But this group was very good, we help each other, we talk to each other, so it was really good. At the beginning everyone was quiet, but we got to know each other. It helped increase my confidence.
- It inspired me, because I thought if they had gone through so many hard times in their lives and they are here and trying to do something better for themselves, then why can't I do it? I have been through tough times, but not like that bad!
- I liked the group experience because I felt like we all had something in common. At first I didn't talk to anybody, but after awhile I made some good friends in there, so it was okay.
- I liked it because you get to know the people that you're around every day so you don't want to be there with strangers. If you need help you'll know that they'll help and don't mind helping you.

- There was a lot of people that I didn't think would have problems in math or even in their life and they showed us that part and I knew that I wasn't alone.
- Actually, initially before I joined the group, I was so down. When I joined the group I see the small obstacles that I do. So I have to do something else—improve myself. I have young children to take care of. So all of this, I'm much, much better. I look on the brighter side.
- We had someone in our class that was MHMR, and they were up on the board, and I would see her and say, if she can learn it I can learn it too.
- I loved taking the class in a group setting. Being in the same class with the same people every day, we really enjoyed each other.
- It was quiet at first, and then something broke and we all just started talking; it was good.
- Having friends that are encouraging, seeing them do it and seeing them push themselves helped me to push myself a little more.
- To see that they are going through certain things as well, and so am I, but they're still here, so why should I not be here.
- The prep academy was a great experience, and I like how they have people who really do care, and understand what you're going through.
- That class was great. I wish I had her again for my other classes. She was a really good teacher, and she had different ways of explaining things that like sometimes

people don't really think about it, but the fact that she cares about her students, and really cares about whether your learning or not, and she really tries to help you if you are not learning it. That makes it even better.

- I liked the group setting; the girls were very inspiring. I like that they shared their stories, some were really personal, but that really inspires people.
- Not everybody has an easy life, so if you have a little extra support that would be great.
- Being in a group was very helpful, [classmates] sat behind me, and I have their phone numbers. I call them when I have questions about the homework, or assignments.
- I can do my work, and I can be doing it right, but I think I'm doing it wrong. I guess I have to have that reassurance, so I call [a classmate] and ask how do you do this problem, and she say you're doing it right and that's the right answer.
- I loved the group sessions, [a classmate] was right by me and she is very smart. She helped me a lot. I love being in groups because I learned a lot from the group, I taught them and they taught me.
- The Friday sessions were my favorite class, it was full of emotions for some reason (laughs) and I always said Oh Lord, we better bring our tissues today.
- We had to do essays, and the very first topic was something that inspires you, or what motivates you. Some people had quotes, some poems, and I actually made

people cry with my poem, and I told the teacher I started this crying stuff (laughs).

- It was very emotional, but it was very helpful. It taught me my study habits, my test taking skills, it helped me transition. If I had a hard time during the week in my math, my Friday built me up.
- I got bus passes, and one time I had to take a test, and my husband had to work and we didn't have nobody to watch the kids. K (another student) was helpful with that, so I brought the kids to school and she watched them for me.
- I had a lot of people that were at my level so that I didn't feel like I was alone.
- I am surprised people stuck in [class], they went the whole route, none of them quit. Some didn't come because they passed the TSI, other than that we all stuck together.
- We all have our different lives, but we became very close, we all worked together, the whole class. We call each other family. CI was my home.
- It was like everyone had their own inspiration for being there, and having big dreams and stuff. They were there for a reason and they wanted to be there.
- When we were expressing ourselves, telling our stories and all of that, that's how we got to know each other, when we hear something and you know sometimes we don't talk, we're shy because we don't know people and we are not going to

say things about ourselves to strangers. But when we start, the teacher has a good way to make us talk. Yeah, she was great.

- There was a time when I just wanted to give up and walk away. But, my advisor told me don't even worry about it, we are here to help you, so what do you need help with?
- And what also really, really made it helpful was that she was able to relate to us and through our life situations, she goes whatever happens don't let that get you down, because school is going to be hard, but I can tell you I made it through and you can too. I just loved that she kept on doing that, and kept on telling stories about how her trials and tribulations, and how hard it was for her, but she made it through, and she reassured us that we would make it through too.
- She always made us laugh or CRY in those parts. It was like stop making us cry (laughing), but we had fun. She made math fun. Everybody in that class hated math. I wasn't a big fan of math. I mean I knew how to add and subtract but that was about it. I could do money; being a cashier for so many years I already knew how to do that. But she just made it fun, it was always emotional in that class, and I never knew if it was going to turn to happy or sad, but it was always just one of those two.
- Maybe I didn't go to the tutoring sessions as much as I should have. But every time in class that the teacher said if you need help come up here, I would

automatically get up and go to the table. Or I try to get groups together to study during lunch, and at lunch people were doing math homework, so I would sit next to them, or they would ask a question and they would explain it to each other.

- That was very much helpful toward everybody, we all became friends and we all kind of helped each other. Some people even gave people rides, and took them home. We became friends personally, and at school as well, especially with a lot of girls in the class (laughs).
- We all got close. We're on Facebook now. We actually talk to each other through Facebook. It was a good experience because you also see other people that are struggling just like you are. There's things you can be compared to, things you need, sometimes their lives are worse than yours at times, but you are still there comforting them, everything is going to be fine. We all got along very well. I'm glad now that I have friends that I can go talk to.
- I have the teacher's e-mail and Facebook, so we keep in touch. Now I am an official community college student, and I know what I've got to do. I have a support system now. I can't wait for my next classes to start.
- We actually passed out a piece of paper with our names and numbers on it, and then if someone missed they'd text and we would tell them what the homework was, or we took a test today, or homework's not due until next week. We would

always stay in touch with each other so no one would get left behind. It was very much helpful. One of my classmates would always post things on Facebook, and every time she would post it gave me so much confidence, because she had so much confidence that she would overcome everything, and that gave me a lot of confidence to be where she is. She would say you can do this, I know you can!

- We would always stay in touch with each other so no one would get left behind.
- I listen to the music that the teacher gave us [for motivation], and when I'm feeling down I say, I need some good music so I'll put on the music she always put on and sing along with them, really loud too! And I would think about my classmates every time that music came on, and my teachers.
- I think it was like the third Friday when it was the first time we shared our personal feelings, like what motivated us. That was when we started connecting, because most everybody talked about their kids or their siblings, so we connected in all that. Others were just thinking about their future and stuff like that, so we started talking to each other, and how we could help each other, that was pretty much how we started off.
- I really liked it. We get to connect and learn different stuff about everybody. Like, everybody has their strengths and weaknesses, so if I had a weakness someone else will have it as a strong-ness, and that will help me and I will help

someone's weaknesses that's my strong-ness. And pretty much it was good. Yeah.

- What I don't like about it is now everybody is separated, and that's pretty much it, it had no downs about it. When we didn't agree on an answer, we worked it out and come up with the right answer. I don't have no downs for it.
- Once we got to the last two weeks, and everybody was going to go their own path, then we started to know that we were going to have to get to know new people, and that's when we got scared. I guess it's going to be the same I hope. So we are alright, just keep going forward.
- I am looking forward to keeping in touch with my classmates, and the experience will, everybody has the experience of meeting new people and all. I really recommend CI, just keep going forward and know what you want to do, and keep up on your stuff.
- No, I don't think the group experience increased my confidence in earning a degree; it was just more comfortable. On a 1-5, 3.
- It didn't really affect my confidence in going to college though; I know I can do that. I'd give it a 1.

In summary, the student comments regarding the cohort intervention revealed a strong emotional bonding between the students based on the theme of a united group with a common cause, and with a sense of mutually supporting family responsibility

to each other. Another theme was the powerful inspiration the students drew from each other and from their leader teacher, with whom they identified both culturally and through gender. No less a theme was revealed in the positive attitude shared by the students in achieving their goals, and pride in the fact that the cohort completed the course together with no attrition.

Case management. Another form of social relationship that CI deems critical to a student's success is a case manager to provide ongoing intrusive guidance and support in helping the student navigate the college environment. CI, in fact, calls its case managers Navigators. The Navigator supplies the college knowledge, and the psychosocial support, to keep the student on his or her academic pathway, and from giving up on college.

When students enter the College Prep Academy, the Senior Navigator serves the entire group all the way through their remedial work. Once the students complete the Prep Academy, the cohort will disperse into the college courses required for their chosen career fields, and are assigned to a Navigator who specializes in that career field. The role of the Navigator is to do whatever is necessary to keep the students on their academic path, which is described as twisting one arm and holding the hand on the other. The Navigator's methods range from being the stern taskmaster, to Mom, to confidant, to counselor, to source of financial support in a pinch. The students come from low-income backgrounds, and likely are the first in their family to attend college.

The students typically have no one in their family or circle of friends to ask about college or what it takes to succeed in such an environment. The students indicated that they became quite attached to the Senior Navigator, and wished they could continue with that person as they continued their education.

The number of staff perspectives provided are lengthy to show the broad variation in duties and skills required of the Navigators, and to richly illustrate the challenges the students face and must overcome to be successful in their college careers.

Staff perspectives on case management.

- The career navigator is basically a case manager. Our role is to make sure the student is successful. We guide them, stay on top of them, and make sure they are doing what they need to do to be successful in the program.
- Every CI student is assigned a case manager. That's your person. You don't have to go just anywhere; you go to that person.
- I tell people I do social work, they (clients) go to school, but it is really social work case management.
- You have this mentality that is given through generations that higher education is for other people. That has changed a lot over the last 20 years, but still. The navigators give the student someone to turn to when they have no one to turn to. That is a significant benefit. A lot of students are very self-motivated and get things done, but others need the help, especially the low-income population.

- They constantly need reaffirmation; you can do this. And that is not just in higher education, it is in life, you go through periods of self-doubt, and if there is someone there, part of your family, a church person, you need that, someone to give you some direction. The community college addresses this at a very small scale, and especially now, I don't think it is a priority for them. I don't know, because their priority is growth right now, and they are growing, but I think that just as a community college in general, that is who they are supposed to be serving.
- It is true that CI can say and do things to the students where the community college cannot say those things to them. I had a case last week where a student said this is what I want to do, and I said good, but I am not going to sponsor you. My rules are this, and you don't follow my rules you are welcome to do it on your own, and you are free to choose, which is basically go to the community college on your own. You can try to do what you want to do the way you want to do it, but you are on your own. This program is not for everybody, but if you came to us, this is what we expect. We are going to invest in your education, so we want to see our risk is well taken with them. And we have a small number of students relative to the whole student population at the community college.
- I told my reading teacher yesterday, hey we did not get the results we were expecting, this is your first semester, modify. What do you need to modify, how

you teach it, how you do it, the hours of the class, the office hours, just come up with a plan so we can get better. And she looks at me like, that's a beautiful work program, we decide to use technology, don't use technology, get two books, use no books, handouts, what will improve results. Whereas the programs at the community college have to have all these approvals to change anything, and if a change is not approved, there is no change.

- By the way A is still here. He tries to quit every month, but he is still here. I believe he was a five, but there is something with him. Maybe because he is first generation. Mom or Dad tells him you need to work, not go to school, so I think he doesn't have any support so he tends to want to quit. He also doesn't speak good English, so maybe that has something to do with it. It's hard doing the translation on everything.
- And I found out late, but he needed rent and electricity bill money, things a first generation student with little resources typically need. But I couldn't help him with nothing. I said bring me a bill and I will pay it, but he said my father will never give me a bill. He says I better work for it and get the money to pay it, because he thinks I should be working and not wasting my time going to school.
- In summary, the most important element of CI's success, it is a combination of case management and support services. The case manager makes it easier to offer those support services because they guide the student into the services they need.

- I have been with CI 15 years. I started myself as a participant. I went through every step that all of our students go through. My ID was #200, and now we are in the ten thousands, so I apply with the first group. I went to a very short training, when I finished the training, my career navigator, Janie, said we're hiring a front desk person, would you like to apply? I said yes, from there I think I got a promotion within the first few months, and then a second promotion within 6 months, then I was a Nav. Assistant, and then a navigator, and now I am a senior career navigator. So I have been through all the processes. Since day one, I know from the student's view, and from our part.
- It is very helpful having been on both sides of the house when working with the students, because I can see how scared you are, how busy you are, between yes I have this commitment but I have to pay my bills, I have to take care of family, and everything else they have to do, so it has been very helpful. It was very scary when I went through the program, every step. What is next, what is next? I always thought there was going to be a catch to it, so that was my experience as a student. It was very good, very nice, and I had [a career navigator]. Having the extra help, because I wanted it, but being from another country, you don't even know what is a GPA. So it was helpful having that extra help, feeling comfortable, asking for what you don't know. I know I had to do things, but how do I do it?

- I really enjoy the part of seeing someone that is ready to change [his or her life] but don't know exactly how, or where to start.
- I always tell them that I don't know if you learn from me, but I learn from each one of you. You hear things like, oh my God, I was complaining about my whatever, but the students here are you know, from the basics, and the prerequisites, seeing them after the 12 week [prep academy], and seeing how much power they get, from day one to the end of the 12 weeks, I get inspired.
- I go home because I have to go home. It's not like one of those jobs where, is it almost five, is it almost four? I get exhausted, but this can change their lives. Even if they don't pass the classes. This semester one had a few failing. They did not pass the reading, and I said you know how you can learn, so I have done my job. I want to have a good contract, and a good outcome, but as long as you learn. But now they know how to learn, and what it takes. They say, now I know what to do, I know what I'm going to do different, and I know what it takes. Seems like to me, it's not only the switch, but once they pass one class they get what it takes for them to continue the rest.
- My role is diverse, some of my students need a lot of hand holding if you want to call it that, and some are very independent. They say this is what I'm doing; I'm on track, and what I am going to do next. All but three of my students are in pre-reqs and co-reqs right now. I have a student that just was accepted for LVN this

fall. I have a pharmacy tech, and an EMT. The [federal] project just took off, we are ending year two, and going into year three. My experience is a little different than the other navigator's where I can offer my students things the other CNs can't. The credential to careers, so I am trying to get my students the credential, the CNA, the Phlebotomy, along with their RN, LVN, whatever program they decide to go into.

- I personally just work with healthcare students, and as a career navigator I feel that one of my main duties is to make sure they understand the healthcare program, because they are so complicated at the community college, and try to explain that to the students in as many ways as possible. The different details such as pre-reqs, co-reqs, what the process is as far as getting into different classes, what the process is for getting into the different programs, and like anyone they have to hear it multiple times and in as many ways as possible before they get it. I feel like a teacher many times. How to navigate the community college system, how to be successful in school, ideas about study skills, etc.
- The community college's healthcare programs in my opinion are particularly complicated. Actually just going through the RN website trying to figure out what the pre-requisites are, for example you have to take human anatomy, but before you get in anatomy you have to take an anatomy assessment exam, and

you can only take that assessment three times a semester, and now you have to pay for it the first time. Little things like that kind of add up. Human Physiology is another class, and now you can't get into it unless you take the chemistry assessment exam, and then you can only take that three times a semester, and it costs $20.

- And inside knowledge, like which campus has the more knowledgeable advisors, and don't go to that campus for financial aid, go to this other because they have a good financial aid office, and so on. The students share experiences with each other and us, which helps us all out.
- And since our students are working and have families, I feel a responsibility to find out the tricks in the system, because the students don't have the time, and they are already exhausted. I feel bad sometimes, because they come after work, and they are still in their scrubs, and they're tired, and the traffic is bad, and I'm like let's just visit real fast and I'll let you go. They are just overwhelmed all the time, so I try to smooth things out. My caseload is healthcare, so they are at the [college campus], and I have a few at [another college campus]. While they are in their basics, they can go to any campus they choose.
- Being here at this [new campus] has been amazing. If they have a financial aid problem, I say let's walk just outside and take care of your financial aid. Oh, I lost my ID, let's go talk to admissions right here, and get you a new ID and take

your picture right here. Next door, Julie used to be the health science counselor, so I ask her all the time, what about the RN program? They have the expertise right here next door literally. They ask me where's the learning lab? It's right here, go downstairs, you can study there. Everything's here, library, it's been nice. It's a one-stop shop, whereas before they would have had to go to other campuses and parking and all of that. And we pay for parking too, that's another benefit. That helps them and makes things easier.

- Attrition, I don't really see them coming back if they stop out. If they have a stable family situation, in helps get them through the program. The ones who don't have a stable situation, or still keep the wrong friends, or whose family adds stress to them, those seem to be the ones most likely to drop out. I had three students who were telling me they don't talk to their moms anymore. They just had to stop talking to them about the program. They just had to eliminate the negative influences in their life, the ones who keep trying to pull them back. Sometimes there is alcohol; sometimes the students become the parents. I know one case where the mom seem to be jealous of the student, followed her around. Another student who is taking care of her three brothers because her mom's in jail, all kinds of crazy issues. So many different backgrounds. Some of them have learned those lessons that sometimes you have to lock people out, but some haven't and that gets in the way of school. Sometimes I tell them not to be so

hard on themselves, look how far you've come. Some went to GED on their own, and then came to CI. They're breaking cycles, they're fighting generations of poverty, emotional abuse; they are doing a lot. It's pretty amazing.

- The students compare themselves to each other, and get down on themselves, she's making As and I'm not, and I tell them, yes, but she is single and living with her parents and that's not you, you have kids and have to support yourself. That makes a big difference; don't be so hard on yourself.
- Do students feel the non-academic interventions are useful? Yes, and let me tell you why. I was in a meeting and we were working on this cohort that is going to start at the community college this fall, and there were three students who are already in the RN program who were going to motivate the students. And one of the things they talked about was the career navigator. They didn't think it was going to be that person that they needed because, because their family didn't understand and they couldn't talk with them about the classes, but they could come talk to their navigator. When they wanted to give up the navigator would say oh no my dear, you are not giving up. Let me get you a soda and let's talk about this.
- Our non-academic interventions are useful because, we are kind of nice about it, but then we are tough on them so that they can stay on track. Because it is so easy to say I give up. Like one of them said it is like a diet, it so easy to say let

me get the burger and fries, let me just give up. But then somebody has to say, no no, let's go get that salad. I know the feeling on a personal level.

- The non-academic interventions are very useful. Sometimes I think about my own experience when I was getting my degree in Laredo. If I had had a career navigator it would have made my life so easy. My parents didn't have an education so it was difficult, especially with going to the American side and learning the language, that was difficult learning the English but that is where I had to get started. Now, I am almost there [with the English] (laughs).
- I think the big challenge is a medieval institution, you all came out of Latin schools, and the Sorbonne, and Cambridge, and you've got gowns and funny caps and Latin inscriptions and so on and so forth, and sometimes the things that come with that get in the way of a 30 year old single mom working to get ahead in the world.
- The fact that, number one, nothing in the college is easy, this if the first experience for many of them, so we tell them, you don't have to register for anything, just come to this classroom. August 21, is the first day of school, show up at eight in the morning. Once you drop your kids off at daycare or school come over here, we'll get your books, we'll get you everything. So we don't want to make it too much.

- Once we have them and they start showing up for 12 weeks, then we start showing them, okay, when you are going to the community college you go and register, let's talk about how you register. And, they also did a scavenger hunt so they can go around and see where to register; at least they start getting familiar. So all of that is done with the purpose in mind that they can just focus on the learning at that point.
- The other thing is, when the Navigator is their assigned career navigator she has those peer sessions, life skills, every Friday, but she also has office hours at the campus with them and we know that she has a lot of one on ones to talk about issues that are going on that are beyond what is happening in the math and the reading/writing classes. You know, my husband and I…, he is not supportive, so we can problem solve and work with those individuals. Not everybody is going to need that, but for those who need it we want to be available.
- And the Navigator was actually the one who initiated that for college prep. Before, I used to travel there so someone was available in the afternoon, but the Navigator said no, I am going to be here. These two days a week they are going to see me, they know they can come at any point. And it is not by appointment, first come first serve. So they don't feel like they can't see the Navigator without making an appointment two or three days in advance. That availability matters a lot.

- The Navigator also connects with her students through Facebook, and some of them are like, really? But the Navigator says for some of them that is the only way I know what's going on with them. I socialize with them, but I don't necessarily say much on Facebook, but I know enough about them, and when they are getting themselves into trouble by what they're posting, so that is another case management tool. She says Linked In is too formal, Facebook is more informal and they will just spill everything there. Yeah, I bombed a test because this weekend I went to so and so, so the Navigator can say so what happened on the test? You are not going to be successful this way, (laughs). At first they are happy to friend the Navigator, but they don't know what happens later. Sometimes she can even find them that way if they disappear, which they sometimes do.
- Now our cases management, we have never really talked about levels, but technically since we started CI, we know we have had levels of individuals, because some of them need intense case management and interventions, some of them just come and check with us as we expect them to do, and some of them because they are already in their programs don't need us that much.
- So, with college prep we call it high needs, and not because the students need it, but because of the 12 week program that is too quick and we got to get them ready with TSI, so we see them every single week, and I don't foresee that

changing. Even if we were to scale up we would just add more staff because we don't need to take away that component because we find that very, very helpful and we need to prepare them for what happens after that with the college.

- Now that the colocation is going to happen at [the new campus], it allows for a better transition academically because everything in the way of staffing is going to be in one place with the counselors and advisors, which is going to be a big step for us, because right now things are separated at the current campus. That will be a big plus.
- So we try to be that person who understands, values them, cheers them up, so we are a little bit of everything. Some day we're their moms, some days their cheerleader, some days the person pushing them to go the extra mile, and that's why all of us here, regardless of our roles, know that when we have students that want to talk, we just say, okay, sit down. We have an open door policy for our students because we know there is a lot of sacrifice that is going on. Sacrificing time with their family.
- That is why the career navigators are so important, they carry about 75-80 students in their caseloads, and they are expected to meet with them on an ongoing basis. We are not expecting to see them every single week, but some kind of contact on a bi-weekly basis whether it is e-mail, Facebook, whatever they want. Especially with the ones who have completed college prep because

the prerequisite courses is a very tough area. With college prep we have them in classes and we can be there, so college prep is more intensive for them.

- The career navigator plays that survival role for them. Sometime they say the Navigator is being so tough on me, and we say I know you can do it, that's why I'm tough on you. I want to make sure you can get that A in the class and move forward. It is a difficult role because sometimes you don't know how to balance it; with some of them I know I was as young as they were when I started with the college prep. They want to be my friend and say let's go to lunch together, and I say no, no, no, no, I am supposed to guide you here, so I cannot be too close to you. Now once you graduate we'll go to lunch. It's difficult to find that balance because we do care about all of them. But I do believe that the Navigator does a really good job of guiding them. You don't need it, but you (another student) need it.
- I don't have any bus passes right now, the community college started charging for them, but most of the students have their cars, and because they need transportation to go to the different campuses, they need predictable transportation, not be dependent on buses. If they don't have a car I get worried. Because how are they going to get to clinicals on time? So you start preparing them for the program, let's start working on getting you a car, because you may

have to drive to Georgetown for clinicals. I have a student driving to Killeen twice a week. That's just the way it is, sorry.

- If they are newer students and don't have any priority to register, they are going in all different directions to get their courses. And it depends on their work schedule, and their kids' schedules, so they may be at [the college campus], and then at [another college campus], or depends. And by the time they get to register they get whatever courses are left over. Of course later when they have more credit hours they can register earlier, and try to get their classes at just one campus as opposed to several campuses.
- And also, the students use Rate My Professor website to find out which teachers are more student friendly or not. So I can advise them of what I hear about the professors from other students. But the Prof's that have the top ratings fill up fast, so they can't always get the better professors. I just tell them to go online and check out the professor before they register.
- The process for career navigator. Once the students are selected, they come to an enrollment session where I meet my new students for the first time. At the enrollment session I go over general rules and policies, procedures, and expectations of CI. You know, don't forget the commitment you signed (laughs), and talk about what I need from them. Steps to get registered, what to look out for, childcare. And that we will be having weekly meetings, how to get books,

they are usually stressed about the books and how to get reimbursed for them. And they always have a lot of questions, what are you worried about, what's going on, find out what they need help with. Usually it's a childcare question.

- Most of them respond well to my suggestions, but also they are adults and I don't want to insult them. And they are from so many different backgrounds and experiences, and I do want to make sure I meet the needs of everyone. I still feel like I'm not doing the best I can because they are at all different levels, but I at least try. I taught high school, so it is a little easier for me, I can read the classroom and see where they are.
- I think they listen to each other and listen to each other. It seems like a lot of our students don't have anyone to talk to, they don't know anyone who is going to school…and struggling through it too. They can't talk to their famil[ies] because their famil[ies don't] really know what that's like. So it gives them a chance to talk to people, and I feel like sometimes my job is just listening, because they don't have anyone else to talk to, so I just listen a lot. Kind of be there for them.
- What's helpful is the students I have in program tell me their struggles as they are going through with time management, and I can turn around and share those things with my new students. I tell them so by the time they get in program (i.e. nursing) some of those things won't be an issue. Start talking to your family, getting that organized, because once you get in program you won't have time to

spend with them. You won't be going to birthday parties, no social life; you just are going to have the time. It helps for those in program, and those who have graduated to come talk to them and share lessons learned, because once you're in program, because the programs at the community college are very good, they put them through hell and really test them. That's why they do so good on the state board exams. So we try to tell the students to lay the foundation now, know that anatomy, because you won't have time to relearn it once you're in program. Some just want to skate by; you really want to understand it like second nature, it's just one of those conversations.

- A lot that we do with learning styles, we just research stuff on the Internet. Most of them have heard about it, and some instructors talk about it in the classes, so it helps them think about it and find ways to study that suit their learning style – flash cards, whatever. When they go to the community college Anatomy & Physiology open lab, they can touch the models. I tell them the students who do well in the class spend a lot of time in the open lab. Students tell me about a lot of websites, like Khan academy to help learn the material, Quizlet for flash cards others have already done. Just any technique to give them an edge. The contact is what's important. Not sitting at home, spend as much time as possible on campus, because once they go home they get distracted.

- I keep my students from just starting their pre-reqs all the way through their nursing program. We used to switch navigators when they were admitted to the nursing program, but that seemed to cause an extra level of stress trying to meet and learn to work with a new navigator, so we went back to staying with the same person all the way through.
- Another thing, compared to the community college, we work with the [local workforce agency] directly so we can send them there for stuff, and we just got e-mails from [a local non-profit agency] that they have some slots available for housing, and so we have those connections where we can work real quickly. Whereas the community college doesn't have that kind of time or connections – that's not the focus. We have the time to do social work, which is not the community college's focus. We can provide health care insurance, MAP cards, things that health care students have to have to take healthcare courses. If the student is struggling and has to pay for all those things in order to take the classes, we can help them. How do they pay for a $200 dollar book, and all their shots that are required, and the background check, drug screen, uniforms, scrubs, before you get accepted? I don't know how they would do it.
- And they are using their Pell grant to pay their bills. We caution them, don't drop your classes; go talk to financial aid first [because they will lose their aid]. Some of them did that when they were younger and now they are stuck and can't get

aid. They say I was young, I didn't know, and I say I know, that's why we have to do it differently (laughs). None of that ever occurred to me either. The first time they weren't ready, now they are but their record follows them and messes them up.

- The purpose of the grant was to get the student into a hospital setting, a clinical setting, that way when they get into their program they already have some experience. The way I sell it to my students is this is a way for you to not only earn experience, you will also earn more than you can at a day care, or fast food place. Most of my students are working minimum wage jobs. So, for example, CM, my first phlebotomy student that got hired at the Medical Center, and she is going to be working as a phlebotomist. She was working at a hotel in the kitchen for $7.50 an hour; they hired her part time for $11 an hour. She was working overnight at the hotel, so this is a much better deal for her, and still frees her up for school in the afternoon. Her career is surgical tech. It gives them that opportunity.
- Another student is working at a grocery store, she took some classes last semester and she didn't too well. She failed both classes, and they were pre-reqs. She came to me and said, I don't think college is for me. And I said what do you think about the CNA? She said I really want to work in that field. I'm not saying I'm never going to go to school, I'm just saying college is not for me right now.

She's young, early 20s, a single mom, and with her she just finished her clinicals over the weekend for CNA. And then we will place her into a job. So with her she got a certification, so she is not leaving empty handed. Right now she is working at the grocery store for $8.50 an hour, so if I can get her at least $12 or $13 an hour in a hospital or rehabilitation center, that would be so much better for her. That's the way the grant was structured.

- I try to meet with my students weekly, I have my meetings here on this board, so Thursdays are here, and Fridays are at [a local workforce agency]. If they can't meet at those times I have them call me or email me and set up an individual meeting. Those seem to work very well. In a group setting you don't get as much information, like I say I'm going to stick around for anyone who wants to continue talking, and ten will say they need to meet with me individually. So, sometimes you get a lot more out of the individual meetings. I also make myself available to meet at other campuses. I will meet them there. Gas money is always an issue with my students, or they're on the bus and they live way south, or whatever, so I meet them at there, or outside if it's nice. The student was very grateful for me meeting her there.
- And then being here on [the new campus], I've noticed I've had a lot more walk-ins or drop-ins, so they come by and say hey, I'm here. Doing well, took my first test, and so on, that's been kind of nice to have that. At our headquarters they

have to make an appointment, but here I've noticed we can take them to the library, or admissions, or whatever. The first couple of weeks we filled up over two and a half sign in sheets, and there are 20 slots on them. I had two schedule on my calendar, but I had six more just walk-in. It's great. Over there, they might not have time to stop by, but here they were here anyway for class so they come by.

- And, they are able to get their classes here. Most of my students are in Human Anatomy, Biology, Human Physiology, or Microbiology, which are here [at the new campus]. So I can sit down with them for these classes and tell them you can go to [the new campus] or you can go to [another campus]. Because those are considered the bio innovation classes that were [redesigned] by the grant, so my grant students have to take those classes. And then I try to pair it up with Statistics; because the goal is to get them completed with their pre-reqs the sooner the better. Because what happens is they end up doing all their co-recs, and then they are left holding the bag because they still need their pre-reqs and they haven't [completed them]. Another catch is, to take Physiology, they have to take Anatomy, and several other classes. So I try to get my students to take Anatomy as soon as possible because it is a pre-req to several other classes they have to take. If they take only co-recs, it's going to take them another year and a half to take their pre-reqs. Co-reqs are basic transfer courses; pre-reqs are the

specific courses that are pre-requisite to the healthcare program required courses such as Anatomy.

- I also help them balance their classes; they may want to take Anatomy, Microbiology, and a math at the same time. I say no, you are going to shoot yourself in the foot, those are all difficult courses and you don't need to take all those on at once. So I help them look at the big picture strategically.
- I do have some students with no kids, don't have to work, that can handle more than one of these classes, but I tell them, if I see one drop, one F, then I'm not going to approve such a load any more. And those are my students that don't need the handholding. They just kind of go on their own. So I'll have about ten students ready to apply for the RN program by the end of this semester.
- A typical day, a lot of walk-ins. The struggle my students typically have, money is a big thing. One just came in and picked up her utility bill check, and said you do not know what this means to me. I was trying to figure out bills, her husband only gets paid once a month working for the state, and so after they pay bills they only have $300 to last the whole month. That includes gas, groceries, so they have to live very simple. Her daughter just started college at [a university], and got scholarships, but they still have to help her. So she got a part time job at her son's daycare to help out the daughter.

- Money, transportation, and another thing I've noticed are relationship issues. Last week one of them, she's has a live in boyfriend, and about a month ago he hit her. But she's trying, he agreed to leave the house if she can find someone to sublet that can pick up his part of the lease they just signed. Meanwhile he's gotten verbally abusive. She dropped her classes, Anatomy and Statistics, because she just can't deal with it all. She is such a good student, and she didn't want to lose her sponsorship, and I assured her she wouldn't, and we set up an appointment at Safe Place. So she is trying to tend bar and taking extra shifts, she doesn't want to ask him for money. And she has a daughter, and she had to remove the daughter to her grandparents. He is not threatening, but she doesn't feel safe for her daughter in the 8th grade, if he starts the verbal abuse with her daughter. So my thing to her was just working with her through a life experience. Then he does nice things, and then he starts in, typical abuser behavior. I talked to her about being alone, and my own experiences when my husband left. You are still responsible for a little person, so you get up every day and do what you need to do. Safe Place has a waiting list, but she needs it now. I tell her she really needs to think about who you are, and what it would be like without this person in your life. So I do a lot of that.
- Then you have students dealing with death. I had two students whose fathers had passed away. They had to drop everything and leave to take care of that. One's

dad had a stroke, and his wife is not true, and not taking care of him. So she has to move her dad to Texas and take care of him, and she had to drop all her classes. I called her over the summer to see how she was doing, and she had to get a job, he had no insurance so she had to buy his medicines, and he finally passed away. So, I call her and try to get her back into classes, but now she is pregnant, and her husband doesn't think it is his, and they had to do the DNA test, and now she has to work full time. So we are going to put her in Phlebotomy so she can work. You hate to ask, but it is things like that which get in the way of getting them through a program. They are in the middle of a traumatic situation, and you hate to call them and ask if they are ready to register for classes. The one who lost her dad had to take out loans just to pay for the funeral, and now they have to pay back the loans.

- They have thought this way for so long, it's hard to get them thinking outside the box; they don't know that there could be another way to do things. One wants to get a divorce but doesn't have the money. I suggested going through legal aid, and she said what is that? Austin is so rich with all these non-profits and services, but they don't know how to access those. She says I don't know if I qualify, and I say you're a waitress, they are barely giving you ten hours a week, I think you will qualify.

- The child-care is helpful. She was on the waiting list at [a campus], but finally got in and her son loves it. I tell them to go get on the wait list at [a campus]. Having childcare at the same location they take their classes allows them a lot more study time for their classes. When we give them vouchers they have to find a provider, which only pays the day they are in classes. Ideally the childcare should be full time, because it gives them all day to work on their schooling, and then pick up the child at the end of the day. I hear there will be childcare here [at the new campus] if the bonds pass. Having it central in one location would be very helpful.
- I got my caseload two years ago, so none of my students have graduated. The first three in program will graduate, and I have seven ready to apply for LVN, so I hope they get in soon. The ones who are waiting have certificates, so while they are waiting to be accepted they can work in the field and save up some cash for when they get in the program. They tell me there is no way they can work with the class schedule they have, and the clinicals, so they don't see how they can do it if they do get accepted, so we have to figure that out with them. The CNA is 60 hours classroom, and 40 hours clinical. The Phlebotomy is a little more than 60 hours classroom, but more than 100 hours clinical. And the clinicals have to be on weekdays for Phlebotomy, so it is difficult for them to work much. They work at the clinics or hospitals around Austin drawing blood.

- What would they do without a case manager? I have a group going through the Phlebotomy that started in the summer, and I go to meet with them at [the new campus], during their lunch break. And as I do, I notice other girls are saying, wow, they're helping you with that? Wow, and these are students that just came off the street and were taking the class, but I felt really bad because it felt like there was always this little charge, certain shoes for example, so I gave them vouchers for that, and I wonder who is going to do that for the others. And the exam is $135, on top of the $835 for the course. I wondered, because you would hate for the money to be a barrier.
- And I have some students who are very young, and I think you didn't know that? When I was there age I was married and had a son. But these just graduated maybe a year of two ago and they are just clueless about, like I didn't know I had to do that, you didn't know that! I had a couple that didn't know they needed the meningitis [shot] to register. I'm like, there are posters all over the campus, all over the website, it was just bizarre to me. Do you have insurance? No. A friend of mine told me the shot costs $200 at the drugstore. Here's a voucher, go do it right now.
- Some of my student's need a lot of hand holding, and then I have to follow up. Did you turn in that document the community college needed? Yes, I did. Sometimes it's a matter of, they said they would fax it to me, no have them fax it

to me. So we know we get it, and then we will turn it in to wherever it needs to go. Sometimes it's a lot of that. Especially if it's a financial aid document where they have defaulted on a loan, and they make an arrangement with a loan servicer. Well, they are saying they are faxing it but I haven't got it; have them fax it to me. So I am a go-between, and I follow up to make sure that all the steps actually happen. I can't do it for them, but I can see that they do it. I put things back on them though. On the immunizations we need doctor verification, we need this, we need that, so I give it back to them and tell them they need their doctor to sign off on this to verify that you got the immunization and they go ooohhhhh. I can't do this for you, so it is a matter of teaching them steps, baby steps, and following up with them, kind of like parenting.

- The older ones aren't as much of a problem; it's a maturity thing. This past summer I lost three cases because they were taking Anatomy, and after they dissected a cat, they said I don't want to do this, how about this networking program, can I do that? So we do this little career exploration, and I look at their SAGE scores, okay this is a match, and then [the career navigator for IT] and we transfer them to him. Oh you mean you're not my navigator any more? No, I'm not your navigator anymore. I was so squeamish. When you came into the program you were so certain you wanted to be a nurse, what happened between then and now? Well, I'm figuring out I'm not really into the sciences. But that is

one of the questions we asked you in the very beginning, and again, she is 20, very young. That's the young ones. I didn't know either when I was 20. I wanted to be a prosecuting attorney, but here I am.

- It's about a lot of motivation, even the ones that don't need a lot of hand holding, if they are uncertain about something they come and ask. Even in the degree mapping, I show them where they are and where they need to be. I help them plan ahead, like when do you need to take certain exams for entrance into a program. One didn't know they had to have 40 hours of volunteer work before she could apply to the program, and I'm thinking it's on the website, where do I go, what do I do? So I steer them to the website and tell them where they can get all of the details and all of the information.
- Is the community college more complicated than other schools? I don't know what other colleges do, so I think the community college is easier to navigate than say, the university. Even then it was where do I go, what do I do next, but I had the sense to go figure it out, some students don't even have that.
- I tell my students, what does your heart want to do? What did you dream about growing up? I ask questions like that.
- And sometimes I'm walking to the bathroom and I see one of my cases, and I say I haven't seen you in awhile, do you have a few minutes, and they say yes, and I say okay, let's go to my office (laughs). Or if they have classes, can you swing

by after class? One just walked by me and I said, did you just walk by me? Let's go to my office.

- I think the great things our navigators do is, most of our students are first generation college students, and when you come from that background you may not even know what a credit hour means. The community college advisors are equipped to discuss schedules, but they are not equipped to deal with students on a more fundamental level. You can be intelligent and perfectly capable of becoming an RN, but if you came from a background that many of our students do, you may not have that academic language down. And what I see with the case managers is they guide them through that. I think that is a lot of the issue with men, because they don't want to look dumb.
- And of course case management, that accountability. Are you coming, are you doing your homework, are you doing what you are supposed to be doing to be successful, because if you're not, then don't come. I hate to say it that way, but the message is do this and you will be successful, but if your not then you are not changing anything and you are not going to have the same positive result.
- That's what Bandura was saying, we think it is just the subject, and it is, you have to know it. But I am just going to put a plug in; I've seen a lot of different programs. I've been doing this since 1990, and I was in Upward Bound myself and I was in that kind of thing, where UB got me to thinking about college and

how to do college. And I worked with the…math academy, I was the one that started it for a local high school, and again we were getting those student who were not supposed to be successful, and they were outperforming the ones that were, because again, with the interventions, the climate, the relationship with each other, and with the teachers, all those are pieces that are so important.

- I honestly think a lot of CI's success is the navigators. There is someone there to push them in a good way or a bad way, but for the benefit of the student.
- You know when I was going to school would I have benefited from a navigator? Absolutely. Because when I first came to this country I was so afraid of everything, of the whole college process. I'm first generation to ever get a high school diploma. My parents were migrant workers in the fields; they didn't go to school. So this whole thing of higher education was a whole new ball game in my family. And I had to figure out all of that on my own. Very limited English, so it is very beneficial to have someone there to guide them, especially low-income students who are led to believe since early on that maybe they aren't college material.
- I think one of the big messages we would want to get across to the community colleges is that not taking career related pre-requisite courses is causing the students in career programs to take longer than they should. So someone who is interested in a workforce degree, a 2-year degree, should be advised in a more

focused way. So what's happening is they exhaust their financial aid money taking courses they don't need for a 2-year degree.

- One of the things we were excited about in partnering with the community college is the possibility to give this information to them, especially those who are geared towards a workforce degree. I know that the community college is not focused on workforce degrees. I know the community college wants to get them in and out as soon as possible. But the advisors seem to have a bias towards the 4-year degree, and not so much the workforce degree. I am going to give you one example; my friend got a degree in psychology, but now works in the insurance industry. But someone who gets a workforce degree goes to work in that field, and they are making the bucks.
- I think the students believe the interventions are useful, because I have seen the connections the students make with their navigators; they are almost family, not just here to do business. It is about the connection.
- There is a lot of emotion in it, you are helping me to succeed and they do appreciate it. I see both positive and negative, some students are fighting with their navigator! They are calling me, they are pressing me, but the students realize they are doing that for their own benefit. I don't think I have ever heard of a student saying having a navigator wasn't beneficial.

- And the community college's college readiness program is NOT successful, and I think it is because they lose the face-to-face. And the personal, handholding, someone to push you. I don't know what it is, but it is not successful.
- Learning disabilities, when they go slow and you talk to them they say, oh yeah, I was in the special classes, or oh I have the waiver for this test, or now that you mention I have never been tested but yeah I have always struggled. So it's one of the questions. People are afraid to talk about learning disabilities, very afraid, because if they were in that system before, they just put them in that chair and transfer them from grade to grade, so when they come to the community college they don't discuss it. They say I really want to learn. I really want to do this, so don't put me on the bench.
- It takes someone to push them; it takes a mom. I tell them, I'm the mom, and I am a good mom so… One of the students we had, I had to put them on probation two times, and she said I hated you when you put me on probation, but thank you for that now, because if you had not done that, I would not learn, and I would have continued with the same behavior and would not be where I am today. But I HATED you at that time. I have been called Angel and called the other, so now I am calling you an Angel again. I saw how you were looking at me and I thought, uh oh, mom I'm sorry, but she is here and she finished. It's a lot of work.

Sometimes I think, I don't have these issues at home, but here I have 20 students that don't listen to me all the time, but it's a lot of work to do it.

- We all need it, well some of the students need to be left alone, some of them need the mom, some of them need the principal, some of them need just a teacher, there is no rule that fits every student. And for the student to be able to take it, they tell me I am an adult, and I say well it doesn't look like it, and it's not fun for them and it takes a lot from them to be willing to take the feedback, but it is necessary in order for them to change.
- I think if we were elementary kids we don't even think about being shy, we just go for it. But as adults we have to think about all those feelings and emotions that are involved because some of them have been very successful in their lives and they just needed this CI sponsorship to make it happen. But some of them have been told no so many times in their lives, you're not up to our standards and you won't be anybody or things like that, so they carry that with them.
- Academic is not necessarily our expertise, only the students needs at this point.
- I was resistant to the move to the new location [at the new campus], as was everyone in the office, but I can also see the benefits now having us all together in one place. We have more opportunity to reduce duplications, and work things out where we don't do things like the community college.

- We worry a lot about their focus, are they ready to learn, and they don't have any other barriers. And that is when the other supports come into play.
- I am a motivator to them and try to keep them going. That's also the rewarding part of the job, because once they do graduate, they are a different person. And along the way they change, and they slowly start to sense that. We joke that on the day of the pinning ceremony we don't recognize them they've changed so much. It's a huge shift. Their confidence builds over time, and by graduation day they are different people. Along the way they deal with so much that almost anything can knock them down, and I am their to encourage them, and motivate them, and check on them, problem solve with them, and keep them going. The community college can't do that; I guess they don't have the time. I've heard that when they get busy they have 15 minutes with each student; at CI we can spend an hour and a half with them (laughs).
- We also talk about how the health care students versus the high tech students are kind of different. The nurses seem to be a little more needy. The IT students are kind of nerdy, they know what they need to do and kind of do it. Whereas our students are talking, and crying, and very emotional (laughs), it's a different personality it seems. It's kind of interesting.
- And, they are with us for some length of time, three, four, five years maybe. We used to push them, but now we seem to be a little more lax on that. Especially

since they have to get As and Bs to be competitive, so they can't be taking three classes. Like for Anatomy, if they are working and have kids, I often advise them to just take that class by itself. The students tell you what works.

Student perceptions of case management. Students interviewed were asked the following questions to ascertain their perceptions of case management services:

- Has CI provided you with someone to assist you in managing and navigating your career path through college (a case manager)?
- In what ways has that person assisted you?
- How did they assist you?
- How often have you met with that person?
- Have you found these services to be useful to you? Has this service affected your perception of your ability to earn a college degree? If so, in what way?

Student Rating. Have you found the case management services to be useful to you? The responses indicate that the case management services were very useful to the students (M = 5, Mdn = 5, SD = 0, SE = .0).

Student Rating. Have the case management services affected your perception of your ability to earn a college degree? The responses indicate that case management was useful in supporting confidence in college (M = 5, Mdn = 5, SD = 0, SE = .0).

The student ratings were unanimous in giving the highest possible scores regarding case management, and are well supported by the student comments in the interviews.

The comments show that students look to the case manager as the one person they can always turn to for guidance in both academic and personal situations. The comments also indicate that the case manager does not wait for the student to ask for guidance, but is also proactive in supplying guidance, supervision, and discipline when needed.

The following are excerpts from student responses to case management services.

- I had the Navigator, they have assigned me another just this week. I talked to the Navigator a lot. I could talk to the Navigator and she would give me advice, and I wish I could have kept her, but I can still go to the Navigator. She is so understanding. She has helped me a lot, and especially understands me. One time I asked her, are you a counselor or a psychologist or something? And she goes no, I just understand what everybody went through and I learn from that. She just gives such good advice, and just opens our eyes. It is good to know she is there.
- If I didn't have her then I would have been holding back a lot. I wouldn't be checking my emails for the community college. I would have never known, really.
- It made me feel more comfortable, too. Before, when I didn't have a navigator to show me or tell me what to do, I was just lost. And now I kind of know what I need to do.
- That scares me a little bit because I've never been to college and it's all new for me. It's not like going to high school where you enroll and you get your classes

and that's it. It's a lot more, the stuff that you got to do before starting classes, a lot of paperwork, so we were all kind of lost at first, but having her there telling us, you guys need to do this, and have this or that, that really helped too. There are a lot of things to get into college.

- We meet with her on Fridays as a class and then after that, we met every Friday during the whole college journey. And I think she'll be with me throughout until I graduate.
- She's like a mom. She tells you what you need to do and she's on your case all the time if you're not doing it. I really need that and I know I need it so I feel comfortable.
- I never realized that until they kept pushing and pushing and telling us, you're ready. You can do it. Don't be afraid.
- I would always thank them for showing us that we can do it and having faith in us. I feel comfortable about that.
- Yeah, with their guidance it is much easier. There are a lot of things, really, I don't know.
- The Navigator helped out a lot, if I wasn't there she would call or text me, see where I was at.
- When she would come into class you could see her body language, you know, you weren't doing so well.

- She would always ask if you needed any help, how you were feeling, how's the classes coming along, she really cared as well.
- I kept her posted on everything that was going on. I would rate a 5 on both usefulness of the career navigator, and in building my confidence about going to college.
- The prep academy was a great experience, and I like how they have people who really do care, and understand what you're going through.
- They really want to help no matter what you're going through, even though we are already in the class and something goes wrong, they're still willing to help. See what they can do.
- Really, when you're an adult, you're an adult, but they are still willing to help. They're not like, well you should already know this; you're grown. No, some people didn't have that when they were younger, so I think it's a great program, and I really do encourage my other fellow friends that want to get in college to come.
- The system is tough to figure out, and that's why I'm glad they are here to help, and after this first time, I'm sure by next time we will already know what to do. I'm going to go sign up for my classes right now.
- I like having someone that can guide me with the classes. It's amazing that there is somebody to help you since you don't know anything.

- I think it's hard at first, like me, I don't really know what to do. It's all new to me, so it's helpful to have someone. I'm going to be the first one in my family to go to college, so I can't ask them because they don't know.
- Once you have somebody to go to you feel that you have somebody to go ask. I have that problem that I don't like to ask too many questions, or when I don't know something I wonder who to ask, but when I know I have somebody it gives me more confidence.
- There was a time when I just wanted to give up and walk away. But, my advisor told me don't even worry about it, we are here to help you, so what do you need help with?
- My advisor helped me on a lot of occasions, and that gave me the courage to keep going, like I need to stop worrying. These people are here to help me, so I just kept on going forward.
- I feel like I can always come to CI in the future and ask questions or talk to someone. I'm glad CI is here. I always wanted to go back to school but something always came up and I couldn't finish, but now I have people who say don't worry about it, we'll help, don't give up, keep going.
- The Navigator helped me a lot with everything. I'm kind of new at this college thing, and like, oh it's college? Like the first thing, everybody was amazed, they still don't believe me, but I'm still hanging. But the Navigator helped me a lot;

she still keeps helping me. I believe I have another navigator, but haven't met him. Oh yeah, it was very helpful.

- It's helpful, she's on top of my case, but also my mom, she's a navigator too, so she's always saying you gotta' do it, you gotta' do it. I get it from all angles. Because my mom is one she's always telling me stories, and then like she tells people to apply CI, but we are going to be on top of you all the time because we are paying for it and we want you to succeed. If you don't have any support they are here to push you to the limit so you want to do it, so I would say it is very helpful.

A summary of student perceptions on the case management intervention show the critical role this intervention plays in the student's success in the college setting. This role is particularly important after students complete the prep academy and disperse into their respective educational paths (most often at multiple other campuses) since the powerful daily effects of the cohorts previously discussed are no longer present in a structured way.

The student comments reveal a common theme of having a single point of contact to turn to for guidance, supervision, discipline, affirmation, reassurance, personal counseling, and who truly cares about them and their aspirations in changing their lives for the better. Additionally, if the student does not turn to the case manager for these supports, the case manager will turn to the student

proactively and intrusively to ensure that reluctance on the student's part does not cause them to fall behind in their college endeavors.

While many faculty, staff, and students in the college setting often take these sources of support for granted in their own lives, it is clear from the student (and staff) comments that the personal availability of such support is not a given for all students.

III. Making college life feasible. In addition to the foregoing interventions that focus on the student's educational progress, CI provides assistance with certain challenges that are notorious for derailing the best laid academic plans for low-income adults attempting to fit going to college into their daily lives. These services include childcare, transportation, and occasional emergency financial support when students' budget planning cannot cover unexpected events. Moreover, often just the awareness that this support is available whether used or not, reduces student anxiety and frees them to concentrate on their scholastic endeavors.

Staff perspectives on making college life feasible.

- We worry a lot about their focus, are they ready to learn, and they don't have any other barriers. And that is when the other supports come into play.
- Especially during college prep a lot of them cut their hours at work, so they can be here all day for the 12 weeks, and they don't get the financial aid, or any other support then, so we do more of the explaining of what we can do so you will

make it through the 12 weeks, then you can go back to employment and you will make it.

- If you lost your job, or something unplanned happened, then we help them, but we also let them know that this is a relationship where we both hold each other accountable. We tell them when they do the interview when they get accepted to the program, I said we are going to hold you accountable for going to school, making those As and Bs, completing the college prep step or whichever step they are in, and giving back to the community. And, you are going to hold us accountable for us paying your classes – one time- child care, everything else we do, so they are very clear since day one about what we expect. And we are also clear about what we are NOT able to do for them. Like we are not going to go pick them up at home, or pay all your bills, we are not going to do that. It hasn't been a problem so setting expectations up front is important.
- The other supports are the childcare. We want to make sure that they choose where to take their kids for daycare. We never tell them where to take them, because it is all about them and where they are comfortable dropping off those kids so they feel comfortable. They say, okay my kids are okay with Grandma because I know Grandma has it. Or, I love this day care provider of this facility, so we never do that for them. They ask us for ideas, so we always refer them to a specific website but we don't tell them where to take them. We found out as

parents that that is better for us and for them. And we haven't had any complaints about that process.

- So we have individual assistance, and we don't offer it to everybody, the bus pass, but not the gas, and the emergency assistance is according to what is the situation. I am buying diapers this semester for a student, and I say bring me a receipt, but there wasn't one. Well, let me bring you diapers and tuna fish, things like that, you're not eating at least tuna fish? Something that would last two days, because sometimes they can work on the weekend, but if I don't, so just those things so I am not saving the situation, just until you get paid or you get your child support, or you get that employment, so you can make it through the 12 weeks. So that's how we handle the emergency assistance.
- We help them through their whole career [prep, pre-reqs, major program] through the program, but not on a regular basis. We work on an individual and situational basis, like say, what did you do with the financial aid? We want to help, but don't want them to waste their money and then come and ask. I need proof of an excuse, prove there was a funeral, etc. this to avoid them thinking this is Christmas. Once they are in the actual CI program we co-enroll with [the local workforce agency] and they help them with gas, even if we pay the rest, because some semesters they pay tuition, sometimes we pay tuition, it changes from semester to semester, but [the local workforce agency] always gives them

money for gas, $20 per week, so it's minimum, so we encourage everyone to co-enroll with [the local workforce agency], because most likely they cannot work more than 20 hours per week and stay in school full time. We try to limit help to once a year, but if it is not do to lack of planning we will do more than once per year.

- The childcare is helpful. She was on the waiting list at [a campus], but finally got in and her son loves it. I tell them to go get on the wait list at [a campus]. Having childcare at the same location they take their classes allows them a lot more study time for their classes. When we give them vouchers they have to find a provider, which only pays the day they are in classes. Ideally the childcare should be full time, because it gives them all day to work on their schooling, and then pick up the child at the end of the day. I hear there will be childcare here [at the new campus] if the bonds pass. Having it central in one location would be very helpful.
- And I found it late, but he needed rent and electricity bill money, things a first generation student with little resources typically need. But I couldn't help him with nothing. I said bring me a bill and I will pay it, but he said my father will never give me a bill. He says I better work for it and get the money to pay it, because he thinks I should be working and not wasting my time going to school.

- The financial support is case by case, like this one, I am a single dad and I have to provide for my baby. Okay, so what bill do I pay so you will have that extra money to take care of the baby? Sometimes they say I don't get paid until Friday, so that's when we do the gas voucher. So we don't do it on a regular basis because there is not enough money in the world to do that.
- The students don't get transportation every single semester, which is another one of our services, because the intention is that we are going to help them reach self-sufficiency. So we don't want them to see it as okay, they are going to give me a bus pass or gas card, we pretty much want to work with them.
- We don't let them get student loans, because it goes against why we exist, and we also have found out that when they have so much money in there hands, they don't do the right things. They don't seem to budget properly.
- Student loans. It's for one's who are at the end of their career [preparation] we may authorize a student loan, because we prefer for them to graduate and remain full time students, but we try to discourage student loans. Out of my case of 80 students, maybe one per semester I authorize a student loan, but it's… One student told me their credit cards were killing them, so okay, but prove to me that you use the money to pay the credit cards. If it is needed to stay in school, but we discourage loans.

- I don't have any bus passes right now, the community college started charging for them, but most of the students have their cars, and because they need transportation to go to the different campuses, they need predictable transportation, not be dependent on buses. If they don't have a car I get worried, because how are they going to get to clinical on time. So you start preparing them for program, let's start working on getting you a car, because you may have to drive to [another town] for clinicals. I have a student driving to [another town] twice a week. That's just the way it is, sorry.
- But I think you, [the researcher], were in that class where some students always had the Starbucks coffee. Even a regular one is $3.50, if it's not a cappuccino blah blah blah. I need money for gas, and it's like, no, I myself drink Folgers, and I do it at home, and that's why I drink Folgers because I want to have money for gas. Or, it's very hard for me to see you eating every day from the cafeteria and then you're asking me for gas. When I see someone eating Tappa's, when there is not even a microwave working, can you try that? I'm going to help you, but it is hard for me to help you when you are spending $10 every day at a lunch, plus a snack, plus a drink, plus the coffee. No wonder you don't have money for gas. Let's talk about budgeting.

- So we don't do that everyday, but we explain what is an emergency, not a lack of planning. And even if it was a lack of planning, then we discuss with them how are we going to plan so in the future you don't get in this situation.

Student perceptions of financial support. Students interviewed were asked the following questions about the emergency financial support, child-care vouchers, transportation money, and similar supporting interventions that CI offers its students:

- CI sometimes helps students with things like childcare, emergency loans, transportation, etc. Were you able to use any of these services?
- Which services, if any, were used?
- How did the services, if used, help you with going to college?
- Did you find the services used helpful, and in what way?
- Were there other things that CI offered that helped you with going to college?
- Has this service affected your perception of your ability to earn a college degree? If so, in what way?

Student Rating. Did you find the financial support services useful? The ratings show that students found the financial supports in childcare, transportation, and emergency bill payment useful (M = 4.4, Mdn = 5, SD = 0.996, SE = 0.3). Three out of the ten students in the sample rated the financial support services a 3, because they did not use them.

Student Rating. Has the financial support services affected your ability to earn a college degree? Students rated the financial support intervention's effect on their college confidence as useful (M = 4.4, Mdn = 5, SD = 0.996, SE = 0.3). Three students rated the financial support services a 3, because they did not use them.

Student comments supported the ratings they gave regarding financial support. Not all students need, or want, to ask for help in the way of childcare, transportation, emergency bill payment, and the like. But the comments indicate that knowing it is available relieves worry, and can make the difference for low socioeconomic status students (as all CI students must be) in pursuing a college degree.

The following are excerpts from the student responses to financial support services questions.

- If I needed any help they were always willing. I managed to work out things, but they were there if I was in a pickle and needed help, you know, financially or just talking. That was really great.
- They really want to help no matter what you're going through, even though we are already in the class and something goes wrong, they're still willing to help. See what they can do.
- I had plenty of car problems, but I really didn't, see my problem is that I don't like getting help from others, that's kind of my problem, but I know that there was that and the Navigator kept telling me we can help you, we can help you, but

I'm kind of a little, I can do this by myself kind of person, but yeah that's pretty helpful. I know I see some of my classmates asking for the bus pass, and it looked that they got helped, and gas money I guess? I think it was gas money, and they got helped and all that. It was nice for people that needed it to get help. For me it was not all that useful, because I don't really like [to ask].

- I think what caught my eye was that they're going to pay for the whole school for you and I really needed that because I was working at a factory and I couldn't afford school.
- CI sometimes helped me buy school supplies.
- They helped with parking and bus.
- I got help with transportation, but not child-care.
- I did take advantage of the gas situation because I was on the other side of town, and that really helped out a lot.
- I got bus passes.
- My main problem during the summer is with childcare.
- I didn't really use any of those services. I figured CI was helping me enough with my education, so I tried to take care of the rest. I tried my best to get a ride when I needed it.

- But you know, there are people in my class that use the transportation, and they find it very helpful. And my classmates are always talking about dropping their kids off at day care and stuff.
- CI helped me mostly with transportation. My husband and I have cars, it's just sometimes that his job takes him far, he works up north, and he gets paid every two weeks. One paycheck is used for our bills, so that leaves no gas money whatsoever until the next check.
- CI even paid one of our bills because it was so friggin' expensive, and I would have stayed home if that happened because we would have had no gas money, no nothing. I can't even ask family for rides at all because of other situations, but I just loved the fact that CI was there when I needed someone the most.
- I really don't have very many people to ask for help, because of what my family believes, which is you're on your own, you're and adult and have to figure this stuff out for yourself. Sometimes I'm like trapped in a corner and don't know what to do, but with CI they were able to ease that pain for me and give me what I need to not give up. I really appreciated what CI has done for me. I missed class only two times, but those two times I was really set back, and I didn't like it at all. I'm like, oh my God, why?
- I feel like I can always come to CI in the future and ask questions or talk to someone. I'm glad CI is here. I always wanted to go back to school but

something always came up and I couldn't finish, but now I have people who say don't worry about it, we'll help, don't give up, keep going.

- I was already behind on student loans and stuff so I knew that if they could help me, then this would be my only chance to go to school.
- I never thought I was going to be here. When I ended high school and wanted to go to college, but I didn't have the money. I didn't know how I was going to buy books and stuff, so I just thought I am not going to go to college.
- I don't have kids so, but at the end they raffled off a gas card, so that was good. And the Navigator told me that if I needed help with a bill or something she could do that. I think CI is a blessing for me. If it wasn't for CI I wouldn't be able to go to college. It's too expensive and I wouldn't be able to go.
- For me CI was a blessing, I feel very lucky. Nobody is just going to go and pay your classes, so they are good. I will be going to my classes at [a campus], and one in [the new campus]. It's nice, brand new. I'm thankful for all CI's help.
- The most interesting is there are people here that have had chances, and like they didn't really get the opportunity because something came up with their family or they started having kids and stuff. And they couldn't do it and didn't finish, so CI gives them another chance to redeem themselves and to get back on track, and help them get their degree and be what they want to be.

- CI has helped me build confidence about my ability to be in college, because I'm getting to learn the college stuff and what it's all about and how it's going to be. I'm really looking forward to it. I'd give it a five, as being useful.
- Not everybody has an easy life, so if you have a little extra support that would be great.
- It's great. I think what they are doing here is awesome. They are helping a lot of families, not just the person who is going through the program, but the whole family is getting a benefit too. They think about everything. I know at first it's a lot or paperwork like your tax return and how much your spending, but I didn't have any trouble getting all the paperwork in.
- I grew up in [a foreign country], and when you go to college there it's not that expensive. But going to college here you hear how much it is and it kind of scares you, and you set your mind to think I can't do that, I'll have too may loans to pay to finish, and after that I don't know if I'm going to get a job so, it kind of like stops you from wanting to go because it scares you, but finding this program, that's been great, they help with everything. I cannot say, oh I can't do it because of this or that. I've got everything in front of me just to go and do it.

In summary, student comments regarding financial support centered around a theme of scarce resources, low income, not having financial and other support available from family, unwillingness to take on debt, and similar conditions often

found among low socioeconomic status individuals and families. The lack of depth in personal financial resources can easily prevent going to college, or worse cause a student who is in college to drop out. Not all students need or choose to avail themselves of financial help, but knowing it is available is useful in itself.

Research Questions 5

Is there a difference in remedial math completion between students who participate in a prescribed program of non-academic interventions and those who do not?

Yes, a difference was found in success rates. While this study was not a quantitative study and tests of statistical significance will not be provided here, a comparison of Capital IDEA TSI math completions with all Texas 2-year college TSI completions showed that CI results from fall 2009 to fall 2014 averaged approximately 84% (Capital IDEA, 2009), compared to 39% for all Texas 2-year community colleges tracking the fall 2009 cohort for three years (Texas Higher Education Coordinating Board, 2014, p. 13). The data available from these sources indicated that these completion rates were relatively stable over time, and provided an adequate comparison for the purposes of this study.

Chapter Summary

This chapter presented findings that provided evidence that showed that CI students found all of the interventions useful, and that all of the interventions increased student confidence in their ability to earn a college degree. In the few instances where a

student did not find an intervention useful, it was due to the student not using the intervention. In the few instances where students indicated an intervention did not increase their confidence in earning a college degree, those students indicated that their confidence was already high. In addition, the evidence provided by CI staff showed that all staff gave the highest ratings possible to the perception that students find all the CI interventions are useful, and that staff believe all of the interventions are useful to students.

The abundant interview excerpts presented in this chapter from both staff and students provided support to the statistical data in the respondents' own voices, and provided a rich perspective from both providers and beneficiaries of the CI non-academic interventions. Discussion of these findings, and conclusions based on them are included in chapter five.

Chapter Five: Discussion and Conclusions

The purpose of this study was to use the psychosocial perspective of Bandura's social cognitive theory (Bandura, 1986) in order to gain a better understanding of whether or not there is a relationship between attending to the psychosocial needs of students and successful math remediation. As discussed more thoroughly in chapter two, social cognitive theory, supported by related findings from neuroscience, posits that learning and development is a continuous triadic of reciprocal interaction between the individual, the environment, and other people. Bandura further described social cognitive theory as the "nature of persons" and noted five required capabilities that define the psychosocial nature of human beings (Bandura, 1986, pp. 18-21):

The Required Capabilities of Social Cognitive Theory

6. Symbolizing Capability
7. Forethought Capability
8. Vicarious Capability
9. Self Regulatory Capability
10. Self-Reflective Capability

These required capabilities form the fundamental premise of this study, that these capabilities when effectively nurtured and supported are essential factors in academic achievement.

To examine this premise, this study was structured to gain insight into how one successful program that specifically and systematically addressed student psychosocial needs led to sustained and extraordinary success in math remediation in a highly compressed timeframe. This achievement is in contrast to the dismal success rates of math remediation efforts nationally as found in the literature. This study also sought to add to the literature, which is ample with respect to non-academic interventions that show positive correlations with improved academic achievement, but contains little on how and why they work Karp (2011). This study proffers an answer on how and why non-academic interventions work from a social cognitive theory perspective.

Restatement of the Overarching Research Questions

The overarching research questions for this study are:

1. Is the effectiveness of the CI program due to the emphasis on non-academic support mechanisms?
2. Do the non-academic support mechanisms used by the CI program have student psychosocial needs, such as self-efficacy, as a basis for student success?

The specific research questions used to gather the data necessary to respond to the research questions were based on Karp's model, which categorized non-academic interventions found in the literature, but also considered students' perceptions of an

intervention's usefulness a key factor to the intervention's effectiveness. These questions are:

1. Which non-academic interventions are used to support students in remedial math?
2. Why are the interventions used to support students in remedial math?
3. How are the interventions used to support students in remedial math?
4. Do students perceive the non-academic interventions as useful?
5. Is there a difference in remedial math completion between students who participate in a prescribed program of non-academic interventions and those who do not?

Findings and Interpretations for Research Questions 1 - 3

This section uses the same overall reporting structure found in chapter four as a guide to summarize, discuss, and interpret the findings based on the major categorical themes and sub-themes. The structure, adapted from Karp (2011), is restated below and delineated by Roman numerals I, II, and III, with the non-academic interventions identified in the findings from the research questions shown as sub-themes in each category.

I. Clarifying Aspirations and Commitment
    a. Recruitment
    b. Assessment

II. Developing College Know-How and Creating Social Relationships;

a. College Prep Academy

i. Remedial math course

ii. Study skills course

b. Cohorts

c. Case management

III. Making College Life Feasible

a. Financial Support

i. Childcare

ii. Transportation

iii. Emergency bill payment

Each category and sub-category will be discussed in turn.

I. Clarifying aspirations and commitment; the recruitment and assessment interventions. The findings from staff interviews identified the intake interventions of recruitment and assessment as vital to identifying students who were sufficiently motivated to commit to the time and effort of going to college. Staff described this as a self-selection process whereby the student demonstrated sufficient motivation by arriving on time to orientation, providing completed forms as required, demonstrating qualifying criteria as to income and the ability to be certified by oversight bodies (no criminal record), completing the assessment testing process, and in a position to commit

to full time matriculation for at least 12 weeks if remediation was required to meet mandated state testing requirements for college-level proficiency in math, reading, or writing. These processes were deemed highly effective by staff in filtering out students who were not psychologically prepared to change their current environments in order to accommodate being a college student and achieving their goals.

From the interviews, and researcher observations made in the summer remedial math classroom and skills class, it became obvious from students' stories about what motivated them that the students weren't necessarily interested in college (or math) per se, but that they had become sufficiently motivated to reject their current life situation and saw college as a medium in which to change their current environment. Once that decision had been made, all coursework became just an obstacle in their path to overcome.

From a social cognitive theory perspective, the researcher would conclude that students admitted to the CI program have self-vetted during the recruitment intervention for ample indication that all five of Bandura's required capabilities are fully engaged in the student, including the most important one according to Bandura, self-reflective capability. This capability is the metacognitive capacity to be both the agent and object of thoughts and behavior, with the ability to analyze one's thoughts and change them given sufficient motivation (Bandura, 1986, pp. 21, 354). The students who persisted

through the recruitment and assessment processes had considered their thoughts and behaviors, and demonstrated a motivation to change them.

The second intervention in the recruitment process was assessment. The student was motivated to change, but to what? The assessment intervention used a brief battery of tests to determine whether a remedial intervention was needed in math, reading, and writing, and assessed psychological traits and logic skills. These assessments were then used to devise an educational plan and career path for the student that aligned well with the results of their personality traits and logic skills. Some students already had a clear career goal in mind, some thought they did, but others had only a vague notion of what the possibilities were. The educational plan developed for each student provided a goal and a clear pathway to achieve that goal.

Social cognitive theory asserts that goal setting, and the plan to achieve the goal, play into the second of Bandura's five capabilities; forethought capability. Bandura classified forethought as an element of intentions and goals, which in turn give reason to sustain behavior toward anticipated outcomes over time without immediate external inducements, and to avoid negative behaviors inconsistent with goal achievement (Bandura, 1986, p. 467). In addition to a clear goal anchoring forethought capability, the goal also symbolized the life change the student sought in the first place, and provided focus for social cognitive theory's first element in the nature of humans: symbolizing capacity. Together, the capabilities of forethought and symbolizing support the crucial

capability of self-regulation, without which any benefit from establishing the previous capabilities is lost. Unlike other theorists of the day, Bandura believed that the ability to self-regulate went much deeper into the self than simple reward and punishment, resulting in a psychosocial enabling of a new environment for the self and others (Bandura, 1986, pp. 336-337). Taken holistically, social cognitive theory indicates that directing these three mutually supportive capabilities towards a clear goal that symbolizes the life change the students desired, and that enhances self-regulation, actually does give rise to a new environment for the student and those around them. As one student in this study who sought a better life for her young children put it: "There are times when I just burst out crying saying I'm doing this! I'm in college!"

II. Developing college know-how and creating social relationships; the college prep academy, cohorts, and case management interventions. The findings for this section gave ample support to the effectiveness of building on social cognitive theory's five capabilities that were identified and nurtured in the recruitment and assessment interventions. The College Prep Academy provided a venue where the interventions of remedial math, cohorts, and case management, were conducted simultaneously in a mutually reinforcing way that closely resembled social cognitive theory's triadic system of interaction between the person, the environment, and other people. The person (student) was placed in an environment (college classroom), along with other people (teacher, fellow students, case manager), which appeared to be a

traditional classroom setting found in most any educational institution. There were some differences however.

The students would spend up to six and one half hours per day, five days per week, for 12 weeks, together in this environment. During the 12 weeks, the interventions of remedial math (and reading/writing), study skills, cohorts, and case management were applied in a nearly boot camp fashion. The intensity of the Prep Academy, like boot camp, broke down old behavioral patterns and installed new ones that built college-going habits. The cohort of 20 students, mostly strangers to each other before joining the program, forged strong social bonds with each other, the teacher, and the case manager, that reinforced students' resolve to achieve their goals. The students' perceptions of the Prep Academy interventions are presented at length in chapter four, and illustrate the effectiveness of these interventions for the students. All 20 students completed the 12-week Prep Academy together.

Social cognitive theorists would not be surprised by the effectiveness of these interventions, particularly in terms of one of the five capabilities that has not been discussed yet; vicarious capability. Bandura suggested that the majority of learning occurs through observation, which is far more efficient than direct hands on experience because it permits the learner to focus on the topic more conceptually while observing others doing the work. Bandura referred to this as modeling, which enhances learning ability because not only do the students see something being done, they also bring their

symbolic capabilities into play, which connects the learning to the learners' motivations (Bandura, 1986, pp. 20, 47).

The cohort as an intervention deserves special mention here. Vicarious capabilities and modeling were not only applied to learning math, but observation of other students as well. This was profoundly influential and motivated the students to stay the course, as it were. In the interviews, students repeatedly mentioned that hearing the life challenges of other students, and there were many emotion filled stories, caused them to see their own challenges as more surmountable. As some students put it: "I had problems, but not like they did! If they can do it I can too," and "they have two kids and work fulltime, what is my excuse for not getting the homework done?"

The cohort also created a mutually supportive social network for the students, who often would not have had any other to turn to, as their families were not always supportive, or did not understand the sacrifices college demands. If a student missed class, their social media lit up from the other students inquiring about them, offering class notes, or providing the day's assignment. The cohort created a strong sense of responsibility to each other, and a network of vicarious satisfaction in seeing others persist in the course.

The cohort model, more than any other intervention, exemplified the tenets of social cognitive theory at work, with Bandura's five capabilities leveraged and nurtured in the student to the fullest. Over the 12-week period, the cohort developed from a

collection of strangers into a tight-knit social group bound together in a common cause. The camaraderie engendered by the cohort model was pervasive, and allowed the students to be in a psychologically safe place every day where they could share their hopes and fears with each other, the teacher, and the case manager. They also helped each other with the math. In such an environment, learning math was no longer symbolic of the grim reaper standing in the way of changing their lives for the better. The Prep experience had instilled the confidence that hard work and self-regulation would surely overcome that obstacle.

The case management intervention was the students' lifeline to navigating the often daunting processes associated with college going. CI calls its case managers Navigators for this reason. The Sr. Navigator served as the liaison between the students and the college during the Prep Academy, and then after the Prep Academy the student is assigned a different Navigator that specializes in the student's chosen career path. The Navigator system ensures that the student has a specific individual to go to throughout their college career that knows all the college ropes, and can alert the student to upcoming deadlines, fees, entrance exams, and the myriad of other things college may require along the way.

From the social cognitive theory perspective, college knowledge is not the only thing the Navigator provides for the students. They also facilitate the reciprocal triadic process that has been carefully cultivated by CI, as well as stepping in as needed when

the Navigator detects the student's five capabilities might need reinforcement, such as lapses in self-regulation and forethought. This may put the Navigator in the role of counselor, enforcer, mom, or simply a shoulder to cry on, for both educational and personal issues.

The staff comments in chapter four give an excellent account of the role the Navigators play in their own words, and provide great insight into the world of CI students; a world that many faculty and staff in higher education may not appreciate to the depth they should to be more effective, and affective.

III. Making college life feasible; the financial support intervention. In addition to its other interventions, the CI program understands that for low-income students the financial margin may be thin, and the student may have little available help from his or her own resources. The high cost of childcare that might enable a student to attend college may be out of the question, and a car breaking down may cause a student that is already enrolled in college to miss enough classes to ruin a semester. The CI program strives to take these issues out of play for the student by providing childcare vouchers for local providers, and emergency cash for unexpected expenses. The staff interviews for this intervention presented in chapter four indicate that CI firmly expects the student to allow for the unexpected from their own resources, but when that is not enough, they step in to help rather than lose the investment they have made in the student's education.

A social cognitive perspective might classify this last intervention as a preventative measure that frees the student to engage in any or all of the five capabilities of persons without undue angst caused by concern for the welfare of their children, or constant exposure to sudden emergencies common to low-income students. As noted by both Bandura and neuroscience, anxiety draws brain resources away from the pre-frontal cortex that orchestrates the five capabilities and learning, and directs it to the more primitive fight or flight mechanisms. Sufficient anxiety will literally short circuit any attempts at teaching and learning. Interventions that create a safe environment are therefore essential to academic achievement.

Findings and Interpretations for Research Questions 4 – 5

Research questions four and five attempted to gauge student perceptions of the usefulness to them of the non-academic interventions. The findings were presented in chapter four, and indicated that the students interviewed did perceive all of the interventions as useful, with "5 " being Very Useful ($M = 4.67$, $Mdn = 4.83$, $SD = 0.285$, $SE = 0.1$). Only two students rated any intervention as not useful to them because they did not use the service, as opposed to using the service and not finding it useful.

Conclusions

Overall research question 1. Is the effectiveness of the CI program due to the emphasis on non-academic support mechanisms? Participants in the CI program achieve success in remedial math at a greater rate than students who are not participants

in the CI program, where success is defined as passing a state prescribed assessment of college readiness in math with a score sufficient to enroll in a college level math course. The findings presented in chapter four showed that a significant difference was found between CI and state community college success rates based on TSI math completers (Capital IDEA average = 84%, Texas community college average = 39%).

Possible alternative explanations might be the selectivity of the CI recruitment process resulting in students with exceptional math proclivity. The argument against this possibility is that the selection process only screens for motivation (a psychosocial factor) to persist in a college workforce program, and does not screen for math ability beyond whether the student requires remediation or not. In addition, CI has limited financial resources, and would not place students with higher math abilities that could pass the TSI exam in a remedial math class due to the additional program costs involved, and the added time to complete a degree for the student, which also presents added program costs.

Another alternative explanation might be that the compressed time frame of the College Prep academy is inherently more effective than the typical model used by community colleges, which would expand the material from the 12-week Prep Academy into at least two semesters, or 32 weeks. Lengthening the course into two (or more) semesters also provides an opportunity for the student to not enroll for the second semester, which as Bailey et al. (2009) found, and discussed more fully in chapter two,

lowers success rates even more than students failing to pass the course. This argument could have some merit as a partial explanation, which is why CI itself uses the compressed time frame as part of its math intervention. However, the interview data from students gave the pace mixed reviews, and dwelt more on the psychosocial aspects such as the teacher caring that they learned, and that the students helped and encouraged each other to learn the material. Given the student interview responses, no evidence was found to support alternative explanations for the large differences between CI and state results on the TSI.

Overall research question 2. Do the non-academic support mechanisms used by the CI program have student psychosocial needs, such as self-efficacy, as a basis for student success? Yes. The non-academic interventions used by CI are inherently designed to support student psychosocial needs, while the cognitive oriented elements of the student's educational plan (college courses) are left to the community college to provide. Therefore CI does not offer services that are not aimed at student psychosocial needs. This conclusion is supported by data from student interviews, which are replete with qualitative evidence that leaves little doubt that the students attribute their success to the interventions provided by CI. As one student put it "I got my education from [the community college], but it was CI that made me believe I could do it." Another student summed up her experience with "CI changed my life." Such comments are not atypical, and affirm the psychosocial nature of the CI interventions.

Limitations of the Study

The study had several limitations. The sample size in the study was small thus rendering statistical testing irrelevant. The researcher disclosed favorable bias toward the CI organization in chapter three, along with preconceived ideas about what the results might show based on previous experience with CI. To guard against researcher bias, extensive interviews were conducted with staff and students and reproduced in chapter four. The researcher also participated as an observer, during the first week of the Prep Academy math course, and on several additional days during the 12-week term in an attempt to sample the experience of the class as the students did.

To hedge against reflexivity bias, the researcher was introduced to the students as a UT Austin doctoral student during class observations, rather than as an employee of the local community college the students were enrolled in. This was also done at the suggestion of CI staff to minimize the potential for introducing any more distractions for the students than necessary. The students and teacher incorporated the researcher into class activities immediately, although the researcher was not summoned to the board to work a math problem at the researcher's request (!). Some minor reflexivity bias was suspected by the researcher during certain of the student interviews, but was not judged to result in responses different from what the student would have otherwise provided. To guard against reflexivity, the interview questions elicited verbal responses on the interventions, with the ratings placed at the end of each intervention question. The verbal

responses were typically personal anecdotes, and were consistent with the ratings in all instances, high and low.

The sample of students interviewed was limited to ten for practical reasons related to the limitations on the time frame of the researcher to perform the study. The sample of students interviewed was not randomized, although the researcher asked CI staff to choose a sample believed to be representative of typical students from among the 20 students in the summer 2014 cohort. Despite these and probably other limitations, the responses from the interviews seemed sufficiently candid and objective to support the research conclusions, and make alternative explanations implausible to the researcher.

Recommendations and Implications for Future Research

The findings of this study suggest that community college leaders and policymakers stop viewing remedial math education as simply another cognitive exercise in math instruction. It isn't. This view has resulted in an educational debacle that is well documented in the literature and the popular press, and has resulted in a politicized national debate rightly questioning the basic educational competency of these colleges and their societal role in the continuum of postsecondary education. As one community college administrator commenting on remedial math results put it, "a multi-billion dollar process producing this level of failure in any other business in the world would be shut down immediately" (personal communication, 2014). Worse, organizations like CI demonstrate year-in and year-out how to correctly think about

remedial math instruction, and they do it right under the community college's nose, even using the college's own teachers, facilities and curriculums. What's different is CI, and many organizations like it, correctly view remedial math success (and academic success in general) as a psychosocial byproduct, and address it as such. Therefore, the straightforward recommendation from this study is for community colleges to do likewise using the model under their noses, as is. Or, even wiser, engage organizations like CI to do it for them.

The implications for future research are evident. Community college students in particular should be a prime area for future research. Rigorous studies of educational issues at these colleges should be encouraged, and conducted from a social psychology perspective in order to focus on the underlying societal issues that seem to be involved in the lack of academic success. Technological innovations, such as the math emporium model discussed in chapter two, have shown great promise in improving remedial math success, particularly for minorities, but the research found was conducted from a programmatic perspective rather than a psychosocial perspective, with little mention on how and why the emporium model was more effective for students. Workforce intermediaries like Capital IDEA are numerous and would be rich sources for longitudinal studies on the long-term effects of non-academic interventions on students lives. And finally, studies examining the effects of programs of instruction based on

individualistic cultures on collectivist cultures might delve even deeper into the efficacy of non-academic interventions and related psychosocial effects.

Importance of the Study

The results of this study add to the literature on non-academic interventions based on Karp's meta-analysis discussed in chapter two of this study. Karp (2011) found much in the literature showing positive correlations between programs using non-academic interventions and improved academic achievement, but found little about intervention processes or student perceptions about the interventions' efficacy. Karp noted that research in this area would be an important theoretical step forward.

Taking heed of Karp's analysis of areas "ripe" (Karp, 2011, p. 22) for further research, the present study focused on one recognized program specializing in non-academic interventions, which resulted in ample findings on non-academic processes and mechanisms, how and why they work, and student perceptions of the efficacy of these processes. The study also attempted to relate the findings to social cognitive theory and related neuroscientific substrates based on the researchers judgment. While Karp and others might rightly question the rigor and methodology behind these latter associations, the attempt was made based on the researcher's observations in hopes of spurring further research linking remedial math success with Bandura's social cognitive theory on how students develop and learn.

Significance of the Study

The findings of this study can have important benefits for students by showing that proactive attention by college educators to affective barriers that stem from student psychosocial needs are an essential element in improving remedial math success. Due to the pervasiveness and similarity of the remedial math problem across the nation, significant improvements in remedial math success could translate into increased postsecondary educational attainment and broadened career options for many more students, which could result in more of the societal benefits that stem from an educated populace, and a stronger middle class.

Summary

This single case study explored the relationship between non-academic interventions supporting student psychosocial factors and remedial math success. The theoretical framework proposed that remedial math success was linked to psychosocial factors as described by Bandura's social cognitive theory rather than merely cognitive factors. The literature review revealed that remedial math success in the community colleges was chronically problematic, that psychosocial factors were fundamental to human development and learning, and well supported by neuroscience, and that academic success has long been positively correlated with programs of non-academic interventions. According to this study's findings, non-academic interventions provided psychosocial support almost exclusively, which resulted in extraordinary success in

remedial math completion. The conclusion drawn from the findings is that effective psychosocial support is essential to achieving exceptional remedial math success rates. It is not a math problem.

Chapter five concludes this study. Recommendations propose that community college leaders and policymakers adopt the model used by the unit of study of this research rather than perpetually tinkering with curriculum and delivery and calling it progress, or wiser yet, outsource the job to organizations like CI who already understand the issues and are adept at addressing them.

Appendix A – Interview Questions

			STUDENT INTERVIEW
			Interviewee: **Date:** **Location:** **Career Goal:**
Q#	**RQ#**	**NAI#**	**Question**
1	4	2	What brought you to Capital IDEA?
1	3	1	How did you hear about CI?
1	2	2	What about CI seemed most interesting to you?
1	4	3	What kinds of things does Capital IDEA do that you find useful to you?
1	3	2	How did you decide to become part of the Capital IDEA program?
1	4	2	Has this program affected your perception of your ability to be successful in college level math? In what way? Not useful 1 2 3 4 5 Very Useful
Q#	**RQ#**	**NAI#**	**Question**
2	2	2	Did you go through an assessment and testing program when you first became involved with the Capital IDEA program?
2	2	2	What types of assessments and testing did you go through?
2	3	2	How did they provide these assessments to you (tests, career guidance, budgeting expenses, etc.)?
2	4	2	What did you learn from the assessments?
2	4	2	Were you surprised at any of the results?
2	4	2	Did the assessments help you focus on a career goal?
2	4	2	Did the assessments help with committing to getting a college degree?
2	4	2	Did you find them useful to you? Not useful 1 2 3 4 5 Very Useful
2	4	2	Has this service affected your perception of your ability to earn a college degree? In what way? Not useful 1 2 3 4 5 Very Useful
Q#	**RQ#**	**NAI#**	**Question**
3	4	3	How did you like the College Prep Academy (remedial math course)?
3	4	3	What did you like most about the Academy?
3	4	3	What did you like least about the Academy?
3	4	3	Was learning the math tough?
3	4	3	The Prep Academy was time intensive, how did you feel about the way it was offered?
3	4	3	What are your thoughts about the tutoring sessions, and were they helpful to you? Not useful 1 2 3 4 5 Very Useful

3	4	3	How would you rate your confidence in taking your future math courses? Not useful 1 2 3 4 5 Very Useful
3	4	3	Has this service affected your perception of your ability to earn a college degree? In what way? Not useful 1 2 3 4 5 Very Useful
Q#	**RQ#**	**NAI#**	**Question**
4	4	1	How did you like going through the course as a group?
4	4	1	What did you like most about the group experience?
4	4	1	What did you like least about the group experience?
4	4	1	Was it helpful to go through the course as a group? Not useful 1 2 3 4 5 Very Useful
4	4	1	Has being in a group affected your perception of your ability to earn a college degree? In what way? Not useful 1 2 3 4 5 Very Useful
Q#	**RQ#**	**NAI#**	**Question**
5	3	3	Tell me about the college skills sessions you attended, what did they cover?
5	3	3	What did you learn from them?
5	4	3	Did you find these sessions useful? Not useful 1 2 3 4 5 Very Useful
5	4	3	Which ones did you find the most useful to you?
5	4	3	How did these skills make you feel about your ability to navigate college?
5	4	3	Has this service affected your perception of your ability to earn a college degree? In what way? Not useful 1 2 3 4 5 Very Useful
Q#	**RQ#**	**NAI#**	**Question**
6	1	4	Capital IDEA sometimes helps students with things like childcare, emergency loans, transportation, etc. Were you able to use any of these services?
6	1	4	Which services, if any, were used?
6	3	4	How did the services, if used, help you with going to college?
6	4	4	Did you find the services used helpful, and in what way? Not useful 1 2 3 4 5 Very Useful
6	4	4	Were there other things that Capital IDEA offered that helped you with going to college?
6	4	4	Has this service affected your perception of your ability to earn a college degree? In what way? Not useful 1 2 3 4 5 Very Useful

Q#	RQ#	NAI#	Question
7	1	3	Has Capital IDEA provide you with someone to assist you in managing and navigating your career path through college (a case manager)?
7	3	3	In what ways has that person assisted you?
7	3	3	How did they assist you?
7	3	3	How often have you met with that person?
7	4	3	Have you found these services to be useful to you? Not useful 1 2 3 4 5 Very Useful
7	4	3	Has this service affected your perception of your ability to earn a college degree? In what way? Not useful 1 2 3 4 5 Very Useful
			(Capital IDEA may suggest two or three additional questions similar to the above questions)

# Date:			**STAFF INTERVIEW**
			How long have you been with Capital IDEA?
			What is your title in the organization?
			Please describe your role in the organization.
Q #	**RQ#**	**NAI #**	**Question**
1	1	N/A	Which non-academic interventions are used to support students in remedial math? Assessments Cohorts College Prep Academy Case Management Support Services (childcare, emergency loans, transportation, etc.) Other
2	2	N/A	Why are the interventions used to support students in remedial math? Assessments Cohorts College Prep Academy Case Management Support Services (childcare, emergency loans, transportation, etc.) Other
3	3	N/A	How are the interventions used to support students in remedial math? Assessments Cohorts College Prep Academy Case Management Support Services (childcare, emergency loans, transportation, etc.) Other

4	4	N/A	Do students perceive the non-academic interventions as useful? Not useful 1 2 3 4 5 Very Useful
5	5	N/A	Do faculty/staff perceive the non-academic interventions as useful? Not useful 1 2 3 4 5 Very Useful

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