

Running head: TRACKING IN CAREER TECHNICAL EDUCATION

TRACKING IN CAREER TECHNICAL EDUCATION
IDENTITY OF CTE AND ITS EFFECTS ON ENROLLMENT PATTERNS OF HIGHER
ACHIEVING STUDENTS

By
Michael Sciacca

A dissertation submitted to Johns Hopkins University in conformity with the
requirements for the degree of Doctor of Education

Baltimore, Maryland

July 2017

© 2017 Michael A. Sciacca
All Rights Reserved

TRACKING IN CAREER TECHNICAL EDUCATION

Abstract

This study examines the salient factors contributing to the course selection trends of higher achieving students in career technical education (CTE) classes. While a lack of empirical evidence exists directly addressing the value of CTE classes for higher achieving students, multiple studies examining tracking, future earnings, standardized test score, grade point averages and cognitive theory suggest benefits for higher achieving students in CTE classes. In ABC school district, the perceived value of career technical education classes varies significantly between higher achieving and lower achieving student populations. Additionally, the identity of these classes from the perspective of teachers, parents, guidance counselors and peers has considerable impact on course recommendation for low, middle and high achieving students. An intervention was conducted, which redesigned CTE courses at a pilot high school to fit the IB framework and rebrand the classes in order to attract more high achieving students into the CTE pathways. The findings of the study suggest redesigning and rebranding CTE pathways to create a more rigorous perception of the classes has a positive effect on higher achieving student enrollment into the classes. The results of the study include increased enrollment of higher achieving students, decreased attrition rates of higher achieving students and no significant changes in the enrollment or attrition rates of middle and lower achieving students into CTE pathways.

Keywords: career technical education, CTE, IB, college admission, high achieving students, ability tracking

Table of Contents

Chapter 1 Problem of Practice

Executive Summary	1
Introduction of the Problem Practice	4
Theoretical Framework	4
Statement of the Problem Practice	7
Purpose of Study	7
Review of Literature	8
Needs Assessment Research Questions	20
Discussion	21

Chapter 2 Needs Assessment

Introduction to Needs Assessment	23
Historical Landscape	23
Supporting Documents	24
Goals and objectives	24
Needs Assessment Research Questions	25
Methodology	26
Initial Summary of Results	30
Conclusion	36

Chapter 3 Intervention Literature Review

Intervention Overview	38
Statement of Proposed Intervention	38
Review of Intervention Literature	44
Discussion	54
Conclusion	58

TRACKING IN CAREER TECHNICAL EDUCATION

Chapter 4 Intervention Procedure and Program Evaluation

Methodology	60
Research Questions	67
Summary Matrix	83
Evaluation Approach	85
Data Collection and Analysis	86
Fidelity of Implementation	91
Conclusion	98

Chapter 5 Findings and Discussion

Process of Implementation	101
Findings and Conclusions	103
Discussion	122
Implications for Future Research	125
Implications of Policy and Practice	126
Limitations	128
Conclusion	131

References

References	132
------------	-----

Appendix

Appendix A	142
Appendix B	144
Appendix C	148
Appendix D	152
Appendix E	155
Appendix F	159

TRACKING IN CAREER TECHNICAL EDUCATION

Appendix G	161
List of Tables	
Table 1	26
Table 2	28
Table 3	30
Table 4	31
Table 5	31
Table 6	33
Table 7	35
Table 8	35
Table 9	73
Table 10	83
Table 11	104
Table 12	105
Table 13	106
Table 14	106
Table 15	108
Table 16	109
Table 17	114
Table 18	119
Table 19	120
Table 20	121
Table 21	122
List of Figures	
Figure 1	76

Figure 2

98

TRACKING IN CAREER TECHNICAL EDUCATION

Executive Summary

Tracking is currently taking place in secondary school systems across the country that separates college bound students from career technical education students in the majority of classes, creating significant disadvantages for both groups. Situated learning theory suggests that steering higher achieving students away from CTE classes is disadvantageous because it deprives them of exposure to situated cognition that takes place frequently in CTE classes. CTE education also reinforces leadership, management and practical daily living skills that are preferred by employers ranging across the spectrum of industry sectors.

This study examines the salient factors contributing to the course selection trends of higher achieving students in CTE classes. In ABC school district, the perceived value of career technical education classes varies significantly between higher achieving and lower achieving student populations. Additionally, the identity of these classes from the perspective of teachers, parents, guidance counselors and peers has considerable impact on course recommendation for low, middle and high achieving students. The purpose of this review is to identify the magnitude of both positive and negative effects of career technical education classes for higher achieving students as it relates to academic achievement, college admissions and future earnings.

An initial needs assessment was conducted which explored the reasons tracking exists in career technical education classes within ABC school district. The effects of tracking high achieving students away from CTE classes were examined through the lenses of the historical development of CTE and the drivers which influence student course selection, including counselor, teacher and student perceptions of CTE were identified. The results of the needs assessment indicated a belief among students, parents, teachers and guidance counselors that CTE classes could have a negative effect on higher achieving students. This perception stemmed

TRACKING IN CAREER TECHNICAL EDUCATION

from a variety of factors including the pre existing stigma of vocational education, lower levels of rigor with CTE classes, and the belief that CTE class enrollment would have a negative impact of admissions into highly selective colleges and universities.

In response to these negative perceptions, an intervention was created which redesigned and rebranded a pilot CTE pathway in order to attract more high achieving students into the pathway and to better serve the academic needs of middle and lower achieving students. Redesigning CTE classes to meet the International Baccalaureate (IB) criteria gave the CTE pathway the academic prestige desired by higher achieving students by offering a weighted grade bump, appealing favorably to college admission offices, and validating the rigor of the CTE pathway. Redesigning the courses to meet the IB standards will also provide multiple benefits for middle and lower achieving students including (a) increased academic rigor (b) increased exposure to the habits and thinking of higher achieving students who they have been previously tracked away from (c) giving middle and lower achieving students exposure to an IB class will increase the likelihood of them enrolling in additional IB classes during high school.

The redesigning and rebranding of the business classes in the treatment CTE pathway resulted in a significant increase in the number of higher achieving students enrolling in the business courses, supporting the assumption that the perceptions of low rigor, low relevance, and adverse effects of college admissions were dominate factors in student course selection for higher achieving students. The findings indicate that these perceptions were the primary barriers to attaching higher achieving students into these classes. The concerns of lower rigor in CTE classes have become a self-fulfilling prophecy, resulting in a system that tracks students based on ability into higher or lower rigor programs. However, this study has shown that effective

TRACKING IN CAREER TECHNICAL EDUCATION

rebranding of high interest CTE pathways can attract higher achieving students. The presence of these higher achieving students can increase the overall rigor of the pathway, creating benefits for high, middle and lower achieving students. This study identified the lack of rigor, lack of relevance and negative effects on college admissions as the primary deterrents of CTE enrollment. However, as evidenced in this study, approaches exist that can mitigate these concerns and provide meaningful, rigorous and beneficial CTE pathways for high, middle and lower achieving students.

TRACKING IN CAREER TECHNICAL EDUCATION

Chapter 1

Problem of Practice

Career technical education (CTE) classes are courses in which curriculum is focused on skills designed to prepare students for specific career fields. Historically, high school CTE classes have been designed to create value for lower achieving students who lack the academic skills to succeed in college. CTE programs were used to separate higher achieving and lower achieving students into ability tracks early in high school in order to prepare students for their likely career options (Aliaga & Kotamraju, 2014; Castellano, 2012; Gamoran, 1992). This separation of students resulted in both positive and negative outcomes for each ability level. The impact of this separation can be organized into two categories. They are the effects on curriculum and the differences in learning environment. The distinctions between tracks are reflected in the focus on theory-based curricula within the college bound track as opposed to a focus on practical labor applications within the vocational track (Gamoran, 1992; Holm, Jæger, Karlson & Reimer, 2013). The learning environment influences the prominent cognitive strategies and likely classroom experiences of students in each track. The effects of ability tracking on student learning and the prominence of situated cognition provide a framework in which to examine CTE class benefits and drawbacks for high and low achieving students.

Theoretical Framework

Educational Equity

Educational equity is a measurement of fairness and inclusion between both individual students and student groups. Fairness addresses the degree to which factors such as gender, race and socioeconomic status influence the achievement of academic potential, while inclusion creates a baseline of minimum skill acquisition (Organization for Economic Co-operation and

TRACKING IN CAREER TECHNICAL EDUCATION

Development, 2012). A large body of research exists addressing the educational inequity of minority students, students from low socio-economic households and students with disabilities (Coleman, 1965; Gamoran, 2001; Wigan, 2007). The conversation surrounding educational inequity generally focuses on the advantages that high achieving students from affluent, ethnic majority backgrounds have over lower achieving students from less affluent, minority backgrounds (Lewis, 2007). Little research exists that addresses the potential educational disadvantages experienced by higher achieving students as a result of longstanding efforts to serve less advantaged students. The research that does exist suggests that the emphasis on minimum proficiency standards set by No Child Left Behind (2001) has created a focus on the performance of lower achieving students. This concentration on bringing lower performing students up to a minimum proficiency standard has created significant disadvantages for higher achieving students with regards to educational equity in the school system (Loertscher, 2010). One such disadvantage is the systematic tracking of higher achieving students away from CTE classes. Tracking higher achieving students away from CTE classes creates a skill deficit for these students in the areas of soft skill development, practical experience and knowledge application (Castellano, 2012; Ernest, 2012; Shuayto, 2013).

The separation of students into groups based on academic ability or tracking is currently a common structure of school districts across the United States (Gamoran, 1992; Holm, et. al. 2013). Tracking exists when there is an association between the level of academic rigor of at least two courses a student takes or an association between the level of academic rigor of two consecutive classes in a specific subject area (Lucas, 2002). Ability tracking was formalized in the early 1900s and inserted into the school system in large part due to the work of Charles Prosser who argued that separate ability tracks are beneficial for lower achieving students

TRACKING IN CAREER TECHNICAL EDUCATION

because they provide relevant skill training and better preparation for students facing “blue-collar” employment (Prosser, 1925). Initially, tracking was organized into three distinct student groups: college-prep, general education and vocational education. The rationale of ability tracking was to provide school relevance for students of migrant workers in order to better prepare them for vocational work while maintaining a high level of academic rigor for college bound students. This model was accepted by higher achieving households who believed integrating lower achieving students into academic classes would hold back the achievement of high ability students (Rosenbaum, 1976).

Over the last century, the educational and economic landscape has changed significantly while the tracking system has been largely preserved, creating valuable context in which to examine its effects. Today, college-bound high school students are separated into advanced placement, International Baccalaureate (IB) and honors classes while non college-bound students are steered into general education classes or vocational education classes now referred to as career technical education classes. This results in disproportionately low numbers of high achieving students enrolling in CTE courses (Gamoran, 1992).

Cognitive Theory

Embedded within the California curriculum standards of CTE classes are high levels of experiential learning rooted in situated cognition theory. The constructionist view of situated cognition posits that knowing and doing are inseparable and learning is an active, contextualized process that creates meaning through the interaction between experience and ideas (Brown, 1989). Learning occurs when previous knowledge is used as the foundation to create new knowledge and students are able to take a given piece of information and create meaningful context in which to interpret and apply that information to their own realities (Ernest, 2010).

TRACKING IN CAREER TECHNICAL EDUCATION

According to Bedner, Cunningham, Duffy and Perry (1991) knowledge emerges in contexts in which it is relevant. Natural context of relevance is built into the curriculum of CTE classes, which allows students to more easily make connections between theoretical concepts and the physical world (Castellano, 2012).

Statement of Problem

In a large school district in southern California, tracking is currently taking place that separates college bound students from career technical education students in the majority of classes, creating significant disadvantages for both groups. Multiple research studies document the disadvantages of tracking for lower achieving students (Gamoran 1992; Holm et. al. 2013). However, insufficient research addresses the effects of tracking on higher achieving students. Situated learning theory suggests that steering higher achieving students away from CTE classes is disadvantageous because it deprives them of exposure to situated cognition that takes place frequently in CTE classes (Seel, 2001; Taylor, 2004). CTE education also reinforces leadership, management and practical daily living skills that are preferred by employers across the fifteen industry sectors (Mangan, 2012). This training dichotomy also creates a deficit of diverse perspectives for both groups and handicaps the richness and balanced discussions in core classes.

Purpose of Study

This study examines the salient factors contributing to the course selection trends of higher achieving students in CTE classes. While a lack of empirical evidence exists directly addressing the value of CTE classes for higher achieving students (Bosick, 2012), multiple studies examining tracking, future earnings, standardized test score, grade point averages and cognitive theory suggest benefits for higher achieving students in CTE classes (Burke & Moore,

TRACKING IN CAREER TECHNICAL EDUCATION

2009; Holm et. al. 2013; Mare, 2006; Meer, 2007; Seel, 2001; Taylor, 2004). In ABC school district, the perceived value of career technical education classes varies significantly between higher achieving and lower achieving student populations. Additionally, the identity of these classes from the perspective of teachers, parents, guidance counselors and peers has considerable impact on course recommendation for low, middle and high achieving students. The purpose of this review is to identify the magnitude of both positive and negative effects of career technical education classes for higher achieving students as it relates to academic achievement, college admissions and future earnings. Relevant literature is also reviewed to identify which factors are the largest contributors to discrepancies in enrollment percentages between higher achieving students and lower achieving students in CTE classes.

Review of Literature

High Achieving Students

Although there is not a singular definition of “high achieving” students, common characteristics include high performance in an intellectual, creative, or artistic area; an unusual capacity for leadership; excellence in one or more academic fields; high levels of motivation; and easy acclimation to classroom procedures (Holliday, 1996; Power, 1986). These students are often found in heterogeneous honors, AP and IB classes at the high school level in order to accelerate their learning. Generally, higher achieving students place a high value on grade point average, standardized test scores and college admissions (Kerr, 1986). The most commonly declared majors for higher achieving students entering college are engineering and health sciences (Kerr & Colengo, 1988; Kerr & Solado, 2003).

For the purpose of this study, high achieving student is defined as students with a cumulative grade point average ≥ 3.5 , enrolled in or successfully completed at least 1 advanced

TRACKING IN CAREER TECHNICAL EDUCATION

level class (such as honors, AP and IB) and is currently on track to meet the college admission requirements for one of the premier area public college systems.

Reform efforts over the last two decades, since the introduction of No Child Left Behind (NCLB), have focused on closing the achievement gap between higher achieving and lower achieving students (Goodkin, 2005). NCLB sets minimum proficiency standards for all students and measures success by the percentage of students who perform at grade level expectations. This has resulted in a disproportionately high level of resources directed towards improving the achievement of lower achieving students who do not meet proficiency standards and a disproportionately low level of resources allocated to advancing the education of higher achieving students (Loveless, 2008). Critics of this approach argue that this focuses resources on ensuring lower achieving students meet minimum proficiency standards and deprioritizes advanced students choosing a CTE track, college bound track or blended track course pathway (Goodkin, 2005).

Consequently, higher achieving students are often stereotyped by school faculty and steered into upper level classes regardless of their academic or aspirational career goals. This one dimensional view of appropriate scheduling for higher achieving students often results in large numbers in AP and IB classes scheduled in a variety of subject areas. Kerr (1986) studied the effects of such scheduling on students long term academic performance and found that high achieving students are more likely to experience academic burnout in high school due to the “one size fits all” approach to course scheduling. The increase in likelihood of academic burnout indicates value in an individualized approach to student scheduling that considers the connections between academics and long-term career goals for higher achieving students.

TRACKING IN CAREER TECHNICAL EDUCATION

While the majority of higher achieving students focus on studies related to math and science, college majors and career selection are often complicated due to the concept of multipotentiality (Kerr & Solado, 2003). Multipotentiality is defined as the ability to select and develop any of a number of diverse career options (Frederickson & Rothney, 1972). Higher achieving students generally have high ability levels in multiple subject areas, allowing them to excel in most intellectual endeavors. Average achieving students, on the other hand, have more limited options and make career and college major decisions based on their strengths (Kerr & Solado, 2003). Seminal research by Hollingworth (1926) indicates that multipotentiality causes significant barriers in the decision making process of career selection for higher achieving students. Higher achieving students must rely on criteria other than specific intellectual strengths to guide them through the career decision process. Research conducted by Kerr and Solado (2003) suggests that exposure to specialized career technical education classes can help higher achieving students identify career interests and make better-informed decisions regarding careers and college majors by allowing them to more easily identify areas of interest.

Identity of CTE

The debate over the value of vocational education dates back to the early 1900s at the inception of the integration of career preparation classes into public schools. At the time, opponents of vocational education, led by educational reformer John Dewey, argued that school should be purely academic and play no role in preparing students for work (Gray, 2004). Despite opposition, school districts and legislators were convinced of the value of vocational education and it took roots in the United States public education system and is now present in the majority of secondary schools. Currently, vocational education programs serve as a primary driver of

TRACKING IN CAREER TECHNICAL EDUCATION

ability tracking, with the majority of vocational education students coming from economically disadvantaged or racial minority backgrounds (Gamoran, 1992).

Over the last decade, new initiatives have been introduced designed to rebrand vocational education, increase its relevance for higher achieving students, and increase the rigor of classes to provide a higher quality education for lower achieving students (Lewis, 2008). In 2006, the Carl D. Perkins Career and Technical Education Act changed its language from vocational education to career technical education (CTE) in an attempt to shed the identity of vocational education and increase its appeal to college-bound students (PL. 98-524). Identity continues to create barriers for CTE pathway growth and expansion as the debate continues over the value of CTE pathways for various student populations.

The current reform efforts at the forefront of career technical education focus on the merger of CTE pathways and college-bound pathways. Research by Lewis (2008) identifies significant positive impact on both GPA and college success for students completing a three to four year high school career pathway program compared to students in a general education pathway. This finding indicates value in reform efforts focused on the Career Pathway model, which integrates rigorous academic requirements with CTE classes.

A substantial body of research documents the benefits of CTE pathway completion in high schools across the United States compared to the general student population (Castellano, 2012; Fletcher, 2009; Plank, 2008). CTE pathway completion generally consists of high school students completing a three to four-year course sequence in a specific subject area. According to the Carl D. Perkins Vocational and Applied Technology Education Act, pathways must include an introductory class, a concentrator (intermediate) class and a completer (or capstone) class in

TRACKING IN CAREER TECHNICAL EDUCATION

order to meet the state requirements for a CTE pathway (PL. 98-524). Castellano (2012) finds that student test scores, grade point averages and progress towards graduation are higher for CTE pathway participants when compared to the general high school population. Students who take a combination of CTE and academic classes beginning in the 9th grade are more likely to connect with school and are less likely to drop out, indicating a benefit of CTE classes for students placed at risk (Plank, 2008).

Despite proven benefits, a negative stigma is still associated with CTE as vocational education of the previous generation is regarded as inferior training, perpetuating barriers that steer higher achieving students away from CTE pathway completion (Aliaga & Kotamraju, 2014). The benefits of CTE pathway completion, such as increased graduation and attendance rates, appear to have much stronger significance to lower and middle achieving students when compared to higher achieving students. Factors such as regular attendance, graduation and college acceptance are forgone conclusions in minds of higher achieving students. Instead, they are concerned with gaining acceptance into the best colleges and maximizing the potency of their résumé, college essays and GPA (Kerr & Solado, 2003). Although research by Lewis (2008) and Burke and Moore (2009) identifies significant impact on GPA, standardized test scores and college success for students completing a career pathway program, it is difficult to make a clear, generalizable connection between increased high school performance and college success for higher achieving students and CTE class participation. This indicates a strong need to further research the effects of CTE classes on higher achieving students in regards to college acceptance and success.

Cognitive Benefits of CTE Classes

TRACKING IN CAREER TECHNICAL EDUCATION

CTE classes are deliberately designed to incorporate high levels of application-based learning with academic curriculum, which enables deeper learning and a more useful knowledge base for students (Castellano, 2003). The reauthorization of the Carl D. Perkins Career and Technical Education Act of 2006 strengthens the Federal focus on integrating rigorous academics into CTE classes (PL. 98-524). This deliberate combination of theoretical and practical knowledge highlights the belief by the United States Department of Education that situated cognition is a critical component of the learning process. Brown, Collins and Duguid (1989) argue that knowledge is situated in activity, context and culture in which it is used and ignoring the situated nature of cognition defeats the primary goal of education- to provide usable, robust knowledge.

CTE classes are designed to simulate real world experiences, exposing students to a learning environment in which they are able to experiment with the information they have acquired in order to understand how to apply its usefulness. Brown et al. (1989) compares conceptual knowledge to a set of tools, arguing that both knowledge and tools can only be fully understood through use. It is quite possible (and common) to acquire a tool, but be unable to use it (Brown et al, 1989, p. 33). High achieving students may have a large number of tools that have been acquired in theoretically based academic classes, but those tools are of little value if the student is not able to use them. While many academic classes incorporate micro-simulations of applied learning in the form of word problems, classroom activities and projects, these are often presented in an isolated context and lack the depth to gain the knowledge of true practitioners (Brown et. al., 1989). In comparison, the CTE application based approach to learning allows for an in-depth, comprehensive simulation of the usefulness of knowledge that is beneficial for students at all ability levels.

TRACKING IN CAREER TECHNICAL EDUCATION

Classes such as construction technology connect theoretical concepts of geometry to real world context of house construction, which creates strong foundational knowledge and deeper understanding (Ernest, 2010). Recent data published by Loveland High School in Colorado indicates strong academic benefits for higher achieving students in their Geometry in Construction program. From 2006-2008 sophomore students taking Geometry in Construction in lieu of the traditional geometry class outperformed every other geometry cohort in the district, including honors classes, three years in a row on the geometry and measurement section of the CSAP state standardized assessment (Burke & Moore, 2009). This significant performance advantage suggests value in application based CTE classes for higher achieving students.

The concept of optimal conditions for learning aligns closely with the constructivist views of an active learner and emphasizes the value of experiential learning (Steel, 2001). Research suggests that CTE classes, designed to focus on the application of concepts and analysis of information in a contextualized setting, have substantial cognitive benefits for both high and low achieving students (Taylor, 2004). In his study, Taylor (2004) uses observational and survey data from educational constructivism concepts of active engagement, realistic context, and collaborative learning to examine the impact of situated learning theory in lesson design. The study finds statistically significant increases in the pre and post test scores of student learning and also positive evaluation of the lessons by the students. Taylor (2004) concludes that the use of constructivism concepts in lesson planning can produce positive results in students' learning compared to information delivered without context or active engagement. This conclusion supports the notion that career technical education classes can be beneficial to higher achieving students due to their focus on contextualized learning and application of advanced concepts.

TRACKING IN CAREER TECHNICAL EDUCATION

Value of CTE in the Workplace

The effects of CTE classes on higher achieving students in regards to college degree attainment, career selection and future earnings are mitigated by a lack of empirical research, conflicting data among existing studies, and the rapidly changing landscape of CTE in the United States. School administrators and district personnel are often required to make major decisions regarding school CTE programs in the absence of replicated research studies to inform their thinking (Castellano et al., 2003). There is a significant body of research identifying the career benefits of CTE classes for middle and low achieving students over the last decade (Bishop, 2014; Fletcher, 2009; Mare, 2006; Meer, 2007). However, most of the noteworthy studies focusing on CTE do not directly address the effects on higher achieving students. The studies that include the effects of CTE courses on higher achieving students appear to have a stereotypical, outdated view of CTE classes, defining them as “classes to help narrow the earnings gap between bachelor’s degree and non-bachelor’s degree students” (Castellano et al., 2004, p. 240). This perception that CTE classes are designed for non-college bound students remains a primary barrier in the collection of relevant data addressing the effects of CTE classes on higher achieving students.

Fletcher (2009) investigates the relationship between high school curriculum tracks, college degree attainment and job earnings. The study examines educational attainment and income 6 to 8 years after graduation for CTE track, dual track and academic track students. Surprisingly, although students on the CTE track had the lowest level of Bachelor’s degree attainment, they had the highest amount of annual earnings by the end of the study period (Fletcher, 2009). Bishop (2014) also finds that CTE programs have a positive effect on future earnings. The analysis of 12-year longitudinal data indicates that students following a CTE or

TRACKING IN CAREER TECHNICAL EDUCATION

dual track program, completing at least one CTE course each semester in high school, have increased earnings after graduation. Students one year out of high school earned 12% more and students seven years out of high school earned 8% more than their counterparts who did not complete CTE classes. However, there are notable shortcomings regarding the findings of both studies. The finding that CTE students failing to complete a Bachelor's degree achieved higher earnings than students who earned a Bachelor's degree is in direct contrast to widely accepted research indicating clear financial advantages of Bachelor's degrees (Liang, 2008). The earnings in both studies were measured one to eight years after high school graduation which means many of the academic track students will have either just recently entered the work force or will still be in postgraduate school (i.e., master's programs). It is likely that the academic track students will show a steeper increase in earnings as time passes. These two studies exemplify the current gaps in research addressing the benefits of CTE classes for higher achieving students. In order to reconcile these competing theories and suppositions, further research focusing directly on the relationship between CTE course completion and higher achieving students, and the effects of that relationship on GPA, standardized test scores and college admissions is needed.

Meer (2007) uses longitudinal data to examine the earnings of students and finds that vocational track students earn significantly less (approximately 12%) than academic track students. However, using a multinomial logit selection model to account for unobservable differences in vocational education students, the research examines whether the students who chose the vocational track would have earned more if they had selected the academic track. The research concludes that students most suited for vocational work tend to gravitate to the vocational track in education and are better off there. Mare (2006), calculates that vocational education students would earn 3.7% less money if they had selected the academic track and

TRACKING IN CAREER TECHNICAL EDUCATION

academic students would earn 18% less if they selected the vocational track. Mare (2006) concludes that most students gravitate to the tracks in which they will be most successful and the existence of both tracks is beneficial to our society. When compared to Fletcher (2009) and Bishop (2014), these two studies further indicate the conflicting research surrounding the benefits of CTE classes for higher achieving students. Both studies also neglect the new integrated approach model and fail to consider the effects of blending CTE courses into an academic pathway.

Although the research surrounding the benefits of CTE lacks empirical conclusions, employers in the United State have expressed value and merit in the classes. CTE classes often teach skills valuable to employers that are not traditionally available in academic courses. For example, the business world believes that the majority of high school and college graduates are underprepared to work within a team and are unable to apply their theoretical knowledge to unpredictable workplace situations in order to solve problems (Shuayto, 2013). These skills, often referred to as soft skills, are inherent in CTE classes across our country through the regular application of context-based learning (Clark, 2013). Employers in the United States are becoming increasingly vocal regarding the shortcomings of highly paid new employees and have been increasingly advocating for CTE programs at the local, state and national level (Shuayto, 2013).

Soft Skill Development

According to Mangan (2007), corporate managers and executives rank soft skills, professionalism and oral communication among the most important skills for new employees, yet 70% of new employees are deemed deficient in these areas. Leadership and management

TRACKING IN CAREER TECHNICAL EDUCATION

skills are defined as the acquired strengths and abilities individuals demonstrate in order to direct performance, oversee processes, guide initiatives and steer a group of team members towards the achievement of a goal (Mangan, 2007).

Soft skills are the cluster of interpersonal skills such as leadership, social graces and teamwork that enable people to acquire, maintain and advance a career (Lavy & Yadin, 2013). An extensive list of soft skills are required standards in all CTE classes in the state where this research takes place and are explicitly taught in the curriculum. According to Taylor, Castro and Walls, (2004), the use of constructivism concepts, common in CTE classes, can produce positive results in students' learning and accelerate soft skill acquisition compared to information delivered without context or active engagement. This conclusion supports reasoning that CTE classes can be beneficial to higher achieving students due to CTE's focus on contextualized learning and application of advanced soft skill development. A higher level of soft skill acquisition will likely give CTE-exposed students a postgraduate advantage when interviewing and performing in the workplace (Shuayto, 2013). As this deficit is communicated to high school personnel, it has the potential to alter the identity and connotation of CTE classes, thereby creating more value and higher participation in CTE classes of higher achieving students.

Factors Affecting Student Course Selection

Course selection is influenced by a variety of both internal and external school factors that steer students into ability tracks early in their high school careers (Lewis, 2006). The drivers influencing CTE course selection primarily center on the normative identity of career technical education and the perceived consequences of selecting these classes. In order to change the student makeup of CTE classes that have been institutionalized in the American education

TRACKING IN CAREER TECHNICAL EDUCATION

system, both the classes and their identities among guidance counselors, teachers, parents and peers must be reconsidered.

Guidance counselor recommendations are important factors in student course selection, but are often not in line with the college and career aspirations of the individual student. Feller (2003) determines that the discontinuity between students' course of study and their career aspirations is credited to counselors; they are the most important in-school factor. Mounting pressure to prepare every student for college steers the advice of guidance counselors toward classes they believe will increase the likelihood of college admissions rather than curriculum that may be more relevant to students' desired career paths. Highly selective colleges use acceptance formulas that value class rank and GPA as two of the most significant factors (Feller, 2003). With grade inflations from enrollment in weighted AP and IB classes, many high achieving students are deterred from taking CTE classes that would lower their >4.0 GPA because there is no grade inflation despite their interest in CTE subjects (Atwell, 2001). This aversion to CTE classes in order to maintain a higher GPA is a primary driver of the under representation of higher achieving students in CTE programs.

In order to attract higher achieving students to CTE classes, schools must find ways to integrate CTE curriculum into classes that will not detract from their student profile (Atwell, 2001; Espenshade, 2005). In addition, guidance counselors are often unaware of the specifics of CTE classes and still perceive them as vocational education classes with little educational value for college bound students. In ABC School District, many CTE classes have become dumping grounds, in the words of some of the counselors, for students who need to fill holes in their schedules or make up missing credits.

TRACKING IN CAREER TECHNICAL EDUCATION

Teacher recommendation is also a powerful in-school factor influencing student course selection. Teachers often build a relationship with students and their advice tends to carry a lot of weight (Bernhardt, 2014). Unfortunately, the majority of teachers have had very little training regarding CTE pathways as they relate to students' college and career goals (Castellano, Stringfield & Stone, 2003). This lack of understanding perpetuates the current structure for course recommendation, which leads to inconsistencies in course selection guidance and ill-informed decision-making.

Finally, parental influence is shown to have significant weight regarding CTE course selection (Gentry, 2007). Many parents equate CTE classes to the vocational education classes available when they were in high school and are therefore influenced by their perception of what the classes will entail. Parents assign value to the CTE classes based on their expectations of likely careers for their students. Parents of higher achieving students tend to assign little value to CTE classes due to the lack of perceived relevance and steer their children into purely academic classes. Parents of lower achieving students tend to place a higher value on CTE classes because they are able to relate the perceived skill acquisition to future employment opportunities (Degner, 2014).

Needs Assessment Research Questions

- What percent of higher achieving students are completing CTE pathway courses prior to high school graduation in ABC School District?
- What percent of lower, middle and high achieving students are completing CTE pathway courses prior to high school graduation in ABC School District?

TRACKING IN CAREER TECHNICAL EDUCATION

- What are the most salient factors in rank order cited by high achieving students as reasons they do not take CTE classes?
- What is the result of parent, teacher, counselor, SES, and peer influence on CTE course selection patterns?

Discussion

The research in the literature review indicates a strong disconnect between the perceived identity of CTE classes and what is actually taking place in the classroom. CTE programs are still struggling to shed the former stigma of vocational education and therefore are not attracting large numbers of higher achieving students. Although there is a comprehensive foundation of research addressing the effects of CTE courses on lower achieving students, empirical data is scarce regarding the impact of CTE courses on higher achieving students. The research that does exist is mixed and does not agree on the effects of CTE classes on college admissions, academic success and future earnings for higher achieving students. In order to increase the number of higher achieving students enrolling in CTE classes, two obstacles must be addressed. The first is that clear benefits of CTE classes for higher achieving students must be established. Secondly, these benefits must be effectively conveyed to guidance counselors, teachers, parents and students.

Research suggests that attracting higher achieving students into CTE classes will have a mutually beneficial effect on both higher achieving and lower achieving students. Carrell, Fullerton and West (2009) examine the effects of heterogeneous ability group within classrooms and find that performance of both groups of students increased in a mixed ability setting. In addition, higher achieving students tend to come from more affluent households (Coleman, 1966), which bring an increased level of avocation and tangible resources into CTE classrooms

TRACKING IN CAREER TECHNICAL EDUCATION

from higher achieving parents. This increase in support would not exist for lower achieving students in the absence of higher achieving student in CTE classes. This potentially shared interest often goes unrealized in school districts due to the belief that there are only zero-sum outcome solutions and a benefit for lower achieving students would mean a negative outcome for higher achieving students (Read and Shapiro, 2014). The win-win scenario further strengthens the importance of attracting higher achieving students into CTE programs.

Chapter 2

Needs Assessment

This needs assessment explored the reasons tracking exists in career technical education classes within ABC school district. The effects of tracking high achieving students away from CTE classes were examined through the lenses of the historical development of CTE and the drivers which influence student course selection, including counselor, teacher and student perceptions of CTE. Through the use of both qualitative and quantitative data, possible barriers that deter students from CTE classes were explored. Data was captured through the use of both a teacher counselor survey and a student survey in order to determine the current perceptions and barriers of CTE classes in ABC school district.

Historical Landscape

In order to gain a comprehensive understanding of the core concepts affecting the reasons higher achieving students are tracked into non-CTE courses, it was important to explore the origins and evolution of tracking in the United States school system. Tracking was formalized in the early 1900's and inserted into the school system in large part due to the work of Charles Prosser. Prosser (1925) argued that separate ability tracks in the school system are beneficial for lower achieving students because they provide relevant skill training and better prepare these students for blue-collar work. Understanding how the educational and economic landscape has changed over the last century while the tracking system has been largely preserved creates valuable context in which to exam its current structure. The current reform efforts at the forefront of career technical education focus on the merger of CTE pathways and college-bound pathways. Research by Lewis (2008) identifies significant positive impact on both GPA and college success for students completing a 3-4 year career pathway program. This finding indicates value in

TRACKING IN CAREER TECHNICAL EDUCATION

reform efforts focused on the Career Pathway model, which integrates rigorous academic classes and CTE classes. However, despite these identified benefits, the identity of CTE in ABC school district from the perspective of guidance counselors, teachers, parents and students maintains the stigma of vocational education of the previous generation.

Supporting Documents

Two surveys, a counselor/teacher survey and a student survey, were used to collect data designed to measure the perceived value of CTE classes in ABC school district. Using both open ended and closed ended questions; both qualitative and quantitative data was gathered in these surveys to develop a more comprehensive understanding of how the constructs identified in the literature review impact CTE course enrollment patterns. The counselor/ teacher survey focused on the identification of pre-conceived biases that may exist which impact the scheduling advice provided to higher achieving students. The student survey was designed to identify salient factors students believe influence their course enrollment patterns. The appendix of this needs assessment includes:

1. Introduction email to participants.
2. Letter of Informed Consent for counselors and teachers, letter of informed consent for teachers/counselors.
3. Letter of Informed Consent for counselors and teachers, letter of informed consent for students.
4. Teacher/ counselor survey.
5. Student survey.

Goals and Objectives

TRACKING IN CAREER TECHNICAL EDUCATION

Identifying the current ratio of high, middle and low achieving students currently enrolled in CTE classes in ABC school district has created a foundation of information, which validated the need for a detailed needs assessment. Casual observations and small data samples indicate an imbalance in the ratio of high, middle and low achieving students in CTE classes. Upon completion of the needs assessment, comprehensive data was acquired in order to validate the hypothesis that there are currently a significantly higher percentage of lower achieving students in CTE classes when compared to higher achieving students in ABC school district.

After establishing the current ratio of achievement levels in CTE classes, the identification of salient factors affecting the current student makeup of CTE classes was examined. A primary objective of this needs assessment was to distinguish which in-school factors contribute to the course scheduling patterns of CTE classes and the degree to which each factor effects course enrollment. Factors including guidance counselor, teacher and student perceptions of the value of CTE classes were examined in order to identify existing barriers steering higher achieving students away from CTE classes.

Research Questions for Needs Assessment

- What percent of higher achieving students are completing CTE pathway courses prior to high school graduation in ABC School District?
- What percent of lower, middle and high achieving students are completing CTE pathway courses prior to high school graduation in ABC School District?
- What are the most salient factors in rank order cited by high achieving students as reasons they do not take CTE classes?
- What is the result of parent, teacher, counselor, SES, and peer influence on CTE course selection patterns?

TRACKING IN CAREER TECHNICAL EDUCATION

Table 1

Crosswalk of Research Questions and Data Collect Plan

RQ	Value	Type	Target Population	Data Source
(%/#) of students with < 2.5 GPA in CTE classes	District course enrollment data	Quantitative	Student populations at 4 comprehensive high schools	Internal district queries
(%/#) of students with < 3.5 and > 2.5 GPA in CTE classes	District course enrollment data	Quantitative	Student populations at 4 comprehensive high schools	Internal district queries
(%/#) of students with \geq 3.5 GPA in CTE classes	District course enrollment data	Quantitative	Student populations at 4 comprehensive high schools	Internal district queries
Factors identified by \geq 3.5 GPA students as reasons they do not enroll in CTE classes	Student Survey	Qualitative and Quantitative	Student populations at all 4 comprehensive high schools in ABC school district	Student Surveys
Factor identified by counselors and teachers as reasons they may not recommend CTE classes to \geq 3.5 GPA students.	Teacher/Counselor Survey	Qualitative and Quantitative	Counselors and teacher populations at all 4 comprehensive high schools in ABC school district	Teacher/Counselor Survey
Perceived value of CTE classes for > 3.5 GPA students – Student perspective	Student Survey	Qualitative and Quantitative	Student populations at all 4 comprehensive high schools in ABC school district	Student Survey
Perceived value of CTE classes for > 3.5 GPA students – Counselor/Teacher perspective	Teacher/Counselor Survey	Qualitative and Quantitative	Counselors and teacher populations at all 4 comprehensive high schools in ABC school district	Teacher/Counselor Survey

Methodology

TRACKING IN CAREER TECHNICAL EDUCATION

Description of the POP Setting and Study Responses

The setting for this research study is ABC School District in a large metropolitan area on the coast in California. ABC school district consists of 22 Elementary schools, 4 middle schools, 4 comprehensive high schools and 1 alternative education high school with a total combined enrollment of 21,800 students. The four largest sub groups of students in the district are White (66.1%), Hispanic (21.1%), Asian (7.5%) and African American (1.1%). The district has an annual budget of approximately \$255 million which translated to a per student expenditure of \$11,402 (NMUSD Facts at a Glance, 2015). Two very different communities feed into ABC school district from two adjacent cities. City A borders the California coastline and is one the wealthiest communities in the nation with an average home price of \$1,265,000 (Zillow Home Value Index, 2015), while City B is inland and has an average home price of approximately half of City A at \$665,000 (Zillow Home Value Index, 2015). The income disparity between City A families and City B families results in a disproportionately high number of affluent families attending High School 1 and High School 2 (located in City A), and higher levels of lower SES, minority families attending High School 3 and High School 4 (located in City B).

This study includes guidance counselors, teachers and students from all four of the comprehensive high schools in ABC school district. 15 guidance counselors, 79 teachers and 367 students have responded to the survey. The teacher respondents by school are 9 (14.2%) from High School 1, 17 (34%) from High School 3, 18 (28.5%) from High School 4 and 35 (38.5%) from High School 2. The 242 student respondents are all seniors and constitute a sample size of approximately 17% of the graduating class of 2015. The number of students student who completed the survey from each school site are 94 students from

TRACKING IN CAREER TECHNICAL EDUCATION

High School 3, 43 students from High School 4 and 106 students from High School 2. High School 1 Students were not surveyed for this needs assessment.

Variables used in the analysis

Table 2 provides a description, definition and measurement of the key variables in this study.

Table 2

Key Variables

Variable Concept	Conceptual Definition	Operational Definition
Relevance	Coursework that connects with student interests and has practical application	Enrollment in CTE classes
Perceived Value	Societal expectations of the likely benefits a student will acquire	Course selection patterns of students and course recommendation patterns of guidance counselors and teachers
Barriers	Both internal and external factors affecting the course selection patterns of students	Influences that steer students away from enrolling into CTE classes
Course Selection Patterns	The trends in both subject areas and subject rigor that students display while determining which classes to enroll in	Students choosing CTE track, college bound track or blended track course pathway

Data Collection Methods

Three approaches to data collection were used in order to capture the unique perspectives of three key stakeholder populations: (a) guidance counselors, (b) teachers, and (c) students. A counselor/ teacher survey, a student survey and district CTE enrollment data were utilized with the purpose of collecting both qualitative and quantitative data. All instrumentation was reviewed by other student-researchers and revisions were made incorporating feedback from

TRACKING IN CAREER TECHNICAL EDUCATION

a variety of perspectives. Survey instruments and letters of informed consent were submitted to Johns Hopkins personnel for final review prior to distribution. Permission from site principals was acquired prior to dispersing surveys to faculty and students. There was a one-week window for survey completion with one reminder sent out midweek.

The counselor / teacher survey was created to collect both qualitative and quantitative data from counselors and teachers at the four comprehensive high schools in ABC school district (see appendix A). Both open ended and close ended questions were incorporated into the design in order to address research question number three: What are the most salient factors in rank order cited by guidance counselors and teachers as reasons they do not recommend CTE classes for higher achieving students? The goal of this survey was to acquire a more comprehensive understanding of the perceived value of CTE courses for various student populations from the perspective of teachers and counselors. An online survey was uploaded to Google Form and a link was sent out the faculty of High School 1, High School 2, High School 3 and High School 4 with a brief message asking for participation. Informed consent was embedded into survey for participants to accept prior to taking the survey. The letter of informed consent was also sent as an attachment on the original email, which allowed participants to retain a copy if they preferred. There were no problems reported with the distribution or collection of the surveys. The online format was selected for faculty convenience and easy data organization.

The student survey was also designed to collect both quantitative and qualitative data through the use of both open and close-ended questions. The student surveys were designed to answer research question number four: What are the most salient factors in rank order cited by students as reasons they either select or do not select to take CTE classes. However, the student survey was administered in a paper/pencil format. The paper/ pencil format was selected with the

TRACKING IN CAREER TECHNICAL EDUCATION

purpose of increasing the student participation rate. Surveys were handed out to senior teachers in English, AP English, Government and AP government classes. Rather than inconveniencing the teachers by asking them to take their classes to the computer labs or asking the students to complete the surveys at home, surveys were hand out to all 18-year old students in the classes. By asking only the students who were 18 years old to complete the survey, the students were able to sign the Letter of Informed Consent and return the surveys during the class period. This had a significant positive effect on the student participation rate.

Original quantitative data was acquired from our district database detailing the CTE participation rates of all current students attending ABC school district high schools. Working with the district Director of IT, multiple queries were run in order to determine CTE participation rates of various student populations. The data collected reflects the CTE participation rates of students with a GPA of ≥ 3.5 , 3.0-3.49 GPA, 2.5-2.99 GPA, 2.0-2.49 GPA and < 2.0 GPA. Average GPA for all students participating in CTE classes and average GPA of all high schools were also calculated in the data collection.

Initial Summary of Results

Table 3

District CTE Enrollment Data

Total # of high school students	# of high school students completing 1 or more CTE class	% of high school students completing 1 or more CTE class	Average high school GPA in district	Average high school GPA for CTE students in district
6891	2763	40.1%	2.909	2.739

TRACKING IN CAREER TECHNICAL EDUCATION

Table 4

District CTE participation by GPA

GPA	> 3.5	3.0-3.49	2.5-2.99	2.0-2.49	< 2.0
CTE Students	602	577	523	500	561
Non-CTE Students	1530	940	632	491	535

Key Findings- CTE Enrollment Data

The CTE enrollment data reveals an inverse relationship between GPA and CTE enrollment. 28.2% of students with a GPA ≥ 3.5 have completed 1 or more CTE class. 41.1% of students with a GPA $<3.5 >2.5$ have completed 1 or more CTE classes. 50.8% of students with a GPA <2.5 have completed 1 or more CTE classes. This data clearly indicates an imbalance in CTE course selection between high, middle and low achieving students in ABC School District.

Counselor surveys.

16 respondents – 6 (100%) from High School 2, 3 (100%) from High School 3, 4 (100%) from High School 4 and 3 (75%) from High School 1.

Table 5

Guidance Counselor Survey

Q1: How familiar are you with the CTE pathways offered at your site?		
Very Familiar	Somewhat familiar	Not Familiar
81.30%	18.70%	0%

Q2: Level of benefit you feel career technical education classes provide for high achieving students

TRACKING IN CAREER TECHNICAL EDUCATION

Very Beneficial	Somewhat Beneficial	Not Beneficial
37.50%	56.30%	6.30%

Q3: Level of benefit you feel career technical education classes provide for middle achieving students

Very Beneficial	Somewhat Beneficial	Not Beneficial
75%	25%	0%

Q4: Level of benefit you feel career technical education classes provide for low achieving students

Very Beneficial	Somewhat Beneficial	Not Beneficial
81.30%	18.80%	0%

Q5: Would you recommend a CTE class to students planning to enter the workforce upon graduation?

Would Recommend	May Recommend	Would Not Recommend
93.80%	6.30%	0%

Q6: Would you recommend a CTE class to students planning to enter community college upon graduation?

Would Recommend	May Recommend	Would Not Recommend
93.80%	6.30%	0%

Q7: Would you recommend a CTE class to students planning to enter a 4 Year College upon graduation?

Would Recommend	May Recommend	Would Not Recommend
62.50%	37.50%	0%

Q8: Would you recommend a CTE class to students planning to enter a Highly Selective 4 Year College upon graduation?

Would Recommend	May Recommend	Would Not Recommend
31.30%	50%	18.80%

Q9: Would you recommend a CTE class to relative?

Would Recommend	May Recommend	Would Not Recommend
62.50%	37.50%	0%

TRACKING IN CAREER TECHNICAL EDUCATION

Key findings -counselor survey.

Examining the data from the counselor surveys, it becomes apparent that counselors at all 4 comprehensive high schools view CTE classes as more beneficial and relevant for lower achieving students than for higher achieving students. Only 37.5% of counselors believe CTE classes are Very Beneficial for high achieving students and only 31.3% of counselors would recommend CTE classes for students planning to attend a highly selective college. When compared to 81.3% of counselors believe CTE classes are Very Beneficial for low achieving students and 93.8% of counselors would recommend CTE classes for students planning to attend community college or entire the workforce upon graduation, an obvious trend emerges.

Teacher surveys.

79 total respondents: 9 (14.2%) from High School 1, 17 (34%) from High School 3, 18 (28.5%) from High School 4 and 35 (38.5%) from High School 2.

Table 6

Teacher Survey

Q1: How familiar are you with the CTE pathways offered at your site?		
Very Familiar	Somewhat familiar	Not Familiar
16.50%	59.50%	24.10%

Q2: Level of benefit you feel career technical education classes provide for high achieving students		
Very Beneficial	Somewhat Beneficial	Not Beneficial
47%	30%	6%

Q3: Level of benefit you feel career technical education classes provide for middle achieving students		
Very Beneficial	Somewhat Beneficial	Not Beneficial
74.60%	20.30%	0%

Q4: Level of benefit you feel career technical education classes provide for low achieving students		
--	--	--

TRACKING IN CAREER TECHNICAL EDUCATION

Very Beneficial	Somewhat Beneficial	Not Beneficial
74.60%	19%	1.20%

Q5: Would you recommend a CTE class to students planning to enter the workforce upon graduation?

Would Recommend	May Recommend	Would Not Recommend
87.30%	12.70%	0%

Q7: Would you recommend a CTE class to students planning to enter community college upon graduation?

Would Recommend	May Recommend	Would Not Recommend
87.30%	12.70%	0%

Q8: Would you recommend a CTE class to students planning to enter a 4 Year College upon graduation?

Would Recommend	May Recommend	Would Not Recommend
55.60%	32.80%	11.40%

Q9: Would you recommend a CTE class to students planning to enter a Highly Selective 4 Year College upon graduation?

Would Recommend	May Recommend	Would Not Recommend
45.60%	29.10%	25.30%

Q 10: Would you recommend a CTE class to relative?

Would Recommend	May Recommend	Would Not Recommend
75.90%	16.50%	7.60%

Key findings – teacher survey.

Examining the data from the teacher surveys, the most significant variable is the familiarity of teachers with the CTE courses offered at each site. Only 16.5% of teachers define themselves as Very Familiar with CTE classes at their sites. This is a significant piece of data considering students list teacher advice as the third most influential factor in CTE course selection. Teacher surveys indicate that 47% of teachers believe CTE classes are Very Beneficial for high achieving students and only 45.6% of teachers would recommend CTE classes for students planning to attend a highly selective college. 74.6% of teachers believe CTE classes are Very Beneficial for

TRACKING IN CAREER TECHNICAL EDUCATION

low achieving students and 87.3% of teachers would recommend CTE classes for students planning to attend community college or entire the workforce upon graduation, indicating a much narrower gap between high achieving and low achieve student course recommendations when compared to counselors.

Student survey.

243 total respondents: 94 (39%) from High School 3, 43 (18%) from High School 4 and 106 (44%) from High School 2.

Table 7

*Most Cited Reasons Students Self-Identifying as High Achieving **Did Not** Take a CTE Class*

Not interested in topics/ topics do not relate to future goals	Counselor/ Teacher advice	No room in schedule	CTE classes will decrease the chances of getting into the college I want
54%	35%	27%	17%

Table 8

*Most Cited Reasons Students Self-Identifying as High Achieving **Did** Take a CTE Class*

CTE class topics relate to future goals	Needed to fill a hole in my schedule	Taking a CTE class will help my GPA
75%	21%	21%

Key findings – student survey.

Examining the student response data reveals a clear connection between the career interests of the students and the CTE pathways offered at a school site. Students interested in a particular career field that aligns with a CTE pathway offered by a site appear to perceive more

TRACKING IN CAREER TECHNICAL EDUCATION

value in the pathway and increased participation rates regardless of achievement level.

Conversely, students that have career interests that do not align with the CTE pathways appear to perceive less value in CTE pathways and display lower participation rates. This trend is amplified by student achievement level. (63%) of higher achieving students ($GPA \geq 3.5$) cited relevance to career goals as the most influential factor when determining whether or not they should enroll in a CTE class. Lower achieving students ($GPA < 2.5$) also cited relevance to career goals as the most influential factor when determining whether or not they should enroll in a CTE class, but only 43% of student respondents listed it.

Counselor and teacher advice emerged as the second most common reason (35%) higher achieving students did not participate in CTE classes. This data validates the hypothesis of this needs assessment and identifies a possible intervention point to impact change. Counselor and teacher advice was not listed in the top five reasons high achieving students chose to select a CTE class, indicating trends in counselor and teacher advice steering high achieving students away from CTE classes.

Conclusion

The completion of the needs assessment has validated that there are currently a significantly higher percentage of lower achieving students in CTE classes when compared to higher achieving students in ABC school district. In order to answer the needs assessment research questions #1 and #2, district CTE completer data was reviewed and analyzed. 2015 district data indicates a 12% CTE pathway completion rate among all graduating seniors. However, separating this data into students with a $GPA \geq 3.5$ and students < 3.5 reveals that only 4% of higher achieving graduating students completed a CTE pathway while 16% of students with a GPA below 3.5 completed a CTE pathway. The needs assessment has also shed light on

TRACKING IN CAREER TECHNICAL EDUCATION

the most salient in-school factors affecting the current makeup of student achievement levels in CTE classes. Establishing which in-school factors contribute to the course scheduling patterns of CTE classes and the degree to which each factor effects course enrollment has lay the foundation for a targeted intervention. Needs assessment research question #3 asked the rank order of salient factors deterring higher achieving students from enrolling in CTE classes. The top three reasons higher achieving students did not enroll in CTE classes were negative effects on college admissions, Influence of parents and guidance counselors, and a perception of low rigor in CTE classes. The needs assessment has highlighted the importance of guidance counselor, teacher and student perceptions of the value of CTE classes and has identified existing barriers steering higher achieving students away from CTE classes. If a more balanced ratio of student ability levels are going to enroll in CTE classes, these barriers must be addressed through a targeted intervention program.

Chapter 3

Intervention Literature Review

A redesigning and rebranding of CTE classes attracts more high achieving students into the pathways (Pathways to College Access and Success, 2006) and better serves the academic needs of middle and lower achieving students (Gamoran 1992; Holm et. al. 2013). Redesigning CTE classes to meet the International Baccalaureate (IB) criteria gives CTE pathways the academic prestige desired by higher achieving students (Hill, 2012). The IB designation for CTE classes offers a weighted grade bump (Hill, 2012), appeal favorably to college admission offices (Attewell, 2012), and validate the rigor of the CTE pathway (IBO.org, 2015). Redesigning the courses to meet the IB standards provides multiple benefits for middle and lower achieving students including (a) increased academic rigor (IBO.org, 2015); (b) increased exposure to the habits and thinking of higher achieving students who they have been previously tracked away from (Holm, et al., 2013); (c) giving middle and lower achieving students exposure to an IB class increases the likelihood of them enrolling in additional IB classes during high school (Perna, May, Yee, Ransom, Rodriguez & Fester, 2015). This intervention hinged on the hypothesis that higher achieving students see relevance in many of the CTE subject areas, but are deterred from enrolling in the classes due primarily to the perceived low rigor of the classes (Sciacca, 2015) and the negative perceptions of the classes by college admissions offices (Greenbank, 2006).

Statement of Proposed Intervention

To combat the negative perception of the district CTE courses, increase the rigor, highlight the relevance and increase their value in the college admissions process, a redesign and rebranding of select CTE courses was proposed. As an initial step, the proposed intervention

TRACKING IN CAREER TECHNICAL EDUCATION

targeted the business pathway classes at a single high school within the district. The redesign and rebranding efforts included writing new course descriptions using IB course design, providing necessary teacher and counselor training and effectively promoting the new program.

Redesigning the CTE business courses to align with the IB framework included shifting the structure of the classes from a more traditional, definitive model to a more informative, inquiry-based design. The marriage of the internationally minded, theoretical approach to learning and application-based learning theory formed the foundational structure for the redesigned classes. Learning occurs when previous knowledge is used as the foundation to create new knowledge and students are able to take a given piece of information and create meaningful context in which to interpret and apply that information to their own realities (Ernest, 2010). Knowledge emerges in contexts in which it is relevant. Natural context of relevance is built into the curriculum of CTE classes, which allows students to more easily make connections between theoretical concepts and the physical world (Castellano, 2012). Moving to a project-based class structure allows for the integration of current business curriculum with the critical approach to the status quo that defines the spirit of IB (IBO.org, 2015). An increased focus of a global perspective of business will be included in the course redesign and infusing the 10 core elements of the IB Learner Profile into each unit ensure the students are exposed to the foundational elements of IB. Currently, multiple IB business classes exist in schools across southern California that were used as resources when designing our IB Business Management classes.

Writing new course curriculum that replaced the existing Business Management II classes was the initial step in the intervention implementation process. This process began by assembling a team consisting of a site administrator, the site business department chair, the site business teacher planning to teach the class, the site IB coordinator, a site guidance counselor

TRACKING IN CAREER TECHNICAL EDUCATION

and the district Director of College and Career Readiness. Perkins funding, currently available through our district office, were earmarked to pay the business teachers, counselor and our IB coordinator for their time spent in planning and rewriting the new courses. Prior to beginning the course redesign process, the team attended an IB conference in order to gain a foundational understanding of the program, structure and the underlying learning theory of IB. This team discussed goals and expected outcomes of the course redesign, organize their approach to the rewriting of the course and examine the available resources for the intervention. This process began in late winter of the 2015-2016 school year in order to give the team ample time to complete the district new course submission deadline of March 1st. Once the team was able to determine a framework and distribute tasks to each team member, the process of designing and revising the course was facilitated over a two-month period. The initial approach to the course redesign was to begin with the current outline of the Business Management class and then infuse IB curriculum into the existing class using the expertise of the site IB coordinator. This included adding units of study such as international business approaches to the course in order to align with IB core ideas. The team paid particular attention to ensuring that the redesigned course remains relevant and accessible to the lower and middle achieving students who have enjoyed the benefits of CTE classes in the past. Once the course redesign process was completed, the course was submitted for both district approval and University of California approval in late spring of 2016.

Exploring a variety of alternatives to achieve the desired outcome of increasing the number of high achieving students in CTE classes were initially considered. Adding a CTE requirement to graduation, creating CTE pathways perceived as more academic (such as engineering), and encouraging popular Advanced Placement teachers to teach CTE classes were

TRACKING IN CAREER TECHNICAL EDUCATION

all considered. The strategy of beginning with a comprehensive list of alternative interventions and then whittling it down as the process progressed increased creativity and identified areas in which policy options were not mutually exclusive (Bardach, 2012). Through this process, aspects of alternative proposals were able to be included into the final intervention. For example, the business pathway was selected as the pilot pathway due to the subject's widespread appeal to students across the ability level spectrum as evidenced by the needs assessment data, and is currently offered at three of the four district high schools (Sciacca, 2015). Throughout the country, business course enrollment is consistently among the top three CTE choices in high school pathways and college majors (Iowa Department of Education, 2014). Higher achieving students indicated high levels of perceived value and relevance for high school business classes and pathways compared to other district pathways such as culinary, construction technology and media design (Sciacca, 2015). Considering a variety of possible solutions and integrating the most promising components from multiple alternative ideas increased the quality of the final intervention proposal.

The intention of the redesigning and rebranding of the CTE business classes was to increase the perceived rigor and value of these classes from the perspective of higher achieving students while at the same time continuing to emphasize the practical value of the courses for all students at the selected high school. Special attention was paid to ensuring the likelihood of successful course completion is not diminished for middle and lower achieving students. Redesigning both courses in the business pathway was the optimal outcome of the intervention. However, with limited time and resources, it was necessary to concentrate effort and resources on only a single class during the 2015-2016 school year. Focusing on a single CTE pathway allowed the researchers to concentrate resources and compare the intervention pathway with the

TRACKING IN CAREER TECHNICAL EDUCATION

other CTE business classes within the district. The business pathway was selected due to the subject's widespread appeal to students across the ability level spectrum as evidenced by the needs assessment data. Higher achieving students indicated high levels of perceived value and relevance for business and medical pathways compared to other district pathways such as culinary and media design (Sciacca, 2015).

The pre-intervention structure of the CTE business pathway consisted of three classes: an introductory class, Business Economics and Finance, a concentrator (intermediate level) class, Entrepreneurship, and a capstone class, Virtual Enterprise. While these three classes build on each other with regards to curriculum, students are able to enter and exit the pathway at any time. The capstone class, Virtual Enterprise, was selected as the initial class for redesign and rebranding for two primary reasons. Virtual Enterprise already contained a large amount of IB Business Management standards and curriculum. Very few adjustments were needed for Virtual Enterprise in order to meet the IB standards. Virtual Enterprise was the capstone class, and selecting the capstone class as the initial IB class minimized the deterrent effect of a high level IB class for lower achieving students. Rebranding the Virtual Enterprise class into an IB class also increased the perceived rigor of the class. Although the structure and performance expectation did not increase drastically, the perception of increased rigor had the potential to dissuade lower achieving students from taking the class. However, by selecting the capstone class as the initial IB class, lower achieving student were able to enter the pathway at the introductory class level or intermediate class level, which are not perceived to possess the same level of rigor as an IB level class. This will allow staff to talk with middle and lower achieving students who have expressed interest in business through enrollment in the introductory and intermediate level classes and encourage them to continue into the IB capstone class. Selecting

TRACKING IN CAREER TECHNICAL EDUCATION

the capstone class for the IB redesign and rebrand reduced the likelihood of lower and middle achieving students avoiding the entire pathway due to the perceived rigor. In addition, selecting the capstone class as an IB class also increased the enrollment of higher achieving students in the introductory and intermediate level classes due the perceived rigor and value of the IB capstone class.

Once the course was approved, the next component to the intervention focused on preparing the teachers to effectively deliver the new curriculum. This entailed significant training in both the IB approach and the CTE approach to teaching. An effective integration of the theoretical approach of IB (IBO.org, 2015) and the hands-on approach of CTE (Lewis, 2008) was a critical element of the success of the intervention. There are multiple IB trainings in North America throughout the year that focus on either general IB overview training or more detailed subject specific training. The teacher team attended both the general overview training and the specific trainings of the IBCC curriculum. The desired outcome of the trainings was to further develop differentiation skills in order to enhance the rigor and relevance for high, middle and lower achieving students within the redesigned business pathway.

The third step in the redesign and rebranding process was the promotion of the changes to the pathway and the predicted benefits of the changes. The promotion of the IB Business Management program hinged on the ability for the intervention to effectively educate the site guidance counselor team on the details of the newly redesigned business pathway. Guidance counselors have significant influence over course selection patterns and must have accurate information regarding the details of the new classes in order to effectively promote them to the students on their caseloads (Feller, 2003). The guidance counselor who served on the course redesign team kept the rest of the team up to date with the details of the new courses.

TRACKING IN CAREER TECHNICAL EDUCATION

Another important promotional tool was the informational flyers describing the details of the course changes. These flyers outlined the benefits of the course redesign and highlight the advantages of the rebranding. The information was sent to parents via email and was available in the counseling office and on the school website. The business department chair and IB Business Management teacher will be responsible for the on-campus promotion of the new classes. They scheduled class visits to English classes in early spring, prior to registration, to pitch the classes. Particular focus was placed on the presentations made to the advanced level classes in order to ensure they gained a full understanding of the enhanced rigor and relevance for higher achieving students.

The expected result from the described intervention was to create significant increase in the number of course requests for the IB Business Management classes from higher achieving students. The optimal outcome was a course request breakdown that mirrors the population of the entire school with similar percentages of high, middle and lower achieving students. As the results from the initial course requests were considered, adjustments were made to both the course and the process to ensure a balanced population of students enrolling in the pathway.

Review of Intervention Literature

This literature review begins with an examination of the perception of CTE in both the educational and employment settings. Next, an overview of IB is presented to orient the reader and provide foundational knowledge of the programs origins and basic structure within the school system. The following section reviews the influence guidance counselors have over student course selection. The subsequent section addresses the rebranding and marketing of a new CTE pathway. In the final section, literature relevant to staff training strategies are

TRACKING IN CAREER TECHNICAL EDUCATION

addressed. The desired outcome of this review is to gain a comprehensive understanding of the research supporting the intervention and the identification of best practice strategies for intervention implementation.

CTE in Business and Education

The identity and importance of CTE in the media has experienced a boost over the last five years due, in part, to the U.S economic recession beginning in 2008 (Duncan, 2011). Former U.S Secretary of Education Arne Duncan Championed CTE expansion beginning in 2009 by calling for a more rigorous and innovative approach to CTE pathways to combat the stagnation of the U.S economy. Duncan touted the value of CTE classes for both students and the economy. He has been credited with championing a renewed emphasis on CTE programs in public schools across the United States (Markus, 2011). Referring to CTE as “the neglected stepchild of educational reform” (Duncan, 2011), Duncan has highlighted the role of CTE in preparing students to be college and career ready upon high school graduation. However, reviewing the speeches he gave between 2009 and 2013, Duncan focused on the need to use CTE as a mechanism to serve the “forgotten half” of students. Phrases such as “increase graduation rates” and “improving academic standards” appeared over and over in his public speeches, reinforcing the identity of CTE as primarily for lower achieving students. While his apparent intentions have been to boost the perceived importance of CTE for all students, the rhetoric he chose continued to send the message that CTE is not for our highest achieving students.

In 2011 the Harvard Graduate School of Education released the Pathways to Prosperity report, which outlines the importance of meaningful career training in comprehensive school reform (Symonds, Schwartz & Ferguson, 2011). The report gained national attention but was

TRACKING IN CAREER TECHNICAL EDUCATION

viewed as controversial among educational leaders due to its avocation of a holistic approach to education. It makes both financial and educational arguments for the benefits of CTE programs and contends there is value in CTE pathways for high, middle and lower achieving students. The release of this report marks a shift in perceived relevance of CTE for our nation's highest achieving students. Critics of this report argue that a focus on soft skills will dilute rigor for high achieving students and theoretical knowledge should be prioritized (Symonds, Schwartz & Ferguson, 2011). However, the report uses overwhelming employer feedback from companies such as Microsoft, Apple, Cisco and Pearson to argue that even the highest achieving students lack the application-based 21st century skills necessary to be successful in the workplace. The Pathways to Prosperity report credits well-developed, high rigor CTE pathways with developing these 21st century skills and providing opportunities for students to cultivate critical workplace soft skills (Symonds, Schwartz & Ferguson, 2011).

International Baccalaureate

Background.

Established in 1962, IB is an educational program designed to expose students to learning through the lens of an international, multicultural perspective (Hill, 2012). IB is divided into three programs, Primary Years Program (PYP), Middle Years Program (MYP) and Diploma Program (DP). The DP Program consists of the final two years of high school (11th & 12th) and requires students to take full schedules of IB classes. These classes are divided into six categories:

- Language A
- Individuals and Societies

TRACKING IN CAREER TECHNICAL EDUCATION

- Mathematics
- Arts
- Experimental Sciences
- Second Language

Students must take classes in all six categories, as well as an additional 100 hours of Theory of Knowledge class, write a 4,000 word extended essay and spend 50 hours on a Creativity, Action and Service project (IBO.org, 2015). Due to these high academic demands for the diploma program, IB has earned a reputation as a highly rigorous, college prep program. IB is often compared to Advanced Placement (AP) classes and is generally perceived as an exclusive program for a small group of elite, university bound, private school students (Hill, 2012). While this perception is largely untrue, its identity began to resemble AP in many schools and high achieving students made up the overwhelming majority of enrollment in the classes of many schools in North America (Perna, May, Yee, Ransom, Rodriguez & Fester, 2015). To combat this image and expand access to a wider range of students, in 2012 IB created the International Baccalaureate Career Related Certificate program (IBCC) (Hill, 2012). The IBCC program allows students on a career related path to earn an IB certificate and experience elements of the Diploma program while not requiring them to complete the entire program. Because of the recent rollout of the program using a pilot style approach, limited data exists addressing the enrollment patterns of the IBCC program. However, the focus of the program is to expand the appeal of IB beyond the traditional IB student (IBO.org, 2015). This effort to ensure greater access to IB curriculum has given schools an opportunity to create a more inclusive IB environment on their campuses.

Enrollment into International Baccalaureate.

TRACKING IN CAREER TECHNICAL EDUCATION

There have been some significant barriers to students enrolling in IB classes. Enrollment into IB is highly dependent on availability, perception and relevance of the IB courses. The worlds of IB and CTE have not blended well in the past in large part due to the identities of each program. A significant number of students, parents and teachers have viewed IB as elite track classes designed solely for students who will attend highly competitive 4-year universities (Perna et al., 2015). Furthermore, additional barriers may limit lower and middle achieving students from participation in IB classes. Three limiting barriers of IB for lower and middle achieving students are identified: (a) the availability of these classes at high schools with high concentrations of lower achieving students; (b) the participation of these students in the available courses; (c) the degree to which the course structure serves the needs of these students. In each of these three areas, low income, minority students have significant disadvantages to access and success (Perna et al., 2015). These barriers continue to perpetuate the tracking present in the majority of high school across the country (Gameron, 1992).

College acceptance and International Baccalaureate.

Among the most significant factors attracting higher achieving students into IB classes and away from CTE classes is the perception that colleges look favorably on maximizing the number of IB classes taken throughout high school. Attewell (2012) exposes the rationale behind high achieving student course selection in high school. The acceptance formulas utilized by highly selective colleges regards class rank and GPA as two of the most significant factors. With the grade bump from AP and IB classes, many high achieving students are deterred from taking CTE classes that would lower their >4.0 GPA because there is no grade bump despite, their interest in CTE subjects. Greenbank, (2006) also finds that top tier universities are skeptical of the value of CTE classes and tend to prefer AP or IB classes on students transcripts. Less

TRACKING IN CAREER TECHNICAL EDUCATION

prestigious universities use different acceptance formulas and are more accepting of students who take CTE classes in high school. While both Attewell (2006) and Greenbank (2006) make a strong case for the value of IB classes in the college admissions process, they do not explore the relationship between the number of IB classes taken and college admissions. It has been assumed by many students and counselors that “more is better” when it comes to taking rigorous classes. However, Kretchmar & Farmer (2013) challenges the notion that more is better with regards to the number of advanced classes taken by comparing the number of advanced level classes taken in high school to the student’s college freshman year GPA. The study finds significant correlation between the number of advanced classes taken and college GPA when comparing 0-5 advanced classes. However, the law of diminishing returns takes affect after 5 classes and the study finds no gains in college GPA for students who took 5 advanced classes compared to students who took 10 advanced classes. Kretchmar and Farmer (2013) makes a strong case for the reexamination of course recommendation patterns for college bound students. The current trend of maximizing the number of advanced level courses in high school in order to prepare for college should be questioned by administrators, counselors, teachers and parents.

Earning college credits while in high school is important to higher achieving students and their parents. The successful completion of an IB course combined with a passing score on the end of course exam can earn a student college credits while still in high school. Students who earn college credits by taking a college-credit earning class, such as IB, are more likely to enter college and are more likely to be successful once in college (Achieve, 2015). Chodl (2012) examines the relationship between IB course completion and admissions into highly selective colleges. Using qualitative interview data of 30 college admissions officers, the study finds a high correlation between IB course completion and acceptance rates into the countries more

TRACKING IN CAREER TECHNICAL EDUCATION

selective colleges. This finding further reinforces the perceived value of IB courses for higher achieving students interested in attending highly selective colleges.

Counselor Influence on Course Selection

High school guidance counselors play a central role in dispersing college and career knowledge to students and are credited as the most influential in-school factor affecting student course selection (Feller, 2003). Students are advised to enroll in various courses depending on their current career aspirations and their academic profile. However, the growing trend to prepare all students for eligibility to a 4-year university upon high school graduation has affected the course recommendation patterns of many guidance counselors (Feller, 2003). CTE classes have been deprioritized in counseling departments in lieu of more traditional college prep classes such as AP/IB and Honors for higher achieving students. Successful completion of these classes is perceived to increase the likelihood of college admissions and therefore is prioritized over CTE (Greenbank, 2006). While the needs assessment indicates counselors see value in CTE classes, this perception does not translate in CTE course recommendation for higher achieving students.

The role of the guidance counselor has changed over the last two decades due to state and national mandates, which focus on standardized test achievement. Mandates such as No Child Left Behind have pressured counselors to spend their time on activities including test coordination, which have taken time and resources away from career guidance (Schenck, Anctil, Smith & Dahir, 2012). The time spent per student on college and career guidance has reduced over the last 20 years, giving counselors less time to get to know individual students and understand their post-secondary goals and aspirations. As a result, counselors have diverse practices related to college and career counseling and often rely on computer-based programs

TRACKING IN CAREER TECHNICAL EDUCATION

such as Naviance to guide students through the college and career selection process (Alger & Luke, 2015). This reduction of time has led to a one size fits all approach to post-secondary advising which stereotypes higher achieving students into particular course recommendations (Kerr, 1986). This one dimensional view of appropriate scheduling for higher achieving students often results in large numbers in AP and IB classes scheduled in a variety of subject areas rather than a schedule that reflects a student's passions and interests.

Rebranding and Marketing CTE

Branding refers to the initial coherent articulation of a programs or institutions identity and can happen at any point in time (Merrilees and Miller, 2008). Although branding can occur unintentionally, it is becoming increasingly difficult to rely solely on product or program quality for creating a successful identity for a product, service or initiative. Explicit branding efforts are becoming more critical in the creation and management of a positive image for new businesses and programs (Todor, 2014). Once an identity has been created and accepted, it is exceedingly difficult to alter that identity and change perceptions. Rebranding is the disjunction or change between an initially formulated brand and a new formation (Merrilees and Miller, 2008). A deliberate, comprehensive and sustained rebranding effort is essential if change is desired.

According to Merrilees and Miller (2008), rebranding theory is construed into three dominate themes: (a) a solid understanding of the consumer, in order to meet both current and anticipated needs; (b) the use of internal branding to ensure commitment of relevant stakeholders and (c) The role of advertising in the implementation phase. These three themes align with the proposed redesign, rebranding and stakeholder training present in the CTE intervention design. A solid understanding of consumer (student) current and anticipated needs have been acquired

TRACKING IN CAREER TECHNICAL EDUCATION

through both a thorough review of the literature and by conducting an in-depth needs assessment of the targeted student population. The use of internal branding to ensure stakeholder understanding and commitment is addressed through extensive staff training and professional development of both IB and CTE. Finally, the role of explicit advertising has been covered through the creation of site-based marketing literature at the pilot high school.

The behaviors of school staff members have the potential to have the most significant effect on the identity of the CTE pathways. Compared to changes in marketing aesthetics for example, employee behaviors are far more influential on brand identity (Muzellec & Lambkin, 2006). In order to maximize the success of rebranding efforts, managers and administrators need to ensure that the rebranding is approached holistically and supported by all stakeholders. To accomplish this, particular attention must be given to employee acceptance of and reactions to the rebranding efforts (Muzellec & Lambkin, 2006). If the rebranding is not accepted or understood by the staff members responsible for its primary implementation, it is likely that it will fall well short of the desired outcomes. It is a common pitfall in rebranding efforts to primarily focus on external perceptions rather than initially internally implementing the changes (Gotsi & Andriopoulos, 2007). Gots and Andriopoulos (2007) elaborate on this ideas by arguing that the key stakeholders must live the values of the rebranded identity in order to create meaningful change in the perception of the program. It is critical to provide comprehensive training for staff stakeholders to ensure both buy-in and competency regarding the rebranding efforts.

Marketing is another essential component to program rebranding. Once the internal processes of the CTE pathway have been altered to create more relevance for higher achieving students, effective promotion of these changes must occur. Although marketing cannot

TRACKING IN CAREER TECHNICAL EDUCATION

singlehandedly rebrand a program, explicit marketing efforts can have significant impact on program identity and can accelerate the acceptance of the new identity (Muzellec, & Lambkin, 2003). Multiple marketing approaches to rebranding exist and the selection of the appropriate strategy can enhance the likelihood of success. The “sudden eradication” marketing strategy involves an overnight change to the brand (Kaikati & Kaikati, 2003) and may be an appropriate strategy for rebranding the CTE pathway. This strategy is used when an organization desires to disassociate themselves with the previous brand. Brands that are no longer viable or do not align with the current realities of the organization are appropriate for the sudden eradication strategy. This strategy requires a well-designed rebranding effort and effective implementation because failure to eradicate the previous identity can cause confusion among customers (Kaikati & Kaikati, 2003). This confusion can lead to the dilution of any identity and negate any rebranding efforts.

Staff Training

Staff training and profession development (PD) can be valuable mechanisms used to initiate changes at school sites and can be implemented using a variety of strategies in order to create understanding and buy-in among staff members. Mundy, Howe, & Kupczynski, (2015) examine 299 teachers across three school districts to gain an understanding of the perceived value of specific types of PD including professional learning communities (PLC), demonstrated lessons and teacher in-services. The results of the study indicate that teachers perceive the highest value in demonstrated lessons and the lowest value in in-services. Frequency of use was another factor that emerge as highly correlated with the value of the PD. Perceived effectiveness increased when PD topics and strategies are revisited frequently and consistently. The study concludes that demonstrated lessons surrounding a common topic that is revisited on a weekly

TRACKING IN CAREER TECHNICAL EDUCATION

basis is the most effect type of PD. These findings will be incorporated into the IB training design for intervention stakeholders and both demonstrated lessons and a high frequency approach will be foundational components to the PD.

Chalmers and Gardiner (2015) build on the argument that PD should continue over an extended period of time and outline the core components of effective PD for educators. The PD must be initially designed by determining indicators of effectiveness, identifying what aspects to measure, how to measure them and how to interpret and respond to the results (Chalmers and Gardiner, 2015). Clearly defining the expected outcomes will allow formative monitoring of both the implementation and the results over the span of the PD program. Chalmers and Gardiner (2015), advocate for the use of the Academic Professional Development Effectiveness Framework, a framework designed to assist in the creation and implementation of effective PD. The benefits of the framework allows for the systematic collection of both qualitative and quantitative data over both short periods of time and extended periods of time, a focus on the intended program outcomes, contextual factors and acknowledges that changes in teaching occur over time (Chalmers and Gardiner, 2015). Incorporating the framework into the IB staff training allow for frequent monitoring of the implementation fidelity and increase the likelihood of success.

Discussion

CTE has maintained an identity of low rigor and questionable relevance for higher achieving students over the last century in the United States. Altering this identity requires redesigning CTE pathway programs to better fit the needs of higher achieving students and marketing these changes through an effective rebranding effort. Using the research-based

TRACKING IN CAREER TECHNICAL EDUCATION

rebranding strategies outlined in this review, a single CTE pathway was used as a pilot program. The business pathway was selected due to the high levels of interest in the subject from higher achieving students discovered in the needs assessment (Sciacca, 2015).

Changing the identity of CTE requires effective leadership at the individual, group and systems level. Organizing key stakeholders and creating a clear, measurable objective were critical components to the success of rebranding CTE. The first step of the intervention was center on changing the course title and adjusting the course content of the CTE classes in a single pathway. Beginning with the assembly of key stakeholders, Vroom's (2003) *Deciding How to Decide* model will be utilized in order to assess what type of decision we are engaging in. There was no immediate time constraint, which allowed a systemic assemble of a team which likely increased buy-in throughout the process. Sharing the research surrounding the benefits of de-tracking out students in CTE helped lay the foundation for collective support.

The intervention was designed, in part, as a response to local private sector feedback critiquing the perceived skill and knowledge deficits of the graduating students. Among the most common concerns were underdeveloped soft skills and weak knowledge application (Sciacca, 2015). Local chamber of commerce leadership members expressed concerns regarding their perceptions of the limited skill sets of recent graduates stating "recent hires could think, communicate or perform, but rarely could do all three and apply the skill combination to effectively solve problems" (Sciacca, 2015). Although it was a general comment and not targeted specifically at ABC School District, it highlights an area of need within the school system that the intervention attempts to address.

The chamber of commerce also questioned the selection of CTE pathway subjects. They expressed confusion as to why many high schools in Orange County had robust agriculture

TRACKING IN CAREER TECHNICAL EDUCATION

programs when there were very few agriculture related jobs in the area. In comparison, the chamber wondered why there were so few healthcare pathways despite the fact that it was the fastest growing employment sector in the county. The input from private section reinforces the importance of a comprehensive CTE plan that incorporates the employment needs of the community for jobs filled by students spanning the spectrum of ability and interest.

Both the Cal State and UC system possess an enormous amount of influence with regards to course selection patterns of higher achieving students. The perceived value of various courses from students and parents with regards to college admissions has a large impact on course enrollment. Higher achieving students listed “negative impact on college admissions” as the number one reason they did not enroll in a CTE class (Sciacca, 2015).

The intervention design included input from two local college admissions representatives from Cal. State Fullerton and University of California Irvine. Feedback specifically addressing the graduating seniors from ABC School District was not gathered; however, overarching pattern observations of incoming college freshman were discussed. A dominant pattern observed by both college representatives was the increasing number of students who required remediation courses upon entrance to college. While a myriad of factors contribute to this trend, an abundance of research exists linking ability tracking to lower performance for middle and lower achieving students (Castellano, 2012; Gamoran, 1992). Designing an intervention that exposes lower achieving students to the thinking, study habits and general approach to education of higher achieving students created a political ally with the local universities by effectively associating it with the reduction of college course remediation. The political power framework holds that organizations are made up of different interest groups and that decisions come from interest groups fighting for their best interest (Bolman & Deal, 2008). A symbiotic

TRACKING IN CAREER TECHNICAL EDUCATION

relationship with local universities is possible regarding the promotion of CTE classes for higher achieving students due to the potentially mutually beneficial outcomes.

Increasing the number of higher achieving students in the CTE programs was a primary objective of the proposed intervention and is the focus of research question 1. The expectation of the intervention was that an increase of higher achieving students into the CTE pathways is mutually beneficial for high and low achieving students. Exposure to the behaviors, habits and thinking of higher achieving students will create a more productive learning environment for lower achieving students (Gamoran, 1992). However, it was critical that this shift in rigor and identity did not have the unintended consequence of deterring middle and lower achieving students from the program, which is addressed by research question 2. It was possible that the pathway redesign and rebranding will decrease the appeal of CTE courses for lower achieving students, shifting the identity to a course sequence that feels less relevant. Marketing the classes as higher in rigor had the potential to intimidate students who have traditionally enrolled into these classes due to their perceived difficulty.

Frequent monitoring of the enrollment levels of middle and lower achieving students were a critical component to the intervention. If higher achieving students enrolled in the newly designed IB/ CTE classes, pushing out the lower achieving students, then the result would have been replacing one exclusionary practice for another. Guidance counselors needed to be aware of this possible intervention byproduct and continue to encourage more traditional CTE students to continue to enroll in the pathway courses. In addition, counselors must continue to monitor any attrition occurring of enrolled students throughout the school year. The attrition rates of high, middle and lower achieving students were a strong indicator of the relevance and pacing of the class as it relates to different student ability levels.

TRACKING IN CAREER TECHNICAL EDUCATION

Obtaining a clear understanding of the impact of the IB business courses on college acceptance patterns provided valuable information regarding the current perceptions that CTE classes detract from student application profiles. Examining college acceptance patterns of students taking the business courses both pre and post intervention revealed the effects the redesigned IB business class had on admission rates to selective and highly selective colleges. In addition, comparison groups of students from other CTE business programs within the district were used to further identify any effects of the intervention.

Finally, observing the classroom implementation of IB instructional pedagogy into the newly designed IB businesses classes ensured implementation fidelity. Once the teachers completed the IB training, confirming that the training translates into appropriate changes in classroom instruction allowed researchers to examine its effectiveness. Because exposure to the training does not guarantee mastery of the IB instructional strategies or effective delivery of those strategies, gaining a comprehensive understanding of the implementation provided important information that was used to better understand the effects of the intervention.

Conclusion

Rebranding the identity of CTE, in order to shed the previous associations with vocational education, was a critical component in attracting more high achieving students into the classes. Adjusting CTE classes to fit the IB framework and working with counseling teams to dispel perceptions of reduced rigor and value expanded access to both CTE and IB classes. This expanded access was mutually beneficial for high, middle and low achieving students. High achieving students gained the benefits of contextualized learning in subjects relevant to their future career goals while simultaneously addressing the realities of the college admissions

TRACKING IN CAREER TECHNICAL EDUCATION

process. Guidance counselors became a critical component to the rebranding effort through a more comprehensive understanding of the CTE pathways. The understanding translated into more informed course selection advice to the students on their caseloads. Through the combined efforts of key stakeholders, a bridge between college prep and CTE was created and sustained.

Chapter 4

Intervention procedure and program evaluation

Methodology

The lead researcher of this study has spent 10 years as a CTE teacher. Because of this experience, a worldview of pragmatic symbiotic benefits of mixed ability classrooms has been established. Personal observations in CTE classes led to the formalized study examining the benefits and drawbacks of mixed ability CTE classes. Pragmatist worldview is general associated with mix methods research due to the pragmatist focus on real-world practice. There fore, the intervention used a quasi-experimental mixed methods research design, which incorporated both quantitative data collection through enrollment numbers, surveys and college acceptance rates and qualitative data collection through student, counselor and teacher interviews. The mixed methods design was selected to best understand both the effects of the intervention of this study and the reasons the effects occurred. By utilizing this mixed methods approach, the research team acquired quantitative data of CTE enrollment rates, attrition rates and college acceptance rates, as well as qualitative data to gain a comprehensive understanding of the perceived value of CTE classes, barriers that steer various student populations away from the classes and the benefits and drawbacks of CTE course selection for high, middle and low achieving students. Research questions have been designed to define the scope and reach of the study and determine the effects, if any, of the intervention. The research design used an explanatory mix methods approach in data collection. The explanatory approach occurs in two distinct phases, beginning with the collection and analysis of quantitative data. The quantitative data has priority in addressing the research questions (Creswell and Clark, 2011). Once quantitative data has been analyzed, the second phase of the explanatory sequential design is the collection and analysis of

TRACKING IN CAREER TECHNICAL EDUCATION

qualitative data. The qualitative data is used to explain the results of the quantitative findings (Creswell and Clark, 2011).

In this study, quantitative data was initially collected and analyzed regarding the pre and post enrollment numbers of higher achieving students into the business CTE pathways at the treatment site and the two comparison sites. Quantitative survey data was also collected and analyzed to explore enrollment barriers into CTE classes. Once enrollment trends and barriers were identified through quantitative analysis, qualitative measures were used to help explain why these enrollment patterns and perceived barriers existed. Interview and open-ended question survey data was collected and examined in order to establish and support causal relationships between the intervention and changes in CTE enrollment patterns of higher achieving students.

Power and Influence within the District

In order for the intervention team to gain and maintain enough power to acquire resources, influence policy and advance the proposed intervention, it first needed to understand the politics within the district as well as the respective power of each of the major players. The ABC School District maintains an organizational structure similar to many school districts across the nation. The positional power structure is set up in a traditional system in which the school board, consisting of seven members, is at the top of the hierarchy followed by the superintendent, chief business officer, assistant superintendents, executive directors, and directors at the district office level. Below the director positions are an array of manager and staff positions, which vary between departments. The structural framework of positional power posits that specialization and division of labor enhances performance within an organization (Bolman & Deal, 2008). At the site level, the positional hierarchy is also organized with a traditional design beginning with

TRACKING IN CAREER TECHNICAL EDUCATION

principal, assistant principals, and then staff. Although department chair positions exist, they do not hold more explicit positional power than other teachers, and their major job function is to serve as a liaison between administration and each subject level department.

To an outside observer, the power structure of the ABC School District appears obvious, common and predictable. However, when the power and politics of the district are closely examined, a power structure much different than the described positional power structure emerges. Power is an actor's ability to influence an individual or group of individuals to do something they would not otherwise do (Dahl, 1961). When examined through this lens, the power of the district looks very different than the positional power hierarchy. Each stakeholder has the ability to both influence and be influenced by other stakeholders, which disrupts the traditional hierarchical power structure. For example, students are often at the bottom of the positional power structure of the district. However, their ability to influence their parents with regards to the intervention detailed in this study can lead to parental pressure on the school board to either support or oppose the change. This counter-organizational power gives influence to the individuals at the bottom of the organizational chart, who hold a great deal of collective power that they can use to challenge formal organizational leaders (Morgan, 2006 as cited by Jaeger et al., 2014). Mobilized groups of parents wield significant influence over the school board, and the school board possesses power over district and site policy. The power structure is further complicated when considering teachers' influence over students, university influence over parents and students, and employer influence over the universities.

Parents and Students

TRACKING IN CAREER TECHNICAL EDUCATION

The ABC School District draws from two distinct communities. One of the communities is among the wealthiest cities in the country and the affluence within the community is accompanied with high levels of education and involvement. Because the community elects the school board, their influence over district policy is substantial. Policy implementation is a dynamic political process that affects and reflects the relative power of diverse actors and the institutional and environmental forces that influence the play of power (Malen, 2006). If the community has widespread opposition to a particular policy or decision at the site or district level, vocalizing their dissatisfaction often leads to change, indicating significant levels of power (Morgan, 2006 as cited by Jaeger et al., 2014).

The degree in which the parent community supported the intervention had significant influence on both the implementation and outcomes. Convincing parents of higher achieving students that it is in their children's best interest to take a CTE class meant a shift in the traditional behavior of our higher achieving students. College admission is the second most important factor for parents regarding student course selection, behind interest in subject (Sciacca, 2015). This indicates that university collaboration is critical in creating buy-in among the parents of higher achieving students.

UC/ CSU

The value that the UC and CSU systems place of CTE classes during the college admissions process is a highly influential factor in CTE course enrollment for higher achieving students. Both systems have already expressed value for CTE classes by recently adding a separate section in their application asking students to list any CTE classes they have completed in high school (CDE, 2013). The addition of this section signifies value to CTE classes and

TRACKING IN CAREER TECHNICAL EDUCATION

dispels the perception that CTE classes are not for college bound students. In addition, the UC and CSU system have created a streamlined process for a-g approval for CTE courses, which has led to an influx of approved classes (CDE, 2013). While it is unlikely that the district intervention team will have significant influence over the admissions process of CSU and UC systems, obtaining a comprehensive understanding of the current system and publicizing the value of CTE classes in the admissions process allows the team to capitalize on the policy shift.

Employers

Employers across the nation have expressed concern that the majority of high school and college graduates are underprepared to work within a team and are unable to apply their theoretical knowledge to unpredictable workplace situations in order to solve problems (Shuayto, 2013). According to Mangan (2007), corporate managers and executives rank soft skills, professionalism and oral communication among the most important skills for new employees, yet 70% of new employees are deemed deficient in these areas. These same concerns were echoed by the Newport Beach Chamber of Commerce during the needs assessment process (Sciacca, 2015). As a response to these concerns, local businesses, both through the chamber of commerce and individually, have volunteered a plethora of resources to help build and support CTE programs. Construction companies have offered equipment and facility access to CTE programs, the local hospital has offered internships to students enrolled in the CTE medical pathway, and a variety of businesses have offered to volunteer their time both in the classrooms and working with teachers on curriculum development. Local employers appear to acknowledge the symbiotic relationship with CTE pathways and are eager to support their growth (Sciacca, 2015). Partnering with reputable businesses employing highly skilled, highly paid workers

TRACKING IN CAREER TECHNICAL EDUCATION

increases the perceived value of the CTE pathways, which can influence the enrollment patterns of high, middle and lower achieving students.

Teachers and Counselors

Teachers and counselors are critical stakeholders and some revealed concern regarding various aspects of the intervention. Mounting pressure to prepare every student for college steered the advice of guidance counselors toward classes they believe will increase the likelihood of college admissions rather than curriculum that may be more relevant to students' desired career paths (Feller, 2003). Some counselors were hesitant to advise higher achieving students to enroll in CTE courses when they were not confident that the courses would be beneficial to college admissions. In addition, counselors have relied on certain CTE pathways as "safe havens" for lower performing students, knowing that students have a high likelihood of passing the classes. Some counselors worried that increasing the rigor of CTE pathways would reduce the likelihood of passing for lower achieving students, which could affect graduation rates.

Individual teachers also had concerns regarding the intervention. Increased enrollment in one program results in decreased enrollment in another. Some elective teachers and advanced placement teachers viewed attempts to attract higher achieving students into CTE pathways as a threat to their own programs. The political frame holds that organizations are made up of different interest groups that have different "values, beliefs, information, interests, and perceptions of reality" (Bolman & Deal, 2008, p. 194). These competing interests have the potential to cause tension between CTE pathways and other programs on campus. Engaging elective and IB teachers in the intervention process allowed them to better understand the intervention and give input into decisions they believed will effect their programs.

Gaining and Maintaining Power

Within the current power structure, the intervention team first needed to understand the agenda of the actors with significant power and then work to accomplish variable-sum objectives. Leaders within the intervention team identified opportunities for positive-sum gains between themselves and the power players listed above. Once identified, leaders worked to convince the stakeholders that all actors will be better off if they cooperate (Read & Shapiro, 2014). This ability to leverage the support of power holders through mutual benefit allowed the intervention team to gain power within the district. This focus on coalition building for specific initiatives allows them to partner with stakeholders that they may otherwise find as barriers if a bridge of cooperation is not specifically cultivated (Read & Shapiro, 2014).

Controlling the Message

The control of information is also a source of power in the political frame (Morgan, 2006). Gatekeepers both within and outside of organizations are able to allow and restrict access to information as well as define the framework with which the information should be examined. Because they control what information gets released and when, these gatekeepers can be powerful individuals within organizations (Morgan, 2006). A Primary measure of power in the district is the ability of stakeholders to control the narrative and manipulate perceptions. The perceptions of intentions and motives surrounding major decisions has proven to either significantly hinder or help the likelihood of success. Controlling the message creates substantial power to institutional change. As mentioned, the parent community wields a large amount of influence and power due to its ability to elect school board members. This ability to remove members perceived as ineffective or counterproductive exerts pressure on the school board to

TRACKING IN CAREER TECHNICAL EDUCATION

keep the community happy. The intervention team has the ability to influence the perceptions of various school initiatives by proactively controlling the message to the parent community.

Morgan (2006) suggests that leadership ultimately involves an ability to define the reality of others. Leaders can subtly guide or influence the message organizational members receive by controlling symbols such as images, languages, symbols, stories, ceremonies and rituals.

Controlling power by controlling the message is a subtle yet significant way to direct a situation toward the desired outcome (Morgan, 2006). The district office does not possess nearly as much power to control the message, and therefore relies on the sites to serve as a counterbalance to the local media. The intervention team's ability to maintain a reputation as a trusted source of information allowed the school and its leadership to gain power.

After considering multiple alternatives and examining trade-offs, a strategic plan, which establishes policy to reduce ability tracking in district CTE pathways, was developed. Organizing key stakeholders, understanding different perspectives, and finding common, mutually beneficial outcomes facilitated meaningful progress. Leveraging institutional power to create the needed change to implement the proposed intervention requires collaborative alliances as well as bold leadership from site administrators. Institutions change at glacial speed and radical change is usually isolated to singular moments in history (Meyer, 2006). Challenging the current perception of ability tracking and the policy that supports its continued existence within the district was an attainable outcome and will had positive impact on high, middle and lower achieving students.

Intervention Research Questions

TRACKING IN CAREER TECHNICAL EDUCATION

1. To what extent does the CTE course rebranding and redesign to meet IB standards have a positive effect on the enrollment and attrition of all CTE business pathway?
 - a. Effect on high achieving students?
 - b. Effect on moderately (medium) achieving students?
 - c. Effect on lower achieving students?
2. How does an increase in higher achieving student enrollment affect the middle and lower achieving students' enrollment and attrition patterns in the class?
3. In what ways do teachers implement IB instructional pedagogy into the newly designed IB business classes?
4. What is the relationship between taking IB business pathway classes and selective college acceptance?

Participant Selection

All students at the target high school were exposed to recruitment literature advertising the new IB Business Management course. Upon review of the provided material, students were able to determine if enrolling in the class aligns with their goals and interests. Once students enrolled in the class and the school year began, the principal investigator addressed the students as a group, asking if they were willing to participate in surveys and interviews regarding the factors that influenced their decision to enroll in the class. These interviews and surveys also addressed the students' perceptions of their parents understanding and opinions of CTE classes and the IB program. The interviews were conducted at two checkpoints during the first semester of class. These interviews were organized into small groups consisting of 4-5 students and lasted approximately 15 minutes each. They took place during regularly scheduled class time and planned on a day that students were engaged in independent work in order to avoid a disruption

TRACKING IN CAREER TECHNICAL EDUCATION

of instruction. Students who did not wish to participate in the interviews were not interviewed. In addition, a comparison group of students, from the target high school, who did not enroll in the class was recruited via email announcements. These students were asked to share reasons why they did not enroll in the IB Business Management class.

Interview and survey data for as close to 90% of the students who enrolled in the class as possible was desired. Two sections of the class with approximately 34 seats in each class were offered, allowing space for 68 students to enroll in the classes. The desired participation consisted of approximately 60 students. Approximately 30 students who did not enroll in the class provided a diverse enough sample size to gain a comprehensive understanding of the key reasons members of the target population did not enroll in the IB Business Management class.

All students in the class were approached as a group by the principal investigator for recruitment into the study. They all received the same in-class presentation detailing the specifics of the intervention. They also all received a follow up email. Participation in the study did not have an effect on student grades in the business class nor any other adverse effects. The teacher was given a script to read to remind the students to turn in their paperwork if they would like to participate in the study.

In addition, two comparison high school sites were utilized in this research. Each of the two comparison sites have similar business pathways and can be used to identify and account for larger changes in enrollment trends into CTE classes within the district. The sample size of students consisted of approximately 60 students enrolled in the IB business class at the treatment site, 30 students not enrolled in the IB business classes at the treatment site, and 60 students

TRACKING IN CAREER TECHNICAL EDUCATION

enrolled in CTE business classes at the two comparison sites combined. This created a total sample size of approximately 150 students. Using a t-test to find the difference between the two independent means, an effect size of .6 with a power of .95 was the desired outcome.

Criteria for participation.

Students.

- Must be a high school junior at the selected targeted high school for IB Business Management 1 or a high school senior at the selected targeted high school for IB Business Management 2.
- Must have ≥ 3.5 GPA
- Must have completed and returned Parental Permission Form and Student Assent Form.

A small sample size of students (approximately 30) who did not enroll in the class was asked to participate in order to gain an understanding of the reasons they did not enroll. These students were identified by their answers on the needs assessment survey (Sciacca, 2015).

Students with ≥ 3.5 GPA who indicated a strong interest in the topic of business on their survey, but did not enroll in a business pathway class at the target school were recruited to participate in the research.

Teachers.

Business teachers at both the target school and the comparison schools participated in the study. They were asked to complete one survey and two interviews throughout the intervention. The survey for the teachers at the target school focused on the perceived effectiveness of the IB training and was administered after the IB training was completed. The survey for the teachers at

TRACKING IN CAREER TECHNICAL EDUCATION

the comparison schools focused on any training or professional development they have received related to their business classes. The two interviews focused on perceived student engagement, implementation fidelity and program effectiveness for high, middle and lower achieving students. The majority of the questions were open ended to allow the teachers to share their overall observations of the newly designed courses. The pre-semester and end of semester interviews measured growth in these three identified areas. Both interviews were preceded by an observation of the teacher during a class period of IB Business Management. These observations were used to guide the interviews and allow the researcher to gain a more comprehensive understanding of the instruction within the class. Observations focused on classroom content, delivery, student engagement and fidelity to intervention implementation.

Guidance Counselors.

All seven guidance counselors at the selected school pilot site were asked to participate in the study. Each of the counselors was asked to complete one survey and participate in one group interview session. The survey focused on the effectiveness of counselor marketing of the IB business management classes. It was administered after the primary marketing efforts had been completed and students had registered for their classes. Counselor post-registration interviews were conducted after class registration was completed. The interviews focused on the implementation fidelity regarding the promotion of the new business pathway as well as the collection of observation data related to marketing effectiveness to high, middle and low achieving students. Two guidance counselors from each of the comparison schools were also asked to participate in the study. The judgment method of selection of the two guidance counselors was used for both comparison sites. The reason the judgment method was used is that there are only 3 guidance counselors at each of the two comparison sites. This limits the

TRACKING IN CAREER TECHNICAL EDUCATION

participant options and reduces the likelihood of authentic participation (Marshall, 1996). The time and effort demands of counselors in this study exceeds that of all other participants.

Selecting counselors who were initially willing to participate with fidelity and already have a working knowledge of the CTE programs on campus increased the participant buy-in and ultimately led to a more effective intervention. Each counselor from the comparison schools was asked to complete a survey addressing current marketing practices for the CTE business classes at their sites.

Evaluation questions

In order to gain a comprehensive understanding of the fidelity in which the intervention is implemented, frequent and consistent evaluation measures must exist to accurately assess any effects. Evaluation questions have been designed to guide the research team through the process of ensuring appropriate implementation of the intervention. These evaluation questions are distinct from the research questions, addressing the intervention process rather than the intervention outcomes.

1. To what degree are IB philosophy and standards successfully integrated into the newly designed IB Business Management course outline?
2. How are marketing materials used by school staff to promote the new identity of the IB Business Management classes?
3. What is the degree of alignment between the new course outline and the instruction occurring within the IB Business Management classes?
4. To what degree is the knowledge acquired at the IB conference applied to both the business pathway lesson delivery and counseling practices?

TRACKING IN CAREER TECHNICAL EDUCATION

Assessment tools and measures

Table 9

Data Collection Matrix- Intervention Implementation

Fidelity Indicator	Data Source	Data Collection Tool	Frequency	Responsibility
Course design	Submitted course description and outline	Course description Course outline	Single checkpoint – prior to course implementation	Principal Investigator
Addressing Evaluation question #1				
Course delivery	Course sequence	Class observations	Class observation-	Principal Investigator
Addressing evaluation question #2	Lesson design	Teacher interviews Student surveys	2 times over the course of 18 weeks	
	Class Pacing	Student interviews	Teacher interviews-	
	Student engagement		2 times- prior to the start of class and 18 weeks Student surveys-	
			1 time -3 weeks into the semester Student interviews-	
			1 time 18 weeks into the semester	
Marketing	Marketing materials	Brochures	Marketing materials- Single checkpoint prior to marketing	Principal Investigator
Addressing evaluation		Webpage		

TRACKING IN CAREER TECHNICAL EDUCATION

question #3	Guidance counselor marketing to students	Flyers Power Point presentations Guidance counselor interviews Guidance counselor survey	efforts Guidance counselors interviews- 1 time during the course registration period Guidance counselor survey- 1 time post registration period	
IB Training Addressing evaluation question #4	IBO conference	Teacher survey	Teacher survey- 1 time post conference	Principal Investigator

Critical Assessment of Key Criteria

Strosberg and Wholey (1983) discuss three key program design conditions that lead to better evaluation. Ensuring program objectives are well defined was critical to the success of the intervention. Currently, increasing the enrollment of higher achieving students while maintaining the number of middle and lower achieving students are simple and well defined objectives. However, the third objective of the intervention was to increase the levels of rigor and relevance of the business classes. Criteria and metrics to establish an increase in both rigor and relevance did not exist and therefore made it difficult to evaluate results. This required the researcher to develop clear measures of rigor and relevance, which ensured the intervention was evaluable.

TRACKING IN CAREER TECHNICAL EDUCATION

Another important condition needed is plausible program objectives. The results from the needs assessment clearly indicated that the perceived value of CTE classes with regards to college admissions and relevance to future career goals are the primary deterrents from class enrollment for higher achieving students (Sciacca, 2015). If these deterrents were curbed, then a plausible expectation would be an increase in net enrollment of higher achieving students. The intervention plan of redesigning the CTE business classes into IB classes was realistic since there is currently district and site administration support, it is a low cost intervention and it aligns with both school and district priorities. Key stakeholders also endorsed the intervention plan and were anxious to list the new course on the course offering form.

The final condition needed to achieve viable program evaluation is a clear intended use of the information collected from the research. After examining the statistical significances of any increase in higher achieving students, the broader application of this knowledge throughout the district CTE pathways was discussed. Since the evaluation was primarily summative, the results did not effect the initial application of the intervention. Because of this, the use of the acquired information could affect the possible expansion of the intervention to other pathways within the district.

Procedure

Intervention methodology.

A variety of inputs, activities and stakeholder participation were needed to accomplish the desired results of the intervention. The inputs and outputs needed have been divided into three categories on the Logic Model (see Figure 1): (a) course redesign – addressing evaluation questions 1 and 2 (shown in green), (b) course rebranding and promotion – addressing evaluation

TRACKING IN CAREER TECHNICAL EDUCATION

question 3 (shown in purple), and (c) staff training for effective implementation of the new course structure – addressing evaluation question 4 (shown in orange).

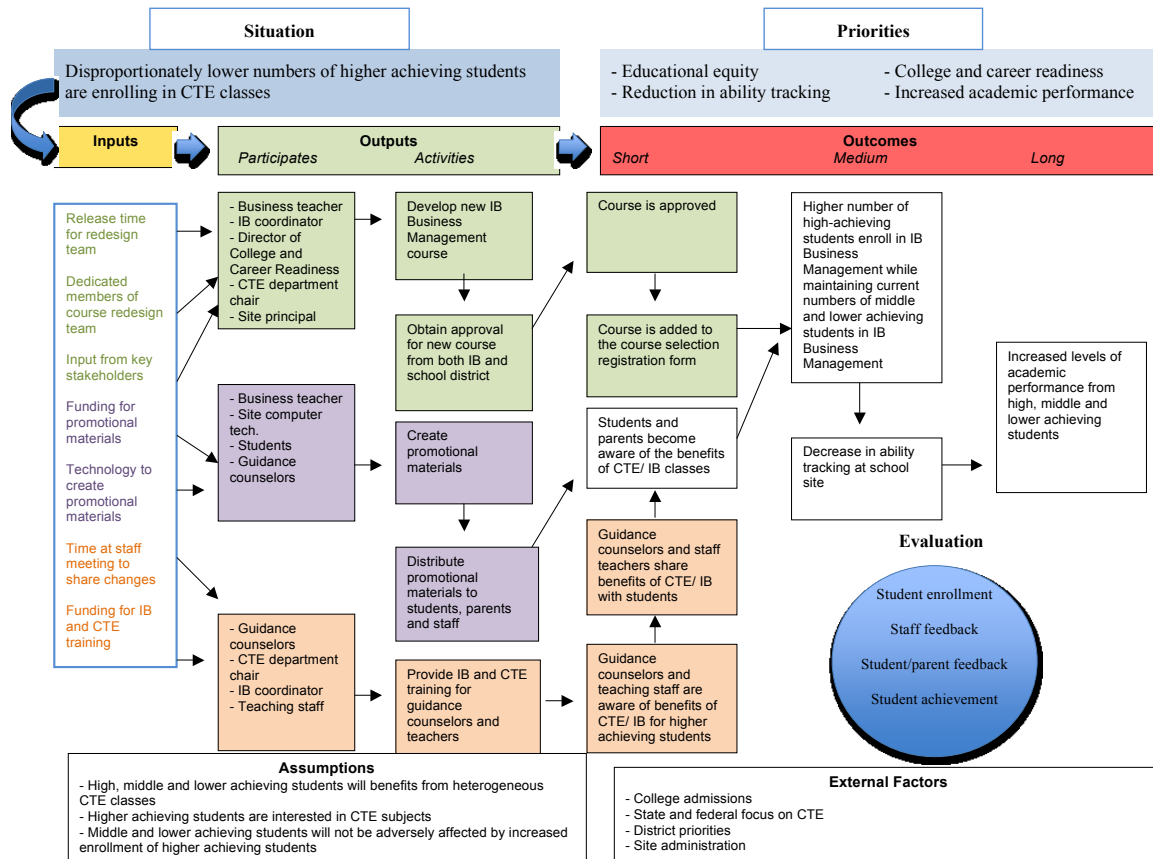


Figure 1. Logic model representing the flow of inputs, outputs and outcomes throughout the intervention implementation process.

The redesigning of the current business class into IB Business Management began with the assembly of a dedicated course redesign team consisting of the business teacher, the CTE department chair, the site IB coordinator, a site guidance counselor and the districts’ Director of College and Career Readiness. These team members used the existing framework of the current IB business classes from other districts to create the new IB Business Management class. This

TRACKING IN CAREER TECHNICAL EDUCATION

required significant time for all team members to meet (Melville, Bartley & Weinburgh, 2012). Funds for teacher release time were necessary to ensure key stakeholders are part of the process. In addition, site administration supported the course redesign by allowing a guidance counselor to work with the team. This required shifting some of the counselor's daily obligations to another staff member for the duration of the redesign process (Feller, 2003). Feedback from students and parents as primary stakeholders was also an important input as the team moved through the process. After assembling the team and redesigning the business class, the updated course description was sent to IB (IBO.org, 2015) and the district office (NMUSD.us, 2015) for approval before the process could move forward. The final course description is listed in appendix F.

Once the course redesign process was completed, effective promotion of the newly designed course was required for successful implementation of the intervention. To accomplish this, time and funding to create promotional materials were needed. The IB coordinator, business teacher and site technology specialist needed release time or extra duty pay in the form of a stipend to create printed promotional materials, website flyers, student announcements and class presentations. The primary marketing tools to reach parents were the website flyers and presentations at the schools open house night. The IB coordinator and IB business teacher secured time to give a short presentation on the changes and benefits of the new class at the parent assembly at Back to School Night. This allowed them to highlight changes, dispel preconceived notions regarding low rigor and direct parents to the website and guidance counselors for additional information. Classroom visits to all 11th grade AP English classes allowed the IB coordinator and IB business teacher to present changes, distribute flyers and answer student questions in an intimate setting. Classroom visits have been the most successful

TRACKING IN CAREER TECHNICAL EDUCATION

promotional strategy for new classes and programs and targeting AP English classes created a manageable number of class presentations. Focusing on 11th grade AP English classes also ensured a high concentration of high achieving students, the target market of the rebranding. The middle and lower achieving students who already expressed interest in business received similar presentations in their 11th grade Entrepreneurship classes. Because the newly designed class is a 12th grade capstone class, the initial rebranding efforts focused on 11th grade students prior to the course registration period.

The IB coordinator and business teacher used their combined expertise of the course structure with the technical expertise of the site technology specialist to create the promotional materials. The required technology and computer software already existed on campus and was used at no additional cost. Adobe Creative Suite and Microsoft Word were used to create the majority of the promotional materials and the district printing facility provided copies of all materials at a reduced cost. The promotion of the course overhaul to staff members was another important aspect that impacted the effectiveness of the proposed intervention. Dedicated time to speak at staff meetings and answer questions required support for the professional development coordinator as well as administration.

The in-depth IB training of the teaching staff and guidance counselors and the creation of promotional materials were two expected outputs of the intervention. Guidance counselors are the most influential in-school factor effecting student course selection (Feller, 2003). Because of this, it was critical that the guidance counseling team received in-depth training regarding the philosophy, program structure, learner profile characteristics and desired outcomes of IB (IBO.org, 2015). To accomplish this, funding was an essential input needed to take members of

TRACKING IN CAREER TECHNICAL EDUCATION

the counseling team to an IB conference. The team of eight counselors selected two counselors to attend the conference, gather information and share the information with the rest of the department. The counselor representatives from the treatment site were accompanied by the IB coordinator, CTE department chair, one general education teacher, and an administrator in order to ensure the team moved forward in a common direction. Guidance counselors have a diverse set of practices and beliefs that can vary significantly from counselor to counselor at the same site if in-depth common training is not provided (Alger & Luke, 2015). This was an expensive aspect to the intervention because it required out-of-state travel for approximately 7 people. Airfare, hotel costs and per diem food allowances elevated the cost to over \$10,000. However, IB training aligns with current district initiatives and priorities and funding existed that was earmark for this type of expense. The required funds were requested and added to the 2016-2017 school budget during the site budget meetings in late May 2016.

The next component of the intervention focused on preparing the teachers to effectively deliver the new curriculum. This entailed significant training in both the IB approach and the CTE approach to teaching. An effective integration of the theoretical approach of IB (IBO.org, 2015) and the hands-on approach of CTE (Lewis, 2008) were a critical element of the success of the intervention. There are multiple IB trainings in North America throughout the year that focus on either general IB overview training or more detailed subject specific training. The teacher team attended both the general overview training and the specific trainings of the IBCC curriculum over a two-year period. However, due to the time constraints of this intervention, teachers only received the general overview training within the scope of this study. Differentiation within classrooms was a focus of the trainings and strategies for effectively engaging high, middle and lower achieving students within the same IB business class was a

TRACKING IN CAREER TECHNICAL EDUCATION

priority. In addition, the on-site IB coordinator provided in-service trainings for both the counseling team and the core group of IB and CTE teachers. The desired outcome of the trainings was to further develop differentiation skills in order to enhance the rigor and relevance for high, middle and lower achieving students within the redesigned business pathway.

Alignment with research questions

Each set of inputs leads to expected outputs, which in turn lead to desired outcomes of change. These outcomes are broken down into short-term, medium-term and long-term outcomes on the logic model (see Figure 1). Each of the three outcome pathways align with one or more of the defined research questions. Course redesign and rebranding described by both the green and purple tracks address research questions 1 and 2 while staff training with regards to the new IB approach addresses research question 3. The medium term outcome of enrollment and retention of higher achieving students while maintaining the enrollment of middle and lower achieving students is a primary indicator of the success of the intervention and explicitly addresses research questions 1 and 2. In addition, the pathways also align with the four evaluation questions described in this chapter. Evaluation questions 1,3 and 4 address the fidelity of implementation with regards to course design and course delivery. These questions align with both the green and orange pathways outlining course design and staff training. Evaluation question 2 examines the fidelity of implementation regarding the use of marketing materials in order to change the perceptions of the business pathway at the pilot high school. All four of these evaluation questions lead the same medium-term outcome of increased enrollment of high achieving students into the business pathway while maintaining the number of middle and lower achieving students enrolled.

TRACKING IN CAREER TECHNICAL EDUCATION

The short-term outcomes include the approval of the IB Business Management class, the addition of the IB Business Management class to the course registration form, an increased familiarity with IB Business Management from school staff and an increased familiarity of IB Business Management from students and parents. The short-term outcomes of the course redesign begin with the approval of the new course by both IB and the school district, resulting in the addition of IB Business Management to the course selection registration form for the 16/17 school year. The course registration form is a piece of paper that lists all courses available for students in each grade level. Students are sent home with the registration form and are required to fill out course requests and alternate requests, obtain a parent signature and then sit down with their guidance counselor to input the requests into the registration system. During these individual counselor meetings, guidance counselors make alternative recommendations based on the goals and interests of the student. These recommendations are heavily influenced by the level of familiarity with each class and program by the counselor as well as their personal beliefs regarding the value of the class for each student (Feller, 2003).

Obtaining approval to add IB Business Management to the course registration form was an important short-term outcome in the intervention process, but it did not ensure the class would be offered the following school year. A myriad of factors are considered when determining which classes will ultimately make the master schedule. Among the most prominent factors are the number of student requests, the course alignment with district priorities and needs of the student population primarily served by each course (Kruse & Kruse, 1995). This means multiple short-term outcomes needed to be present for a realistic chance for the class to make the final master schedule. The combination of the addition of IB Business Management to the registration form with a heightened level of course familiarity and increased perceived value of the class

TRACKING IN CAREER TECHNICAL EDUCATION

from the perspective of both guidance counselors and higher achieving students are all necessary to accomplish meaningful results.

Working in conjunction with the redesign and rebranding process was the promotion of the changes to the pathway and the predicted benefits of the changes. The promotion of the IB Business Management program hinged on the ability of the intervention to effectively educate the site guidance counselor team and teaching staff on the details of the newly redesigned business pathway. Guidance counselors and teaching staff have significant influence over course selection patterns and must have accurate information regarding the details of the new classes in order to effectively promote them to the students on their caseloads (Feller, 2003). The guidance counselor and teacher who served on the course redesign team kept the rest of the staff up to date with the details of the new courses.

The role of the guidance counselors in this study included frequent agenda items during counseling meetings specifically addressing the changes to the business pathway. Consistent monitoring of both the guidance counselors knowledge and perceptions of the IB business class was an essential component to the interventions success. The principal investigator attended counseling meetings at the treatment site weekly for the three weeks preceding registration and the week following the registration period to ensure both knowledge and buy-in are at acceptable levels within the counseling team. The counseling team also visited the business class prior to registration to gain a foundational understanding of how the class is run. The IB business teacher was invited to a counseling meeting to outline the class structure and answer any questions the counselors may have.

TRACKING IN CAREER TECHNICAL EDUCATION

Tangible promotional materials were created as a parallel output to counselor and teacher training. Informational materials including flyers, webpages, PA announcements and video promotions were created which describe the details of the course changes. These materials outlined the benefits of the course redesign and highlighted the advantages of the rebranding. Parents, students and staff members were exposed to the materials in a variety of mediums in order to maximize the likelihood of effective contact. The business department chair and IB Business Management teacher was responsible for the on-campus promotion of the new classes. They scheduled class visits to English classes in early spring, prior to registration, to pitch the classes. Particular focus was on the presentations made to the advanced level classes in order to ensure they gained a full understanding of the enhanced rigor and relevance for higher achieving students.

Summary matrix

Table 10 outlines a summary matrix between research questions, evaluation questions, variable indicators, and data gathering methods.

Table 10

Research Questions, Selected Evaluation Questions, Variables, and Data Gathering Methods

Data gathering approach	RQ3: In what ways do teachers implement IB instructional pedagogy into the newly designed IB business classes? (Process)	RQ4: What is the relationship, if any, between taking IB business pathway classes and selective college acceptance? (Outcome)	RQ1: To what extent does the course rebranding and redesign to meet IB standards have a positive effect on the enrollment and attrition of higher achieving students?	RQ2: How does an increase in higher achieving student enrollment affect the middle and lower achieving students' enrollment and attrition
--------------------------------	--	---	---	---

TRACKING IN CAREER TECHNICAL EDUCATION

			(Outcome)	patterns? (Outcome)
Pre-program questions	Use of IB strategies within the Business pathway prior to training (Quan)	Acceptance rates over previous 3 years into selective and highly selective colleges (Quan)	Enrollment numbers of students with ≥ 3.5 GPA within the business pathway prior to intervention (Quan)	Enrollment numbers of middle and lower achieving students (below 3.5 GPA) within the business pathway prior to intervention (Quan)
			Attrition rates of students with ≥ 3.5 GPA within the business pathway prior to intervention (Quan)	Attrition rates of middle and lower achieving students (below 3.5 GPA) within the business pathway prior to intervention (Quan)
			Self reported reasons why higher achieving students are not enrolling in CTE classes (Qual)	
Session assessment	Number of teachers who attend IB training in-service training (Quan)			
	Number of teachers who attend IB training conference training (Quan)			
	Teacher feedback from IB in-service and conference training (Qual)			
Post-program questions	Use of IB strategies within the Business pathway after IB training is conducted (Quan)	Acceptance rates of students who complete IB Business Management into selective and highly selective colleges (Quan)	Enrollment numbers of students with > 3.5 GPA within the business pathway after intervention implementation i (Quan)	Enrollment numbers of middle and lower achieving students (below 3.5 GPA) within the business pathway after intervention implementation (Quan)
	Quality of IB strategies within the Business pathway after IB training is conducted (Qual)		Attrition rates of students with > 3.5 GPA within the	Attrition rates of middle and lower

TRACKING IN CAREER TECHNICAL EDUCATION

		business pathway after intervention implementation (Quan)	achieving students (below 3.5 GPA) after intervention implementation (Quan)
Program evaluation	Teacher survey feedback addressing fidelity of IB strategy implementation (Qual)	Self reported reasons why higher achieving students chose to enroll in IB Business Management (Qual)	Self reported reasons why middle and lower achieving students chose to enroll in IB Business Management (Qual)
	Evaluation Questions 1, 3, 4	Evaluation Q2	Evaluation Q2
	Classroom observations examining the use and effectiveness of IB strategy implementation (Qual)	High achieving student evaluation of the perceived value of IB Business Management (Qual)	Middle and lower achieving student evaluation of the perceived value of IB Business Management (Qual)
	Evaluation Q1, 3,4	Evaluation Q2	Evaluation Q2

Evaluation Approach

The evaluation for the proposed intervention utilized a mixed methods approach. Increased class enrollment and retention of higher achieving students in the pilot CTE classes, maintaining the current levels of middle and lower achieving students in the classes, and increasing the rigor and relevance of the curriculum were the primary metrics used to measure the initial effects of the intervention. Using historical enrollment data of the demographic breakdown of the CTE business classes over the last three years and comparing that data to the enrollment demographics after the intervention has been implemented identified changes in student enrollment trends. Currently, three high schools within the district have CTE business pathway classes. Only one of the three schools received the treatment of redesigning

TRACKING IN CAREER TECHNICAL EDUCATION

and rebranding the classes into IB business classes. This created comparison groups at the other two high schools. Enrollment numbers of high, middle and lower achieving students are primarily summative and quantitative in nature since enrollment is objective and will be measured after the intervention. However, the increase in rigor and relevance was measured using formative assessments and adjusted accordingly throughout the school year. Qualitative student interviews and surveys were utilized to capture the perception of rigor and relevance from enrolled students.

The intervention hypothesized that higher achieving students will find value in CTE classes once they enroll. Because initial enrollment remains a primary success indicator, the intervention measured one-shot results of enrollment at the start of the school year. This measurement provided information relevant to answering research questions 1 and 2. Although the CTE teacher was heavily involved in the organization and design of these formative assessments, they were administered by an objective observer to minimize participant biases. Advancement through the IB business pathway is another success indicator that was monitored. The percentage of 11th grade students who complete IB Business Management 1 and enroll in IB Business Management 2 for their senior year is a strong indicator of perceived student value of the classes.

Aside from minimum student enrollment requirements from the district office, there are no laws, regulations or grant requirements dictating the parameters of success. This means that success will be defined by the core group of stakeholders (teachers, guidance counselors, principal, students, parents and the district CTE administrator).

Data Collection and Analysis

TRACKING IN CAREER TECHNICAL EDUCATION

Hypothesis/Objective

The objective of the intervention was to increase the number of higher achieving students in the pilot CTE pathway by increasing the perceived rigor, relevance and value, while maintaining the interest and enrollment numbers of middle and lower achieving students. The examination of factors related to research questions 1 and 2 will provide the necessary information to either support or reject this hypothesis.

Effect Size

There is no universal guideline or rule of thumb for judging the practical importance or substantive significance of a standardized effect size estimate for an intervention. Instead, empirical benchmarks of comparison must be developed that reflect the nature of the intervention being evaluated, its target population, and the outcome measures being used (Hill, Bloom, Black and Lipsey, 2008). For the current study, an effect size of .6 has been selected based on previous research studies and the general trends of CTE research over the last decade. Although effect size varies in research related to CTE and ability tracking, a study by Gentry, Peters and Mann (2007) possesses a similar research design to the one detailed in this study and was used as a primary model to determine effect size. Gentry, Peters and Mann (2007) used a sample size of 51 students at a single site to determine the differences in perceived value of CTE classes between higher achieving and lower achieving students. With a power value of .9, the effect size of the study is .58 using an independent sample t test. In the proposed intervention, an independent sample t test was used to compare the means between the treatment group at the pilot high school pre and post intervention. An independent sample t test was selected due to (a) its versatility in adapting to a variety of research designs, (b) a lack of theoretical limits on

TRACKING IN CAREER TECHNICAL EDUCATION

populations that can be compared, (c) control of Type I error when multiple populations are compared and (d) a long history of acceptance in the behavioral sciences (Rojewski and Lee, 2012). The effect size of .58 is considered “medium” in general terms and requires a sample size of 120 participants. The required sample size aligns with the total population of students enrolled in the business pathways (150) at the three high schools included in the study. The feasibility of obtaining an 80% participation rate within the business pathways was reasonable and was accomplished in large part due to strong relationships with the pathway teachers at each site.

Research and Evaluation Design

A quasi-experimental design was used to test the descriptive causal hypothesis discussed above. Three high schools were included in the research study, one treatment site and two comparison sites. The treatment site was selected by the research administration team while the students at the treatment site self-selected into the treatment group by enrolling into the IB Business Management classes. The treatment site replaced the current CTE business pathway classes with the newly designed IB business pathway classes, exposed students and staff to rebranding marketing materials, and provided extensive IB training for business teachers and counselors. The two comparison sites continued operations of their current CTE business pathways.

Using the nonequivalent comparison group design, a pre and post survey was administered to four groups of students, (a) students at the treatment site who enroll in an IB business class; (b) a sample of high achieving students at the treatment site who are interested in business but do not enroll in an IB business class; (c) students at comparison site #1 who enroll in a CTE business class and; (d) students at comparison site #2 who enroll in a CTE business

TRACKING IN CAREER TECHNICAL EDUCATION

class. The surveys measured the perceived value and relevance of CTE classes as well as identified current barriers to CTE enrollment for high, middle and lower achieving students. The surveys assisted in gathering information that was relevant to answering research questions 1 and 2. The pretest survey results are organized in to high, middle and lower achieving students in order to understand the differences in perspectives between the ability groups and identify any significant differences between the three sites.

Longitudinal enrollment data from the treatment site was used to help determine any changes in enrollment patterns attributed to the treatment. Examining cohort data from previous years enrollment in the CTE business pathway and comparing it to enrollment data post-intervention required cohort assumptions that include (a) cohorts differ only slightly from year to year and; (b) one cohort is given the treatment while earlier or later cohorts are not (Shadish, Cook and Campbell, 2002). Changes in enrollment numbers of higher achieving students and changes in the enrollment numbers of middle and lower achieving students were examined at the treatment site to identify possible effects of the intervention and provide details significant to research questions 1 and 2. Any detected changes in enrollment patterns were compared with trends at the two comparison sites to help rule out threats to validity such as historical changes in enrollment patterns on a state or national level.

College acceptance rates into selective universities were another metric used to measure the effects of the IB business classes on college admissions. There are numerous metrics that can be used to determine the selectivity of colleges and universities such as average SAT score and percentage of applicants accepted (Hill, Bregman and Andrade, 2015). However, for the purpose of this study, selective colleges and universities is defined by using the Us News and World Report 2016 ranking system, and will include institutions ranked as “more selective” and “most

TRACKING IN CAREER TECHNICAL EDUCATION

selective”. The examination of college acceptance rates addresses research question 4 and shed light on any effects the intervention may have. Current perceptions within the school district included a belief that CTE classes are harmful to college applications when submitting to selective universities (Sciacca, 2015). Using a quasi-experimental design with comparison groups and pretests and posttests, it was possible to establish a causal relationship between IB business course completion and acceptance rates to selective universities. Because students self-select into the IB business classes and are not randomly assigned, a pretest was a critical component of the evaluation design in order to measure differences in the treatment group and the comparison groups prior to the intervention. It is possible that students who self-selected into the IB business classes also shared other characteristics that effect college admission patterns. A pretest helped identify other factors that may affect college admissions into selective universities such as parental education level, career aspirations and previous course selection patterns. Examining these differences also helped to account for any differences in college admissions patterns that are not caused by enrollment into the IB business classes.

In order to isolate the effects of the intervention, socio-economic status (SES) was a primary control variable in this study. Controlling for the influence of SES enabled an examination of the effects of the intervention on the independent variables of course enrollment and college acceptance. SES was selected as a primary control variable due to the wide range within the pilot site and comparison sites. Variations in SES have the potential to create changes in CTE course enrollment patterns and college acceptance rates to selective universities. For example, parental influence for lower SES households may steer students toward CTE course enrollment due to CTE’s association with blue color work preparation. In contrast, parents from more affluent households may steer their students away from CTE classes for the same reason. In

TRACKING IN CAREER TECHNICAL EDUCATION

addition, admissions rates to selective universities may be affected by SES because of its influence on which colleges are applied to (Kerr and Colangelo, 1988).

Fidelity of Implementation

In order to accurately measure the impact of the intervention, the degree of fidelity to which the implementation aligned with the planned implementation was continuously evaluated. Organizing the fidelity measures into the four evaluation questions provided acceptable framework to examine the intervention implementation. Fidelity was defined as the degree to which the implementation of the intervention as carried by those providing the new CTE program aligns with the design of the intervention (Dusenbury, 2003). Although the ideal outcome is perfect alignment between the intervention design and implementation, there were discrepancies as the intervention was put into action. While any discrepancies are not ideal, it was possible to maintain a high level of fidelity with regards to implantation since variance from the plan was identified early, adjusted for and accounted for when examining the outcomes of the intervention.

Fidelity of implementation evaluation was organized into four measures, which are the business course redesign aligning with evaluation question #1, business course rebranding aligning with evaluation question #2, the application of instruction within the classroom aligning with evaluation question #3 and the IB training aligning with evaluation question #4. First, the CTE business course redesign into IB Business Management had a straightforward approach to fidelity evaluation because a single product, the new course outline, was the result of this aspect of the intervention. This allowed for easy assessment of the end result and identified variance between the created course outline and the intended course outline. This evaluation allowed for

TRACKING IN CAREER TECHNICAL EDUCATION

adjustments to be made to align the course with the intended design prior to course rollout.

Although the process of course redesign slightly deviate from the intended plan outlined in the logic model and theory of treatment, using the final course outline as a fidelity checkpoint ensured the final course outline met the expected criteria outlined in the intervention plan.

The second area of fidelity evaluation, the CTE business course rebranding, required a more complex approach. Rebranding required multiple people working in a continuous effort to change the perception of the CTE business pathway. There was not a singular final product to the rebranding effort nor is there a clear point at which rebranding ends. Instead, the rebranding of the CTE business class consisted of a series of small actions by administrators, guidance counselors, teachers and students, which had incremental effects on the rebranding efforts. This required multiple fidelity checkpoints from each of the key stakeholder groups involved in the intervention implementation. Some of the outputs of the pathway rebranding were in the form of products such as brochures, flyers and other promotional materials. While these materials can be compared to the intended design of marketing materials, the use of these materials was a critical fidelity measure that must be evaluated.

The third area of fidelity evaluation, the alignment of instructional delivery with the intervention design, is a significant indicator of fidelity and was measured to ensure alignment with both the logic model and theory of treatment (Dusenbury, 2003). Rating the teachers effectiveness in program delivery was an important fidelity indicator. The teachers' ability to incorporate IB standards and philosophy into the CTE business class was a primary determinant of the attraction and retention of higher achieving students. Using differentiated instructional strategies to reach high, middle and lower achieving students were organized neatly within the

TRACKING IN CAREER TECHNICAL EDUCATION

theory of treatment, yet in practice, this differentiation is difficult to implement and without it one or more ability level will be underserved.

Finally, the staff training conference conducted by IBO needed to achieve the desired level of IB knowledge competency with both teachers and counselors. To measure this competency and ensure the training aligns with the necessary acquired knowledge predicted in the logic model and theory of treatment, a post-conference survey was administered.

Indicators of fidelity implementation

Nelson (2012) outlines the 5 steps for assessing intervention fidelity and details strategies for identifying appropriate fidelity indices. Using this model, four indicators have been identified as valuable metrics to assess alignment between the theory of treatment, logic model and actual implementation. IB Business Management course design, course delivery, program marketing and staff training were all used as fidelity checkpoints at strategic times throughout the intervention implementation to measure and adjust fidelity of implementation.

The IB Business Management course design consisted of a detailed outline of the course organized into units of study. The course outline also included sample lessons, major projects, required texts and recommended pacing guide. The intention of the course redesign was to take the existing structure of the CTE business class, infuse it with IB teaching theory and ensure high levels of rigor and relevance in order to appeal to higher, middle and lower achieving students. The process of this redesign is outlined in both the logic model and theory of treatment. The final course outline was used as a one-time fidelity measure, prior to its submission to the school board. This occurred in the spring prior to the first year of course delivery and was conducted by the principal investigator. Using the course outline as a fidelity indicator ensured that it met all

TRACKING IN CAREER TECHNICAL EDUCATION

requirements outlined in the intervention plan before it was put into use. While the course outline does not indicate fidelity of process with regards to course redesign, it served as a checkpoint, at which time the alignment with the logic model and theory of treatment were examined and the redesign process was reflected upon in order to determine the fidelity of implementation.

The delivery of the new course material and structure were a critical aspect of the intervention implementation that was monitored for fidelity frequently. Assessing the sequence, pacing and rigor of the new class identified any disconnects between the course outline and the implementation. As indicated in the data collection matrix, the alignment was measured using observations, surveys and interviews throughout the implementation process. Course sequencing was observed through classroom observations from the principal investigator at two points over an 18-week period. These observations focused on alignment between the course sequencing and pacing outlined in the course description and the lessons being taught in the classroom. Teacher interviews were also conducted two times within the first semester of the class. These interviews aligned with the classroom observations in order to get a more comprehensive understanding of the fidelity of the implementation. The student perspective is exceptionally valuable and was captured using both student surveys and student interviews. The surveys were designed to elicit student perceptions of rigor, relevance and value of the class. They were administered at the halfway point of the semester, about 9 weeks into the school year, which allowed for adjustments if significant deviation from the intended intervention was identified. In addition to student surveys, student interviews were conducted by the principal investigator at the conclusion of the first semester of the class. These interviews provided more detail regarding the fidelity of the intervention by gaining a detailed understanding of the student perceptions of the newly designed

TRACKING IN CAREER TECHNICAL EDUCATION

class. The student interviews served as a summative assessment of the fidelity of the intervention.

The implementation of the marketing plan for the new IB business course was reliant on guidance counselors, teachers and the designer of the marketing materials. Guidance counselors were required to effectively share the course characteristics with students and explain its value to high, middle and lower achieving students. To assess the fidelity of guidance counselor marketing, both surveys and interviews were used as tools to gain a comprehensive understanding of how the course was marketed to the students. The counselor interviews were conducted one time and took place after the course registration period in late spring. Conducting the interviews before the registration period has ended allowed for adjustments in marketing training to be made prior to the end of the registration window. In addition to interviews, a post-registration survey designed to measure fidelity implementation was sent to guidance counselors and teachers at the conclusion of the registration period. This survey assessed the alignment between the marketing plan design outlined in the logic model and the implementation of the marketing plan by both guidance counselors and teachers. The survey was a short computer-based format sent out at the conclusion of the registration period. The marketing materials created to promote the new IB business course were used as another fidelity checkpoint. Reviewing the materials prior to their use confirmed they effectively convey the intended message. By conducting the review prior to registration, the fidelity of the marketing materials was managed to align with the intended plan.

The final process evaluation checkpoint was to measure the fidelity of implementation of the IB training for both the IB Business Management teacher and guidance counselors. A counselor representative and teacher from the treatment site attended a comprehensive general IB

TRACKING IN CAREER TECHNICAL EDUCATION

training prior to the start of the new course. Although IBO has a strong reputation for high quality training, fidelity measure needed to be in place to ensure that both the teacher and counselors returned with a clear understanding of both the IB philosophy and the details of the IB business course. This was accomplished with an online survey administered to the teacher and counselors once they return from the training. Any gaps in knowledge were identified, addressed and rectified prior to the start of the school year.

Theory of Treatment

Lipsey (2007) outlines a theory of treatment which includes the four elements needed to create an effective intervention. The first element involves a clear definition of the problem and specifies the treatable condition (Lipsey, 2007). The conditions defined are the disadvantages students resulting from the disproportionately lower number of higher achieving students enrolled in CTE classes across the school district. The intervention focused on the business pathway at a pilot high school site. The primary target population was higher achieving students at the target high school interested in the subject of business and the secondary target population was middle and lower achieving students at the pilot high school interested in business classes.

The second and third elements outlined by Lipsey (2007) are identifying the necessary inputs for the proposed intervention and defining the steps, links and phases required to ensure a functional theory of treatment. Similarly, the logic model (figure 2) provides a detailed list of required inputs for the intervention plan. The inputs are divided up into three categories that correlate with sequential steps of expected outputs and outcomes. Inputs that affected the rigor of the business classes are highlighted in green, with the general outcome of an approved new course outline. Inputs that affected the promotion of the new business pathway are highlighted in

TRACKING IN CAREER TECHNICAL EDUCATION

purple with a general outcome of an enhanced perception of the rigor of the IB Business Management classes. Inputs that affect the staff training required to both teach and promote the new pathway structure are highlighted in orange and enable the staff to effectively implement IB teaching strategies in the new class. Phases within the same step are signified with vertical movement within each color.

The fourth element necessary is the specification of outputs and outcomes and the interrelationships between them (Lipsey, 2007). The desired outcome of the intervention was to increase the number of higher achieving students enrolling in the business pathway while maintaining the enrollment of middle and lower achieving students. This outcome hinges on three overarching outputs (a) the development and approval of a new course outline; (b) The effective creation and distribution of promotional materials; (c) adequate training for staff ensuring program delivery competence. In order to effectively achieve the desired outcome of increased enrollment of higher performing students, the variables of class rigor and class perception were manipulated.

TRACKING IN CAREER TECHNICAL EDUCATION

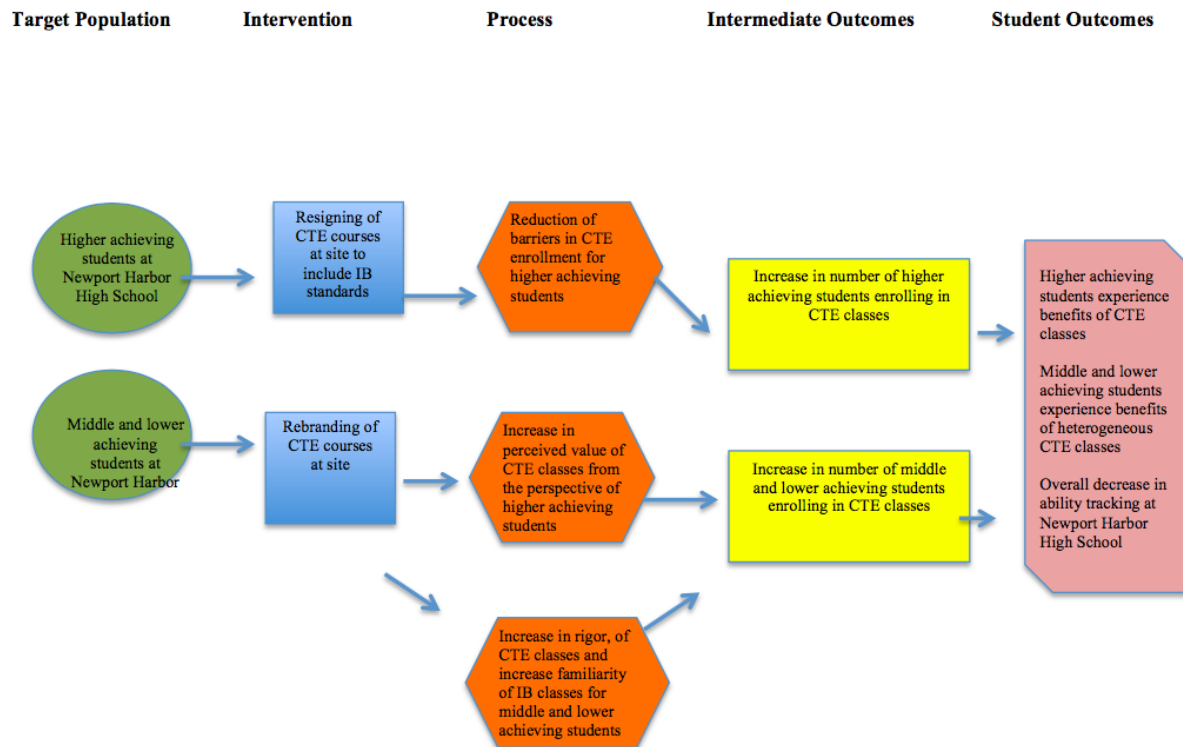


Figure 2. Theory of treatment model outlining the relationships between the target populations, process and outcomes of the intervention.

The success of the intervention was ultimately measured by the number of higher achieving students who enrolled and matriculated through the business pathway. This outcome is listed as a medium term outcome on the logic model due to the 1-3 year timeline needed to measure intervention effects. By ensuring alignment between the theory of treatment and the logic model, clear inputs, outputs and outcomes were articulated to all key stakeholders. This alignment clarified the process of change and shed light on the details contained within the “black box”. In addition, it helped define agreed upon metrics in order to effectively measure the success of the intervention.

Conclusion

TRACKING IN CAREER TECHNICAL EDUCATION

The desired results of the short-term outcomes was the eventual increase in the number of higher achieving students in the class while maintaining the numbers of middle and lower achieving students. The accomplishment of this medium term outcome resulted in a net decrease of ability tracking at the identified school site. A reduction of site ability tracking provides academic and social advantages for lower achieving students (Gamoran 1992; Holm, Jæger, Karlson & Reimer, 2013) and higher achieving students (Carrell, Fullerton & West, 2009; Burris, Heubert & Levin, 2006). By reducing the ability tracking at the school site the desired long-term outcome of the intervention is to increase academic performance and postsecondary options for higher, middle and lower achieving students.

Chapter 5
Findings and Discussion

The overriding purpose of this study was to examine the salient factors contributing to course selection patterns of CTE classes for various student populations. The following four research questions were asked to guide the research:

1. To what extent does the CTE course rebranding and redesign to meet IB standards have an effect on the enrollment and attrition of high, moderate and lower achieving students in the CTE business pathway?
2. How does an increase in higher achieving student enrollment affect the middle and lower achieving students' enrollment and attrition patterns in the class?
3. In what ways do teachers implement IB instructional pedagogy into the newly designed IB business classes?
4. What is the relationship between taking IB business pathway classes and admission rates to highly selective colleges and universities?

These research questions were used to guide the creation and implementation of an intervention designed to increase the number of higher achieving students in CTE classes while maintaining the current enrollment numbers of middle and lower achieving students. Examining the results of the needs assessment, it was determined that perceived rigor and perceived relevance to future college and career goals were the two dominant factors contributing to course selection patterns of CTE classes within the district (Sciacca, 2015). The objective of the intervention was to increase the perceived rigor and relevance of a pilot CTE class, Business Management, in order to examine the effects on enrollment patterns of higher achieving students.

TRACKING IN CAREER TECHNICAL EDUCATION

Through the use of survey instrumentation, interviews, and course enrollment numbers, data was collected to answer the four research questions.

Process of Implementation

Course creation and approval

The redesigning and rebranding of the Business Management class began with the rewriting of the course description and course outline of the class. Beginning in the fall of 2015 a team, which included the site CTE department chair, a business teacher at the treatment site, a guidance counselor and a site administrator worked collaboratively to rewrite the business course using the IB framework. The course description for Business Management, referred to as Virtual Enterprise within the district, was used as a foundational model and IB strategies and curriculum were integrated into the existing structure. Once this process was completed and the final draft was supported by all team members, the new course outline, IB Business Management, was submitted to both the district office and International Baccalaureate for approval. In April 2016, the class was approved to be offered the following school year.

The newly designed IB Business Management course strongly resembled the previous Business Management course in both structure and curriculum. Both the CTE department chair and the business teacher referred to the new course as a rebranding effort more than a course redesign. The two of them agreed that the new course outline highlighted IB strategies that were already present in the previous class outline and that the day-to-day operations within the class would not change significantly.

Course promotion and marketing

TRACKING IN CAREER TECHNICAL EDUCATION

Course promotion and advertising occurred simultaneous to the creation of the IB Business Management. Beginning in early spring 2016, the business teacher and CTE department chair created marketing materials for the new class. Flyers were distributed to current 11th grade students and posted to the school website, weekly announcements were made to the student body, and the business teacher visited 11th grade classrooms to promote the new class. The timing of the course promotions was aligned with the student course request process of the following year classes, which takes place in late spring. An effort was made to visit classrooms just prior to the distribution of student course request sheets to ensure the details of the class very fresh in the minds of the students at the treatment site.

The business teacher and CTE department chair also attended a guidance counselor meeting and presented the details of IB Business Management to the entire counseling team. In addition, the counseling team attended a group visit to the Business Management class to observe the class being taught. Upon completion of the class visit, the counseling team, business teacher and CTE department chair reconvened to discuss the class and address any pending questions.

IB training

Key stakeholders at the site were invited to attend IB training conferences in spring and summer 2016. The business teacher, CTE department chair, site administrator, and a member of the counseling team all attended an IB training conference to establish a foundational understanding of the IB framework. Due to budget restrictions, the entire counseling team was not able to attend the conference. However, the attending counselor was asked to create a summary presentation and the information was shared with the entire counseling team to ensure

TRACKING IN CAREER TECHNICAL EDUCATION

a common understanding of the core components of IB. Interview results indicated that the counseling team had a foundational understanding of IB and were comfortable explaining the basic characteristics of the IB framework to students and parents. The school site IB coordinator attended three counseling meetings in the spring of 2016 to further expand the teams understanding of IB.

Findings and Conclusions

Research Question 1

To what extent does the CTE course rebranding and redesign to meet IB standards have an effect on the enrollment and attrition of high, moderate and lower achieving students in the CTE business pathway?

In order to answer the primary research question, descriptive statistics examined the mean GPA pre and post intervention. The question was examined using an independent t-test with an alpha level of .05. The mean GPA of students enrolling in the business class pre intervention was compared to the mean GPA of students enrolling in the business class post intervention to determine if a significant difference existed between the two groups. The null hypothesis tested assumes there will be no significant difference between the pre and post GPA. All variables in the model showed a significant relationship within this .05 alpha level. At the treatment site $t(140) = 7.1, p = .041$. Levene's Test for Equality of variances was used and equal variances were assumed. The z score calculations reinforces the assumption of normal distribution of GPA data at the treatment site as indicated in appendix G. All but one of the 140 GPA z score fall between +3 and -3. In addition, a visual representation of GPA data in a histogram further supports normal distribution. Table 11 presents enrollment data of the capstone

TRACKING IN CAREER TECHNICAL EDUCATION

business class at the treatment site over the last five semesters. The data indicates a significant change in the enrollment and attrition patterns of high, moderate and lower achieving students between the pre and post periods of the implementation of the intervention.

Table 11

Treatment Site Enrollment and GPA Data

Year	Intervention Period	# of students enrolled	GPA average
Fall 2014	pre	24	2.8
Spring 2015	pre	22	2.61
Fall 2015	pre	27	1.66
Spring 2016	pre	26	2.27
Fall 2016	post	46	3.69

Table 12 compares the mean student GPA of the four semesters prior to the intervention (n=97) to the mean student GPA the semester post intervention (n=46). A statistically significant increase of 1.21 grade points was discovered upon implementation of the intervention. The mean GPA increased from 2.48 pre intervention to 3.69 post intervention suggesting a positive coloration between the rebranding efforts and enrollment numbers of higher achieving students. Within the post treatment group, 30 of the 46 (65%) students had ≥ 3.5 GPA post intervention versus an average of 25% of students that had ≥ 3.5 GPA in the 2 years preceding the intervention. This increase suggests that the intervention was successful in its attempt to attract more high achieving students into the IB Business classes. The percentage of students with ≥ 3.5 GPA increased at the treatment site post intervention indicating an influx of higher achieving

TRACKING IN CAREER TECHNICAL EDUCATION

students into the program. Prior to the intervention, one section of CTE business was offered each semester. However, upon implementation of the intervention, an influx of students enrolled in the new IB business classes resulting in the creation of a second section each semester. The 46 students who enrolled in the class were split into two sections of 24 students and 22 students. These two classes averaged GPA's of 3.91 and 3.47 respectively. While an imbalance of GPA exists between the two post intervention classes, both are still substantially higher than the GPA averages of the pre intervention classes.

Table 12

Treatment Site GPA Change

Intervention Period	# of Participants	# of Participants \geq 3.5 GPA	Mean GPA	Std. Deviation
Pre Treatment	97	25	2.48	1.001
Post Treatment	46	30	3.69	0.80615

Two comparison sites were utilized in this study to control for local, state and national trends that may effect changes in the mean GPA of CTE programs. Examination of the GPA changes at both comparison site #1 and comparison site #2 reveal an increase in mean GPA post intervention time period. At comparison site #1, two out of the 20 (10%) students had a GPA \geq 3.5 post intervention period versus an average of 8.2% of students that had a GPA \geq 3.5 in the two years preceding the intervention. Table 13 identifies a steady increase in GPA within the CTE pathway throughout the pre and post intervention period. This same trend is identified at comparison site #2 (table 14), in which an increase in GPA is detected over a five semester time period. At comparison site #2, 13 out of the 23 (56%) students had a GPA \geq 3.5 post intervention period versus an average of 49% of students that had a GPA \geq 3.5 in the two years preceding the

TRACKING IN CAREER TECHNICAL EDUCATION

intervention. The increase in average GPA post intervention at comparison site #1 and #2 were .19 and .39 respectively. This data indicates that, while student GPAs in CTE classes trended upwards due to other factors, the GPA increase at the treatment site was three times larger than the comparison sites. The difference in GPA growth between the treatment site and the comparison sites suggests that the intervention had a positive impact on the number of high achieving students enrolling into the CTE pathway.

Table 13

Comparison site #1 Enrollment and GPA Data

Year	Intervention Period	# of students enrolled	GPA average
Fall 2014	Pre	n/a	n/a
Spring 2015	Pre	n/a	n/a
Fall 2015	Pre	23	2.08
Spring 2016	Pre	19	3.03
Fall 2016	Post	19	3.17

Table 14

Comparison site #2 Enrollment and GPA Data

Year	Intervention Period	# of students enrolled	GPA average
Fall 2014	Pre	48	3.09
Spring 2015	Pre	32	2.71
Fall 2015	Pre	44	3.61
Spring 2016	Pre	33	3.46

Fall 2016	Post	67	3.31
-----------	------	----	------

Research Question 2

How does an increase in higher achieving student enrollment affect the middle and lower achieving students' enrollment and attrition patterns in the class?

A primary concern when implementing the intervention was the possibility of higher achieving students replacing middle and lower achieving students, in essence, pushing them out of the pathway. Descriptive statistics were used to compare the number and percentage of students with a GPA < 3.5 pre and post intervention. The total number of middle and lower achieving students enrolled in the CTE pathway each semester was gathered and examined to identify any significant changes indicating a decrease or influx of these students. By comparing both the numbers and percentages of middle and lower achieving students pre and post intervention, the study was able to separate the variables in increased enrollment of higher achieving students and a potential decrease in middle and lower achieving student enrollment. The intervention data indicates that, while the percentage of middle and lower achieving students within the pathway decreased, the number of these students remained within the expected range of the previous 4 semesters prior to the intervention. Sixteen students had a GPA < 3.5 in the semester following intervention implementation, while an average of 18 students pre intervention had a GPA < 3.5 each semester. The total number of students with a < 3.5 GPA ranged from 15 to 20 over the four semesters prior to the intervention. The 16 < 3.5 GPA students enrolled in the classes post intervention falls within the pre intervention range and does not deviate from what would have been expected without the implementation of the intervention.

TRACKING IN CAREER TECHNICAL EDUCATION

Table 15

Treatment Site- Students Below 3.5 GPA

Year	Intervention Period	# of students enrolled
Fall 2014	Pre	15
Spring 2015	Pre	18
Fall 2015	Pre	20
Spring 2016	Pre	18
Fall 2016	Post	16

Interview and survey data was collected to identify qualitative measures affecting enrollment patterns. Student survey and interview responses identified perceptions of high rigor in the IB Business Management classes compared to other elective offerings at the school. These perceptions of higher rigor relative to other electives were consistent among high, middle and lower achieving students. Table 16 summarizes the student interview and survey responses and organizes the responses into general thematic categories. Under the theme of rigor, two subcategories are coded into 1A and 1B. The code 1A indicates a student perception that the newly designed IB Business Management class is less rigorous than a traditional AP of IB class. Code 1B indicates a perception that IB Business Management is more rigorous than traditional elective classes offered at the treatment site. Examining these perceptions suggests that the perceived rigor of the class is more rigorous than other electives, but less rigorous than IB and AP classes in core curricular areas. The theme of perceived value is coded into 2A- perceived GPA and college acceptance benefits, 2B- perceived relevance to future career, and 2C-

TRACKING IN CAREER TECHNICAL EDUCATION

perceived value with regards to soft skill development. The theme of context-based learning is coded into 3A- simulation of real world experiences, and 3B- learning by doing.

Table 16

Student Data- Treatment Site

First Iteration (initial codes)					
Rigor		Perceived value		Context based learning	
1A	Less work than other AP/IB classes	2A	Grade bump contributed a lot to course enrollment	3A	This class gives us real world experience
1A	Spend 1-2 hours per week on outside of class work	2A	Had to give up fourth year foreign language to enroll	3A	This class is fun
		2A	This class will look good on transcript	3A	Lot's of fieldtrips
1B	Lot's of work compared to most standard level classes	2A	This class will increase my GPA	3A	Our business feels real
1B	Middle achieving students are challenged by class	2A	My Counselor told me I should take this class		
1B	Most student in class are "smart"			3B	The students have to figure out what to do
1B	More difficult than other electives	2B	I plan to major in business in college	3B	The teacher doe not teach much.
		2B	I'm interested in business	3B	More hands on than other IB classes
		2B	I took a business class prior to this one and liked it	3B	We learn by doing

TRACKING IN CAREER TECHNICAL EDUCATION

		2C	I want to learn presentation skills		
		2C	It's important to learn about business and money		
		2C	This class teaches us leadership skills		
		2C	This class fills an IB requirement for the IB diploma		
Second Iteration (Patterns)					
1A	IB Business is less difficult than most AP and IB classes	2A	Students believe that IB business will help them get accepted to college	3A	Students learn by doing
1B	IB Business is more difficult than most non-AP and IB classes	2B	Students interested in business see value in the class	3B	Student led learning
		2C	Students value the soft skills acquired in IB business		
		2D	IB business fills a requirements for IB Diploma candidates		
Third Iteration (Themes)					

TRACKING IN CAREER TECHNICAL EDUCATION

<p>1 IB Business is perceived to be a highly rigorous elective</p>	<p>2 Students believe IB Business will be helpful to achieving their future goals</p>	<p>3 IB Business is rich in experiential learning compared to other IB classes</p>
--	---	--

A reoccurring theme from middle and lower achieving students enrolled in IB Business Management was the perception that the class was more rigorous and carried a larger workload than most of their other classes. However, these same students indicated that this perception of heighten rigor did not affect their decision to enroll and remain in the class. The most dominate theme emerging from student survey and interview responses was the strong belief that IB Business Management would be valuable to future plans regarding both college and career. One of the higher achieving students accepted into a highly selective university stated “ Most of the elective options on our campus aren’t very interesting to me and don’t relate to my future job. IB business Management is the first elective our school has that is related to what I want to do”. In addition, one of the lower achieving students interviewed shared a similar perspective stating, “ This new business class is hard, but it is really helping me prepare for college and the real world”. Ninety two percent of student responses indicated middle and lower achieving students perceive the class as both highly relevant and highly valuable for their future goals. When combined with enrollment data, these responses indicate a continued interest in the redesigned class and the perception of heightened rigor did not have a deterring effect of middle and lower achieving students.

Counselor interview data at the treatment site collected after the course redesign revealed a belief that the redesigned business class was no longer a viable elective option for the lowest

TRACKING IN CAREER TECHNICAL EDUCATION

achieving students at the school. This group of students was defined by counselors as the students who were currently credit deficient and in danger of not graduating for high school on time. Prior to the course redesign, the CTE business class was used as a “safe haven” for very low achieving students. Counselors would sometimes enroll these students in the class believing they had a high likelihood of passing the class. Counselors indicated that the lower rigor and light workload made the class appealing for seniors who were in danger of not graduating. The CTE business class was not considered a “dumping ground” class, in which high numbers of lower achieving student were enrolled, but it was occasionally used for lower achieving students. After the course redesign, counselors were no longer comfortable enrolling extremely low achieving students into the class, citing the increase in rigor and workload. One counselor stated “I’m not sure IB business management is the best place for some of my lowest performers. It moves faster and those guys will get left in the dust”. Another counselor stated “ I still put some of my low students in the class, but I think there are safer places to put them if they need credits”. Both of these statements indicate counselor hesitation to recommend credit deficient students for the redesigned class. While the quantitative data collected in this study indicates the number of students with a GPA below 3.5 has remained similar pre and post intervention, the perception of increased rigor could have future impact on the counselor recommendation patterns of lower achieving students.

Research Question 3

In what ways do teachers implement IB instructional pedagogy into the newly designed IB business classes?

TRACKING IN CAREER TECHNICAL EDUCATION

Teacher training with regards to IB pedagogy was a critical step in ensuring effective implementation of IB curriculum within the class. The IB Business Management teacher, CTE department chair, two guidance counselors and site administration all participated in IB training prior to the start of the newly designed class. These trainings included a general overview of IB philosophy and approach to learning, detailed curriculum design, and IB teaching strategies. The majority of the trainings were focused on lesson design and implementation.

As described in chapter 3 of this dissertation, IB uses an inquiry-based approach to learning with a focus on critical thinking from a global perspective (IBO.org, 2017). The structure of the newly designed business class has integrated the business curriculum with the IB philosophy to create a project-based experience. Ensuring the IB business teacher has a strong foundation of understanding with regards to the IB standards and curriculum, as well as adequate training and support throughout the implementation process has resulted in the frequent use of IB instructional pedagogy in the class.

Teacher interview data and pre/post classroom observation data indicates increased frequency of IB strategies within the redesigned classes. Initially, the interview data was coded and organized into three thematic categories: rigor, enrollment observations, and the comfort and use of IB strategies within the classroom. Within these thematic categories, trends emerged indicating a perceived increase in the rigor, enrollment and the use of IB strategies within the classroom. Table 17 outlines the codes, patterns and themes that emerged from the teacher interviews. Under the theme of rigor, three subcategories are coded into 1A, 1B and 1C. The code 1A indicates a teacher perception that the newly designed IB Business Management class is more rigorous than the previous CTE business class. Code 1B indicates a perception that IB Business Management moves at a faster pace than the CTE business class and code 1C indicates

TRACKING IN CAREER TECHNICAL EDUCATION

opportunities for rigor differentiation within the class. The theme of enrollment is coded into 2A- changes in the demographic makeup of the class post intervention, 2B- the academic performance of students enrolled in IB Business Management, and 2C- the teachers perceived value of the class with regards to college admissions. The theme of IB strategy integration is coded into 3A- teacher familiarity and comfort with IB strategies, 3B- similarities between CTE strategies and IB strategies, and 3C- effects of rebranding the class. The IB Business Management teacher indicated an increase in rigor within the class stating “ the expectations of student work quality are higher than in previous years” and “I am now able to assign more independent homework, which allows us to cover more curriculum”. In addition, teacher interview data suggested that while the rigor of the class had increased, the students were still successful in achieving the increased academic expectations. Perceptions of student enrollment demographic emerged indicating the teacher believes that lower students are dropping out of the class at a higher rate than prior to the course redesign. The teacher stated, “we have less low kids. I think they are intimidated by so many high end students and are either not signing up or are dropping the class”. While this trend is not supported by the quantitative GPA and attrition data collected in this study, it indicates a teacher perception of higher performance from all students in the class.

Table 17

Teacher Interview Data

First Iteration (initial codes)					
Rigor		Enrollment		IB Strategies	
1A	Assignments are harder	2A	Two full classes- currently 63 students	3A	Teacher completed IB training

TRACKING IN CAREER TECHNICAL EDUCATION

1A	Expectations of work quality are higher	2A	Many IB diploma students	3A	Teacher feels comfortable with IB strategies and philosophy
1A	More writing than prior to shift to IB	2A	Many AVID students	—	
1A	I can assign more independent work and home work	2A	Most students are not pathway completers. They only sign up senior year.	3B	IB Business Management is very similar to VE
—	—	2B	Mostly high achieving students.	3B	The curriculum is almost identical, the pace and depth is greater.
1B	I cover more curriculum	2B	A few lower achieving students dropped after the first week. Teacher speculates they were intimidated Prior to IB switch there were many lower achieving students in class. Post switch there are very few.	3B	VE already used many IB approaches.
1B	Student work quality has increased significantly	2B	—	—	
1B	Class moves faster than before shift	2B	Currently, all students are passing.	3C	IB name draws higher achieving students
1B	Our business ideas are more complex	2B	Students who are not working in class or doing well are recommended to drop	3C	Grade bump is a big selling point
—	—	2C	Teacher believes class is helpful for college success	3C	Switch feels more like rebranding than restructuring

TRACKING IN CAREER TECHNICAL EDUCATION

1C	Associate positions do not require as much work	2C	Teacher is not sure if class is helpful or hurtful regarding college admissions but believes it should be helpful.	
1C	Executive positions require outside of class work.	2C	Teacher believes IB Business Management prepares students for college.	
1C	Teacher does not hear students complaining about too much work			
Second Iteration (Patterns)				
1A	IB Business is more rigorous than VE	2A	A different type of student is now enrolling in the class	3A Teacher incorporates IB strategies into class
1B	IB Business moves faster and is more in depth than VE	2B	All higher and middle achieving students have enrolled and seem to have pushed out the lower achieving students	3B IB strategies were already abundant in VE
1C	There are still opportunities for lower achieving students in IB Business	2C	Teacher believes IB business is helpful for college bound students	3C IB branding is the primary reason for the shift in student enrollment patterns.
Third Iteration (Themes)				
1	The rigor of IB Business has increased, but there are still opportunities for lower achieving students	2	Enrollment patterns are now all most all higher and middle achieving students	3 The shift to IB Business did not require big changes in curriculum or class structure

TRACKING IN CAREER TECHNICAL EDUCATION

The third theme that surfaced from the interviews was the use of IB strategies within the class. Two patterns emerged from teacher interviews, which addressed the use of IB strategies in the IB business class: 1) teacher comfort level with the understanding and implementation of IB strategies and 2) differences between the previous approach to CTE teaching and the IB approach. Teacher interview data indicates that the IB Business Management instructor has a solid understanding of foundational IB strategies. The teacher believes that the off site IB conference, online resources and collaboration with the site IB coordinator have all contributed to a strong understanding of IB pedagogy. The business teacher also believes that she is prepared to effectively implement these strategies into daily classroom lessons stating, “the first IB training helped me understand the big picture of IB. After that, one on one training from our IB coordinator helped me figure out how to apply the ideas and strategies to my class”.

Classroom observations support the presence of high levels of IB pedagogy in the daily lessons of the resigned business class. During the three classroom observations spread throughout the first semester of the redesigned business class, IB strategies were observed in all three lessons. The most common IB strategies observed included inquiry-based lessons, reflective practices and the promotion of risk-taking. All of these strategies are components of the IB learner profile and form the foundation of IB pedagogy (IBO.org, 2017). In one of the observed lessons the class was almost entirely run by the students. Class began with a student, who had the position of human resource associate, taking attendance for the class. This was followed by the CEO of the class outlining the objectives of the day for each department and reminding the students of upcoming events. While the teacher added in some clarifying details, the students were running the class. For the rest of the class, students worked within their departments to complete their daily tasks. The teacher roamed among the departments asking

TRACKING IN CAREER TECHNICAL EDUCATION

questions and providing feedback. The marketing department was working on individual aspects of the company SWAT analysis. The accounting department was finalizing the monthly income statement and depositing sales revenue into the company bank account. The IT department was setting up a Pay Pal account of the company website which allowed students from other schools in the state to order their product online. The sales department was working on a sales presentation for an upcoming trade show. The class structure was the epitome of an IB inquiry-based lesson. However, teacher interview data also indicated that these strategies were already present in her teaching prior to the IB redesign. In general, both the business teacher and CTE department chair believed that there was considerable overlap in the IB teaching approach and the CTE teaching approach that existed prior to the intervention implementation.

While the IB training increased awareness of IB strategies and assistant in the adjustments of multiple business lessons, it did not fundamentally change the approach to teaching that existed prior to the course redesign. This perception is in direct contrast with the perception of the guidance counselors, who believed the class was significantly different and more rigorous post intervention. This disconnect in perceptions can be linked to the IB training the guidance counselors experienced, in which the rigor of IB was constantly highlighted. In addition, the counselors observed the IB business class post intervention to gain a more comprehensive understanding of the class. The guidance counselors indicated that this was the first time they had observed the business class, which denied them the ability to compare the pre and post intervention class effectively. It appears that the counselors believed that the pre intervention business class was less rigorous than it actually was and that they perceived a significant increase in rigor post intervention. To combat this disconnect of perceived increased

TRACKING IN CAREER TECHNICAL EDUCATION

rigor, the enrollment, attrition and GPA data of this study must be shared with the guidance counseling staff to create a better understanding of the actual changes.

Research Question 4

What is the relationship between taking IB business pathway classes and admission rates into highly selective colleges and universities?

A primary concern of both high achieving students and their parents is that enrollment in a CTE class will have an adverse effect on highly selective college admissions. Highly selective colleges are defined in this study using the 2017 Us News and World Report college rankings. Currently, 36 colleges and university in the United States are labeled most selective in the rankings and constituted the list of highly selective schools examined. Three years of college acceptance data was collected and examined in this study. Two years of college acceptance data prior to the implementation of the intervention was examined and compared to post intervention admissions data. This data was also compared to three years of college admissions data from both of the comparison sites in order to control for other factors affecting acceptance patterns.

Table 18

Post Intervention Acceptance Rate of students with >3.5 GPA into Highly Selective Colleges

Group	Total # of students	# Accepted into Highly Selective College	% Accepted into Highly Selective Colleges
IB Business	30	4	13.30%
Treatment Site	233	27	11.60%
District	607	77	12.70%

TRACKING IN CAREER TECHNICAL EDUCATION

College acceptance data from the treatment site indicates no significant changes in highly selective college admissions trends with students enrolled in the IB business pathway. School wide, the average acceptance rate of students with ≥ 3.5 GPA into highly selective colleges and universities is 11.4%. Currently, there are 30 graduating seniors in the IB business class with a GPA of ≥ 3.5 . Out of these 30 seniors, four (13.3%) have been accepted into a highly selective college. Although the rate is slightly higher than the school average in the IB business class, it falls within a reasonable range of consistency with the larger school population. Based on this margin of error, the data does not indicate that the IB business class has a positive effect of acceptance rates to highly selective schools. However, the data does suggest that enrollment in the IB business class does not have an adverse effect on acceptance rates to highly selective colleges and universities. These findings indicate that enrollment in the IB business class does not have a significant positive or negative impact on admissions into highly selective colleges and universities.

Tables 19 and 20 display college acceptance rates two years prior to the intervention implementation for students with a GPA ≥ 3.5 . This data indicates a large shift in the type of student enrolling in the IB business class post intervention. In the two years prior to the intervention only 8 students in the 2015-2016 school year and 4 four students in the 2014- 2015 school year had a grade point average ≥ 3.5 . Of these students zero (0%) of them were accepted into a highly selective college or university. Although this is a very small data sample, the numbers suggest that the students enrolled were not on the higher end of the high achieving student spectrum.

Table 19

15-16 Acceptance Rate of Students with >3.5 GPA into Highly Selective

TRACKING IN CAREER TECHNICAL EDUCATION

Colleges

Group	Total # of students	# Accepted into Highly Selective College	% Accepted into Highly Selective Colleges
IB Business	8	0	0.00%
Treatment Site	219	22	10.04%
District	597	81	13.57%

Table 20

14-15 Acceptance Rate of Students with >3.5 GPA into Highly Selective Colleges

Group	Total # of students	# Accepted into Highly Selective College	% Accepted into Highly Selective Colleges
IB Business	4	0	0.00%
Treatment Site	240	31	12.91%
District	624	80	12.82%

The longitudinal acceptance data supports the findings introduced in the initial needs assessment conducted in this study. Higher achieving students seem to have avoided enrollment into the CTE business class pre intervention, with the very highest achieving students capable of gaining acceptance into highly selective colleges having rejected the class entirely.

The examination of college acceptance data into any 4- year college or university (not solely highly selective) for students with a cumulative GPA of < 3.5 reinforces the assertion that a significant shift occurred in the type of student enrolling in the redesigned IB business class.

TRACKING IN CAREER TECHNICAL EDUCATION

Table 21 indicates an obvious difference in the 4-year acceptance rates of < 3.5 GPA students enrolled in IB business and < 3.5 GPA students who are not. 10 of the 16 students with GPA's below 3.5 enrolled in the IB business class were accepted into a 4-year college or university. This statistic far exceeds both site and district acceptance trends.

Table 21

Acceptance Rate of Students with <3.5 GPA into 4 -year Universities

Group	Total # of students	# Accepted into 4 - Year Universities	% Accepted into Highly Selective Colleges
IB Business	16	10	62.50%
Treatment Site	376	82	21.80%
District	1164	219	18.81%

The data presented in table 21 suggests a shift in the academic profile of students with a GPA < 3.5 enrolled in the business class. The number of middle and lower achieving students enrolled in the business class did not significantly change between pre and post intervention. However, within the group of student with a GPA below 3.5, it is possible that the mean GPA shifted upwards post intervention. GPA's below 3.5 is a very large range and changes within this range would not be detected in this current study. It is also possible that the newly designed IB business class has a positive effect on 4-year college admissions rate and the high acceptance rates can be partially credited to class enrollment. Further analysis of the academic profile of the students with a GPA < 3.5 will further clarify the reasons for such a high 4-year acceptance rates.

Discussion

TRACKING IN CAREER TECHNICAL EDUCATION

Educational equity forms the theoretical framework of this study. The examination of systemic inequities within school systems frequently strive to identify and improve problems in practice, which contribute to educational disparity. The conversation surrounding educational inequity generally focuses on the advantages that high achieving students from affluent, ethnic majority backgrounds have over lower achieving students from less affluent, minority backgrounds (Lewis, 2007). This focus on disadvantaged students has led to the implementation of practices that can have negative outcomes for students who do not face such high levels of adversity in education. The systemic tracking of higher achieving students away from CTE classes has formed one such disadvantage. Through the implementation and study of the research presented in this dissertation, an effective strategy has been identified, which promotes the intermingling of high, middle and lower achieving students into CTE classes (Sciacca, 2015).

The literature on ability tracking is conclusive in its general assertion that heterogeneous class grouping is advantageous to middle and lower achieving students (Gamoran 1992; Holm et al. 2013). However, these findings seem to imply that an advantage to lower achieving students translates into disadvantages for their higher achieving counterparts. A general outlook on education within the treatment site community is that education is a zero-sum gain system, and a benefit for one sub group of students has a converse effect on another group. While this may be a commonly held public perception, it was not found to be the case in this study. The findings of this study indicate that heterogeneous grouping in CTE classes did not result in the negative outcomes which served as deterrents to class enrollment for high achieving students. On the contrary, the findings suggest multiple benefits for higher achieving students enrolling in CTE classes including soft skill development, growth in leadership skills, and exposure to curriculum highly relevant to future career interests. The rebranding efforts of the intervention successfully

TRACKING IN CAREER TECHNICAL EDUCATION

mitigated the perceptions of lower rigor and relevance previously held by higher achieving students and their parents.

The findings of this study also revealed a decrease in counselor recommendations of very low achieving students into the IB business class. Guidance counselors cited an increase in rigor as a primary reason they were no longer comfortable enrolling students who were credit deficient or in jeopardy of on-time graduation. Previously, counselors viewed the CTE business class as a class that every student was able to pass with minimal effort. Lower achieving students were enrolled in these classes allowing them more time to focus on more challenging classes needed for graduation. However, the course enrollment data collected for this study indicates no significant change in the number of lower achieving students post intervention. This indicates that, while counselors may not be recommending the same number of lower achieving students, the number of lower achieving students enrolled in the class remains unchanged.

The redesigning and rebranding of the business classes in the treatment CTE pathway resulted in a significant increase in the number of higher achieving students enrolling in the business courses, supporting the assumption that the rigor of the class was a dominant factor in student course selection for higher achieving students. The perceived lack of rigor associated with the identity of CTE classes across the country is a primary barrier to attracting higher achieving students into these classes. This, in turn, has led to high concentrations of lower achieving students in CTE classes. The high concentration of lower achieving students has affected the pace and rigor of the classes, contributing to lower performance expectations. The concerns of lower rigor in CTE classes have become a self-fulfilling prophecy, resulting in a system that tracks students based on ability into higher or lower rigor programs. However, this study has shown that effective rebranding of high interest CTE pathways can attract higher

TRACKING IN CAREER TECHNICAL EDUCATION

achieving students. The presence of these higher achieving students can increase the overall rigor of the pathway, creating benefits for high, middle and lower achieving students.

Understanding the concerns of both higher achieving students and their parents with regards to CTE classes is a critical aspect of creating more heterogeneous CTE classes. This study identified the lack of rigor, lack of relevance and negative effects on college admissions as the primary deterrents of CTE enrollment. These concerns are rooted in longstanding practices within educational systems that have perpetuated the realities of the concerns. However, as evidenced in this study, approaches exist that can mitigate these concerns and provide meaningful, rigorous and beneficial CTE pathways for high, middle and lower achieving students.

Implications for Future Research

Although the data used in this study was longitudinal and collected over a three-year time frame, all but one semester represented pre intervention data. Despite initial positive correlations between the rebranding of the CTE pathway, higher achieving student enrollment, and highly selective college admissions rates, there is not enough post intervention data to examine long-term policy implementation (Plank, et. al, 2005). The study findings will benefit from a longer examination of the effects of the intervention over a multi-year time period.

A second implication for future research is to expand the examination of college acceptance rates into highly selective schools. A myriad of factors effect college acceptance rate. Controlling for all of the possible variables that could impact fluctuations in acceptance rates was not possible in this study and therefore weakens the assertion that the IB business class did not have a negative effect on admissions rates into highly selective universities.

TRACKING IN CAREER TECHNICAL EDUCATION

These data were only collected for a single year of post intervention acceptance rates and include a relatively small sample size. This one -year examination of a small student sample does not suffice as ample evidence of effect. A longer time period of college admissions data with a larger sample population is also needed to identify trends in acceptance rates.

In addition, this study used student self-reporting acceptance data to determine the admissions rates, leaving the information vulnerable to reporting errors. A more objective method of gathering student acceptance information is needed in order to reduce the biases that exist in self-reporting college acceptance results.

A third implication for future research is to expand the study to include CTE pathways at other school sites and in different industry sectors. Identifying whether the results discovered in this study are able to be generalize over many CTE pathways and at a variety of locations will allow educational policy makers to determine if a comparable intervention will yield similar results in a different educational context.

Implication for Policy and Practice

The results found in this study identify a promising approach to increasing the number of higher achieving students in CTE pathways. As detailed in this dissertation, a plethora of benefits exist for high, middle and lower achieving students from the promotion of heterogeneous ability groups within CTE classes (Burke & Moore, 2009; Holm et. al. 2013; Mare, 2006; Meer, 2007; Seel, 2001; Taylor, 2004). Educational decision-makers interested in reducing the ability tracking inherent in many CTE pathways are able to apply key findings of this study to their school site practices.

First, the findings in this study indicate that a redesign of traditional CTE classes has the potential to attract more high achieving students into CTE pathways. Identifying existing CTE

TRACKING IN CAREER TECHNICAL EDUCATION

classes in an industry sector which appeals to higher achieving students, and ensuring the classes are written and taught at a level of high rigor will alleviate a major barrier to course enrollment for higher achieving students. Many highly rigorous CTE classes already exist across the country and can be easily adapted to fit the requirements of individual school districts. Searching for existing IB, AP and honors level CTE classes will ensure prebuilt levels of high rigor as well as minimize the time and effort needed for course redesign.

Utilizing an existing IB, AP or honors CTE class as the framework for course redesign will also assist with the rebranding efforts of the classes. Traditionally, all three of these designations carry a GPA grade bump, which is appealing to higher achieving students (Sciacca, 2015). Shedding the stigma of vocational education in order to attract more high achieving students into CTE pathways will require convincing these students and their parents that a CTE class will not have an adverse effect on college admissions. Initial data results of this study suggest no adverse effect of CTE course enrollment on college acceptance rates to highly selective universities. Effective promotion of these findings has the potential to alleviate some of these concerns, which may lead to an increase in course enrollment.

The needs assessment conducted in this study identifies the significant influence guidance counselors have regarding the course selection patterns of students (Sciacca, 2015). Although the quantitative data collected in this study indicates that the enrollment of middle and lower achieving students into the newly designed IB business class was not adversely affected, qualitative interview data suggests counselors are more hesitant to recommend these students for the class. In order to ensure that lower achieving students are not pushed out of the redesigned CTE courses, counselors need to play a large role in the initial design and rollout of the CTE classes. Prior to beginning the redesign process, it is recommended that the counseling team

TRACKING IN CAREER TECHNICAL EDUCATION

formally observe the CTE class selected for redesign. This will give them a baseline comparison for the redesigned class with regards to rigor and pacing. If a significant difference in rigor and pacing exists post course redesign, ensuring the counselors have been active participants and have been able to suggest ideas to ensure lower achieving students maintain potential for success. In addition, scheduling meetings with administration, counselors and the CTE teacher which address any concerns the counselors may have will allow administration to reiterate the importance of continued enrollment and success of lower achieving students into the redesigned CTE class.

Limitations

Due to the nature of the study, a quasi-experimental nonequivalent comparison group design was used for the quantitative aspects of the study to provide the researchers with the best opportunity to establish causal effects of the intervention. The use of this design facilitates causal inferences through carefully selected comparison groups and pretest measures taken on the same outcome variable as the posttest (Shadish, Cook and Campbell, 2002). Although the quasi-experimental design is a strong fit for this study, it has challenges that must be addressed to maintain validity.

Multiple threats to validity were considered while designing the program evaluation. Selection bias posed a significant threat due to the differences in school populations between the treatment site and the two comparison sites (Stuart, 2007). The treatment site consists of a more affluent community population when compared to the other two sites. More affluent families tend to be on the forefront of educational change and may be faster to accept the increased value of CTE classes in the college admissions process. Selecting all treatment participants from a more affluent school exposes the research to the possibility that the faster adoption of the value

TRACKING IN CAREER TECHNICAL EDUCATION

of CTE by a more affluent population could be falsely attributed to the intervention treatment. To guard against this possibility, data from high schools with similar community affluence was used to compare overall CTE enrollment growth to that of the treatment school and the two comparison schools. This allowed the researcher to identify any significant differences in the CTE enrollment patterns due to school affluence.

Selection bias also posed a significant threat to validity when examining the desired intervention outcome of increasing the number of higher achieving students enrolling in the business pathway while maintaining the number of middle and lower achieving students. Prior to the intervention, the enrollment in the CTE business pathway at the treatment site was below pathway capacity, allowing for a small increase in course enrollment before the classes reached the maximum allowable enrollment. However, the increase in demand for the class post-intervention exceeded the allowable capacity, and decisions of who would be scheduled into the class and who would not had to be made. Traditionally, these decisions have been made by guidance counselors. If guidance counselors enroll one group of ability levels ahead of another group, the selection of these students will change the outcome of the intervention. To guard against this selection bias, student course requests were considered alongside actual course enrollment in order to examine any differences between the ratios of student ability levels in course requests and course enrollment. In addition, a system of selection was established prior to course enrollment that allowed counselors to align their practices to ensure a consistent approach.

A historical threat to validity has already been identified with regards to this study. Current trends in the state of California are increasing the perceived value of CTE classes. Both the University of California and California State school systems have increased the weighted

TRACKING IN CAREER TECHNICAL EDUCATION

value of CTE course completion in the college admissions process. This change has increased the perceived value and perceived rigor of CTE courses through the eyes of college bound students and their parents. This recent change has likely contributed to the increase in CTE enrollment for higher achieving students. Identifying the magnitude of this change and accounting for the historical change while interpreting the effects of the proposed intervention required the use of comparison sites as well as the examination of statewide CTE enrollment growth. Once the size of the effect of this historical change was estimated, it was controlled for in statistical calculations within the study.

The lead researcher for this study was a former administrator at the treatment site and is a current principal within the school district. This position of power and influence within the school district may have had an effect on the interview responses since anonymity was not possible during the interview process. Both teachers and counselors were interviewed regarding their current practices of student course enrollment. Lengthy guidelines dictating policies and procedures exist within the district to inform enrollment procedures. Some counselors and teachers may not have divulged the entire truth if they believed it was not in line with district policy or it reflected poorly on their practice. It is possible that the lead researcher received sugarcoated responses, creating a threat to validity. However, the quantitative and qualitative survey data, which protect anonymity and enrollment trend data both supported the responses given by the counselors and teachers in the interview. Multiple comments were made during the interview process that could be considered self-incriminating, suggesting more candid responses from the participants. Because of the consistency between survey and interview responses and the candid responses of the participants, it does not appear that the role of the lead researcher had a significant effect on the interview responses.

Conclusion

The findings of this study suggest that the perceived rigor and relevance of CTE classes have a significant effect on course enrollment patterns of higher achieving students. CTE courses still hold the stigma of vocational education and are considered irrelevant by a majority of higher achieving students and parents. Despite interest in the industry sectors covered in CTE classes, enrollment of higher achieving students remains low. However, the findings of this study also indicate that an effective rebranding effort can alter student enrollment patterns. Rebranding a traditional CTE class into an IB CTE class validates the curriculum and removes many of the perceived enrollment barriers of higher achieving students (Sciacca, 2015). Identifying the enrollment deterrents such as negative impact on college admissions, low rigor, and counselor/teacher influence and mitigating those deterrents through course rebranding resulted in an increased CTE enrollment of higher achieving students. In addition, the concern that an increase in higher achieving students would have an inverse effect of the enrollment of lower achieving students was not supported by the findings in the study. The number of lower achieving students remained constant before and after the increased enrollment of higher achieving students. Finally, the concern that enrollment in CTE classes would be harmful to college acceptance rates into highly selective colleges and universities was not supported by the findings in this study. Enrollment in the rebranded IB business class did not have a significant negative or positive impact on acceptance rates to highly selective schools.

TRACKING IN CAREER TECHNICAL EDUCATION

References

- Achieve, I., & Jobs for the, F. (2015). Integrating Earning College Credit in High School into Accountability Systems. *Achieve, Inc*,
- Aliaga, O. A. & Kotamraju. (2014). Understanding participation in secondary Career and Technical Education in the 21st Century: Implications for policy and practice. *The High School Journal* 97(3), 128-158.
- Alger, A. & Luke, M. (2015). School Counselor Perspective: Preparing Students to be College and Career Ready within a Comprehensive School Counseling Program. *The Practitioners Scholar: Journal of Counseling and Professional Psychology*, 4, 17-35.
- Attewell, P. (2001). The winner-take-all high school: Organizational adaptations to educational stratification. *Sociology of Education*, 74(4), 267-295.
- Bardach, E. (2012). *A practical guide for policy analysis: The eightfold path to more effective problem solving* (4th ed., pp. 1–78). Los Angeles, CA: Sage.
- Bedner, A. K., Cunningham, D., Duffy, T. M., & Perry, J. D. (1991). Theory into practice: How do we link? In G. J. Anglin (Ed.), *Instructional technology: Past, present, and future*. Englewood, CO: Libraries Unlimited.
- Bernhardt, P. E. (2014). Making decisions about academic trajectories: A qualitative study of teachers' course recommendation practices. *American Secondary Education*, 42(2), 33-50.
- Bishop, J. H., & Mane, F. (2004). The impacts of career-technical education on high school labor market success. *Economics of Education Review*, 23(4), 381-402.

TRACKING IN CAREER TECHNICAL EDUCATION

doi:10.1016/j.econedurev.2004.04.001

Bolman, L. G., & Deal, T. E. (2008). *Reframing organizations: Artistry, choice, and leadership* (4th ed.). San Francisco, CA: Jossey-Bass.

Bozick, R., & Dalton, B. (2013). Balancing career and technical education with academic coursework: The consequences for mathematics achievement in high school. *Educational Evaluation and Policy Analysis, 35*(2), 123-138.

Brown, J. S.; Collins, A. & Duguid, S. (1989). "Situated cognition and the culture of learning". *Educational Researcher 18* (1): 32–42. doi:10.3102/0013189x018001032.

Burke, S., & Moore, T. (2009). Learning in context. *Principal Leadership, 9*(8), 32-35.

Burris, C., Heubert, J., & Levin, H. (2006). Accelerating Mathematics Achievement Using Heterogeneous Grouping. *American Educational Research Journal, 43*(1), 137-154.

Carl D. Perkins Career and Technical Education Improvement Act of 2006, Center for Law and Social Policy. Retrieved 2011-08-09.

Carrell, S., Fullerton, R. & West, J., 2009. Does your cohort matter? Measuring peer effects in college achievement. *Journal of Labor Economics, 27* (2). 439-464.

Castellano, M., Stringfield, S., & Stone, J., (2003). Secondary career and technical education and comprehensive school reform: Implications for research and practice. *Review of Educational Research, 73*(2), 231-272.

Castellano, M., Sundell, K., Overman, L. T., & Aliaga, O. A. (2012). Do career and technical

TRACKING IN CAREER TECHNICAL EDUCATION

- education programs of study improve student achievement? Preliminary analyses from a rigorous longitudinal study. *International Journal of Educational Reform*, 21(2), 98-118.
- Chalmers, D., & Gardiner, D. (2015). An evaluation framework for identifying the effectiveness and impact of academic teacher development programmes. *Studies In Educational Evaluation*, 4681-91. doi:10.1016/j.stueduc.2015.02.002
- Chodl J. *The Impact Of AP And IB Programs On High Stakes College Admissions* [e-book]. ProQuest LLC; 2012. Available from: ERIC, Ipswich, MA. Accessed April 18, 2016.
- Clark, H. (2013). A comprehensive framework for measuring skills gaps and determining work readiness. *Employment Relations Today (Wiley)*, 40(3), 1-11. doi:10.1002/ert.21416
- Coleman, J. 1966. Equality of educational opportunity. Washington, D.C.: U.S. Government Printing Office.
- Degner, K. M. (2013). Demography as destiny: The role of parental involvement and mathematics course taking patterns among 9th grade students. *Current Issues in Education*, 16(3)
- Ernest, P. (2010). Reflections on theories of learning. In B. Sriraman, & L. English (Eds.), *Theories of Mathematics Education* (pp. 39-48). New York: Springer.
- Espenshade, T. J., Hale, L. E., & Chung, C. V. (2005). The frog pond revisited: High school academic context, class rank, and elite college admission. *Sociology of Education*, 78(4), 269-293.
- Eyal, O. & Roth, G. (2011). Principals' leadership and teachers' motivation: Self-determination

TRACKING IN CAREER TECHNICAL EDUCATION

theory analysis, *Journal of Educational Administration*, 49, 256 -275.

doi:10.1108/09578231111129055

- Feller, R. W. (2003). Aligning school counseling, the changing workplace, and career development assumptions. *Professional School Counseling*, 6(4), 262-271.
- Fletcher, E. C., Jr., & Zirkle, C. (2009). The relationship of high school curriculum tracks to degree attainment and occupational earnings. *Career and Technical Education Research*, 34(2), 81-102.
- Frederickson, R. H., & Rothney, J. W. M. (1972). Recognizing and assisting multipotential youth. Columbus, OH: Merrill.
- Fullerton, J. (2015, June). But does it work? Evaluating the fruits of entrepreneurship. Paper session presented at the meeting of the American Enterprise Institute, Washington, DC
- Gamoran, A. (1992). The variable effects of high school tracking. *American Sociological Review*, 57(6), 812-828.
- Gamoran, A. (2001). American Schooling and Educational Inequality: A Forecast for the 21st Century. *Sociology of Education*, 135-53.
- Gentry, M., Peters, S. J., & Mann, R. L. (2007). Differences between general and talented students' perceptions of their career and technical education experiences compared to their traditional high school experiences. *Journal of Advanced Academics*, 18(3), 372-401,488-490.
- Goodkin, Susan (December 27, 2005). Goodkin, Susan (December 27, 2005). "Leave No Gifted Child Behind". *The Washington Post*. Retrieved May 3, 2010.

TRACKING IN CAREER TECHNICAL EDUCATION

Gotsi, M., & Andriopoulos, C. (2007). Understanding the pitfalls in the corporate rebranding process. *Corporate Communications*, 12(4), 341-355.

doi:<http://dx.doi.org/10.1108/13563280710832506>

Gray, K. (2004). Is high school career and technical education obsolete? *Phi Delta Kappan*, 86(2), 128-134.

Greenbank, P. (2006). Institutional admissions policies in higher education: A widening participation perspective. *International Journal of Educational Management*, 20(4), 249-260.

Hill, C. J., Bloom, H. S., Black, A. R., & Lipsey, M. W. (2008). Empirical benchmarks for interpreting effect sizes in research. *Child Development Perspectives*, 2, 172-177.

doi:10.1111/j.1750-8606.2008.00061.x

Hill, I. (2012). An International Model of World-Class Education: The International Baccalaureate. *UNESCO IBE*, 341-359. DOI 10.1007/s11125-012-9243-9

Holliday, G. A., & And, O. (1996). Personality Attributes of High IQ/High Achieving Gifted Adolescents: Implications of the Personal Styles Model. *Journal for the Education of the Gifted*, 20(1), 84-102.

Hollingworth, L. S. (1926). *Gifted children: Their nature and nurture*. New York: Macmillan.

Holm, A., Jæger, M. M., Karlson, K. B., & Reimer, D. (2013). Incomplete equalization: The effect of tracking in secondary education on educational inequality. *Social Science*

Research, 42(6), 1431-1442. doi:10.1016/j.ssresearch.2013.06.001

TRACKING IN CAREER TECHNICAL EDUCATION

- Kaikati, J. G., & Kaikati, A. M. (2003). A rose by any other name: Rebranding campaigns that work. *The Journal of Business Strategy*, 24(6), 17-23. Retrieved from <http://search.proquest.com/docview/202722235?accountid=11752>
- Kerr, B. A. (1986). Assessments and interventions for gifted students. *Journal of Counseling and Development*, 64, 578-581.
- Kerr, B., & Colangelo, N. (1988). The college plans of academically talented students. *Journal of Counseling and Development*, 67, 42-48.
- Kerr, B. & Sodano, S. (2003) Career assessment with intellectually gifted students. *Journal of Career Assessment*, 11, 168-186 DOI: 10.1177/1069072702250426
- Kretchmar, J., & Farmer, S. (2013). How Much is Enough? Rethinking the Role of High School Courses in College Admission. *Journal Of College Admission*, (220), 28-33.
- Lavy, I., & Yadin, A. (2013). Soft skills - an important key for employability in the "shift to a service driven economy" era. *International Journal of e-Education, e-Business, e-Management and e-Learning*, 3(5), 416.
doi:<http://dx.doi.org/10.7763/IJEEEE.2013.V3.270>
- Lewis, M. V. (2008). Effectiveness of previous initiatives similar to programs of study: Tech prep, career pathways, and youth apprenticeships. *Career and Technical Education Research*, 33(3), 165-188.
- Lewis, T., & Cheng, S. (2006). Tracking, expectations, and the transformation of vocational education. *American Journal of Education*, 113(1), 67-99.

TRACKING IN CAREER TECHNICAL EDUCATION

- Liang, Z. (2008). The Way to Wealth and the Way to Leisure: The Impact of College Education on Graduates' Earnings and Hours of Work. *Research in Higher Education*, 49(3), 199-213. doi:10.1007/s11162-007-9080-5
- Loertscher, D. (2010). Bridging the Excellence Gap. *Teacher Librarian*, 37(4), 50-51.
- Long, M., Conger, D. & Iatarola, P. (2012). Effects of High School Course-Taking on Secondary and Postsecondary Success. *American Educational Research Journal* 49(2), 285-322.
- Lucas, S. R., & Berends, M. (2002). Sociodemographic diversity, correlated achievement, and de facto tracking. *Sociology of Education*, 75(4), 328-348.
- Markus, David. 2011. Duncan Joins Calls to Reinvent Career Technical Education. Edutopia
- Meer, J. (2007). Evidence on the returns to secondary vocational education. *Economics of Education Review*, 26(5), 559-573. doi:10.1016/j.econedurev.2006.04.002
- Merrilees, B., & Miller, D. (2008). Principles of corporate rebranding. *European Journal of Marketing*, 42(5), 537-552. doi:http://dx.doi.org/10.1108/03090560810862499
- Meyer, H. (2006). Gauging the prospects for change. In H. Meyer & B. Rowan (Eds.), *The new institutionalism in education* (pp. 217–224). Albany, NY: State University of New York Press.
- Mundy, M., Howe, M. E., & Kupczynski, L. (2015). Teachers' Perceived Values on the Effect of Literacy Strategy Professional Development. *Teacher Development*, 19(1), 116-131.

TRACKING IN CAREER TECHNICAL EDUCATION

Muzellec, L., & Lambkin, M. (2006). Corporate rebranding: Destroying, transferring or creating brand equity? *European Journal of Marketing*, 40(7), 803-824.

doi:<http://dx.doi.org/10.1108/03090560610670007>

Muzellec, L., Doogan, M., & Lambkin, M. (2003). CORPORATE REBRANDING - AN EXPLORATORY REVIEW. *Irish Marketing Review*, 16(2), 31-40. Retrieved from

<http://search.proquest.com/docview/204580132?accountid=11752>

No Child Left Behind (NCLB) Act of 2001, 20 U.S.C.A. § 6301 *et seq.* (West 2003)

OECD. (2012). *Equity and quality in education* Organization for Economic Co-operation and Development. doi:10.1787/9789264130852-en

Pathways to College Access and Success. (2006). *Journal for Vocational Special Needs Education*, 28(3), 17-46.

Perna, L., May, H., Yee, A., Ransom, T., Rodriguez, A. & Fester, R. (2015). Unequal Access to Rigorous High School Curricula: An Exploration of the Benefit From the International Baccalaureate Diploma Programme (IBDP). *Educational Policy*, 29(2), 402-425.

Plank, S. B., DeLuca, S., & Estacion, A. (2008). High school dropout and the role of career and technical education: A survival analysis of surviving high school. *Sociology of Education*, 81(4), 345-370.

Powers, S., & Douglas, P. (1983). Attributions for success and failure of academically gifted high school students. *Psychological Reports*, 53597-598.

Prosser, C. A., Allen, C. (1925). *Vocational Education in a Democracy*. Boston, New York: Centurry. pp. X-139. LCCN 14000011. OCLC 5537391. LCC LB2842 .P7.

TRACKING IN CAREER TECHNICAL EDUCATION

Read, J., & Shapiro, I. (2014). Transforming power relationships: Leadership, risk, and hope.

American Political Science Review, 108, 40–53. doi:10.1017/S000305541300066X

Rock, D. and Cox, C. (2012). SCARF in 2012: updating the social neuroscience of collaborating with others, *Neuroleadership Journal* 4, 1-14. Retrieved from

<http://www.neuroleadership.org>

Rojewski, J.W., Lee, I. H., & Gemici, S., (2012) Use of *t*-test and ANOVA in Career-Technical Education Research *Career and Technical Education Research*, 37(3), pp. 263-275 DOI: 10.5328/cter37.3.263

Rosenbaum, James E. 1976. *Making Inequality*. New York, NY: John Wiley & Sons.

Sciacca, M. (2015). Tracking in Career Technical Education: Identity of CTE and its Effects on Enrollment Patterns of Higher Achieving Students. Unpublished Needs Assessment, School of Education, Johns Hopkins University.

Schenck, P. M., Anctil, T. M., Smith, C. K., & Dahir, C. (2012). Coming full circle: Reoccurring career development trends in schools. *Career Development Quarterly*, 60(3), 221-230.

Shadish, W., Cook, T., & Campbell, D. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.

Shuayto, N. (2013). Management skills desired by business school deans and employers: An empirical investigation. *Business Education & Accreditation*, 5(2), 93-105.

Seel, N. M. (2001). Epistemology, situated cognition, and mental models: 'like a bridge over troubled water.' *Instructional Science*, 29(4-5), 403-427.

TRACKING IN CAREER TECHNICAL EDUCATION

Stone, J.R., Lewis, M. V. (2012). College and career ready in the 21st century: Making high school matter. New York, NY: Teachers college Press, (224) pp., 31-95.

Stuart, E. A. (2007). Estimating causal effects using school-level data sets. *Educational Researcher*, 36, 187–198. doi:10.3102/0013189X07303396

Symonds, William C., Robert Schwartz, and Ronald F. Ferguson. 2011. Pathways to prosperity: Meeting the challenge of preparing young Americans for the 21st century. Cambridge, MA: *Pathways to Prosperity Project*, Harvard University Graduate School of Education.

Taylor, L. M., Casto, D. J., & Walls, R. T. (2004). Tools, time and strategies for integrating technology across the curriculum. *Journal of Constructivist Psychology*, 17(2), 121-136.

Todor, R. (2014). The importance of branding and rebranding for strategic marketing. *Bulletin Of The Transilvania University Of Brasov. Series V: Economic Sciences*, 7(2), 59-64.

Vroom, V. H. (2003). Educating managers for decision making and leadership. *Management Decision*, 41, 968 – 978. doi:10.1108/00251740310509490

Wu, M., & Greenan, J. P. (2003). The Effects of a Generalizable Mathematics Skills Instructional Intervention on the Mathematics Achievement of Learners in Secondary CTE Programs. *Journal Of Industrial Teacher Education*, 40(2), 23-50.

TRACKING IN CAREER TECHNICAL EDUCATION

Appendix A
Teacher/ Counselor Survey Letter

TRACKING IN CAREER TECHNICAL EDUCATION

High School 1 teachers and counselors,

I hope you had a restful spring break. I am currently working on my doctorate at Johns Hopkins University and my dissertation examines the barriers of career technical education classes for various student populations. If you would please take a few minutes to click on the link below and complete the survey, I would really appreciate it.

This survey is designed to identify influences of career technical education course selection patterns for high school students in ABC school district. This survey is entirely voluntary. The results of this survey will be used to determine the appeal of our current career technical education programs for various student populations. Responses will remain anonymous.

Please read each question and answer to the best of your ability. This survey should take approximately 5 minutes to complete.

https://docs.google.com/forms/d/1X5sa3D0ODL121jmmZhmkrhHU493HKsU1vHs7cQLdI7M/viewform?usp=send_formhttps://mail.nmusd.us/exchweb/bin/redirect.asp?URL=https://docs.google.com/forms/d/1X5sa3D0ODL121jmmZhmkrhHU493HKsU1vHs7cQLdI7M/viewform?usp=send_form

Michael Sciacca
Assistant Principal
(949) 515-6351

TRACKING IN CAREER TECHNICAL EDUCATION

Appendix B

Teacher/ Counselor Letter of Inform Consent

Johns Hopkins University

Homewood Institutional Review Board (HIRB)

Letter of Informed Consent – Teachers/ Counselors

Title: Examining the influences of career technical education course selection in the Newport- Mesa Unified School District

Principal Investigator: Michael Sciacca, Doctorial Student

Date: March 17, 2015

PURPOSE OF THIS RESEARCH STUDY:

The purpose of this research study is to determine the perceived identity of career technical education classes from the perspective of guidance counselors and teachers and how these perceived identities affect their guidance in course selection for higher achieving students?

We anticipate approximately 18 guidance counselors, 50 teachers and 400 students across the 4 comprehensive high schools in NMUSD will participate.

PROCEDURES:

There will be one survey administered to each of the three populations: guidance counselors, students and teachers. Each survey will take approximately 5 minutes to complete.

Title: Examining the influences of career technical education course selection in the Newport- Mesa Unified School District
Principal Investigator: Michael Sciacca, Doctorial Student
Date: March 17, 2015

RISKS/DISCOMFORTS:

There are no anticipated risks to students or faculty

COMPENSATION:

You will not receive any compensation for participation in this study.

BENEFITS:

Potential benefits are an increased understanding of the salient factors influencing the course selection patterns of higher achieving students.

VOLUNTARY PARTICIPATION:

Your participation in this study is voluntary. You may skip any questions you do not want to answer. If you choose to participate, you may withdraw any time. Choose not to participate or withdrawing from the study will not have any affect on your standing in Newport – Mesa Unified School District.

CONFIDENTIALITY:

The records of this study will be kept private. Please do not write your name on this survey. Any reports made public will not include any information that will make it possible to identify you.

QUESTIONS:

If you have any questions regarding this study, please contact Michael Sciacca at (949) 400-0726 or email msciacca@nmusd.us

If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher(s), please contact Homewood Institutional Review Board at Johns Hopkins University at (410) 516-6580.

TRACKING IN CAREER TECHNICAL EDUCATION

Title: Examining the influences of career technical education course selection in the Newport- Mesa Unified School District

Principal Investigator: Michael Sciacca, Doctorial Student

Date: March 17, 2015

SIGNATURES:

By signing this document, you are agreeing to be in the study. I will give you a copy of this document for your records. I will keep one copy with the study records. Be sure that I have answered any questions you have about the study and that you understand what you are being asked to do. You may contact the researcher if you think of a question later.

I agree to participate in the study

Print Name

Signature

Date

Appendix C

Student Letter of Inform Consent

Johns Hopkins University
Homewood Institutional Review Board (HIRB)

Letter of Informed Consent – Students

Title: Examining the influences of career technical education course selection in the Newport- Mesa Unified School District
Principal Investigator: Michael Sciacca, Doctorial Student

Date: March 17, 2015

PURPOSE OF THIS RESEARCH STUDY:

The purpose of this research study is to determine the perceived identity of career technical education classes from the perspective of guidance counselors and teachers and how these perceived identities affect their guidance in course selection for higher achieving students?

We anticipate approximately 18 guidance counselors, 50 teachers and 400 students across the 4 comprehensive high schools in NMUSD will participate.

PROCEDURES:

There will be one survey administered to each of the three populations: guidance counselors, students and teachers. Each survey will take approximately 5 minutes to complete.

Title: Examining the influences of career technical education course selection in the Newport- Mesa Unified School District
Principal Investigator: Michael Sciacca, Doctorial Student
Date: March 17, 2015

RISKS/DISCOMFORTS:

There are no anticipated risks to students or faculty

COMPENSATION:

You will not receive any compensation for participation in this study.

BENEFITS:

Potential benefits are an increased understanding of the salient factors influencing the course selection patterns of higher achieving students.

VOLUNTARY PARTICIPATION:

Your participation in this study is voluntary. You may skip any questions you do not want to answer. If you choose to participate, you may withdraw any time. Choose not to participate or withdrawing from the study will not have any affect on your standing in Newport – Mesa Unified School District.

CONFIDENTIALITY:

The records of this study will be kept private. Please do not write your name on this survey. Any reports made public will not include any information that will make it possible to identify you.

QUESTIONS:

If you have any questions regarding this study, please contact Michael Sciacca at (949) 400-0726 or email msciacca@nmusd.us

If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher(s), please contact Homewood Institutional Review Board at Johns Hopkins University at (410) 516-6580.

TRACKING IN CAREER TECHNICAL EDUCATION

Title: Examining the influences of career technical education course selection in the Newport- Mesa Unified School District
Principal Investigator: Michael Sciacca, Doctorial Student
Date: March 17, 2015

SIGNATURES:

Parental Permission

By signing this document, you are agreeing to allow your child, _____, to be part of the study entitled *Examining the Influences of Career Technical Education Course Selection*. Your child's participation in this study is completely voluntary. If you allow your child to be part of the study, you may change your mind and withdraw your approval at anytime. Your child may choose not to be part of the study, even if you agree, and may refuse to answer an survey question or stop participating at any time.

I will give you a copy of this document for your records. I will keep one copy with the study records. Be sure that I have answered any questions you have about the study and that you understand what your child is being asked to do. You may contact the researcher if you think of a question later.

Child's Name

Child's Signature

Date

Signature of Parent or Legal Guardian

Date

Appendix D
CTE Teacher /Counselor Survey

TRACKING IN CAREER TECHNICAL EDUCATION

Career Technical Education Teacher/Counselor Survey:

Please read each question and answer to the best of your ability. This survey should take approximately 5 minutes to complete. When you are finished taking the survey, please return it to Mike Sciacca at Newport Harbor High School via intra –district mail.

1) What is your current position? (circle all that apply)

- Counselor
- Teacher

2) At what of the following high schools do you currently work? (circle all that apply)

- Back Bay High School
- Costa Mesa High School
- Corona Del Mar High School
- Estancia High School
- Newport Harbor High School

3) Please circle the career technical education pathways you are aware of at your school:

Bio medical

Business

Robotics

Digital Media Arts

Construction technology

Culinary

Other: _____

Engineering

4) How familiar are you with the current career technical education pathways at your school?

- 1) Not familiar
- 2) Somewhat familiar
- 3) Very familiar

5) Please indicate the level of benefit you feel career technical education classes provide for the following student groups (circle one for each student group):

High achieving students (GPA > 3.5)

- 1) Not beneficial for student
- 2) Somewhat beneficial for student
- 3) Very beneficial for student
- 4) Not sure

Middle achieving students (GPA between 2.5 and 3.5)

TRACKING IN CAREER TECHNICAL EDUCATION

- 1) Not beneficial for student
- 2) Somewhat beneficial for student
- 3) Very beneficial for student

Lower achieving students (GPA < 2.5)

- 1) Not beneficial for student
- 2) Somewhat beneficial for student
- 3) Very beneficial for student

6) Would you recommend career technical education classes to students planning to enter the work force upon high school graduation? (circle one)

- Yes
- No
- Maybe

7) Would you recommend career technical education classes to students planning to attend community college upon high school graduation? (circle one)

- Yes
- No
- Maybe

8) Would you recommend career technical education classes to students planning to attend a 4-year university upon high school graduation? (circle one)

- Yes
- No
- Maybe

9) Would you recommend career technical education classes to students planning to attend a highly selective 4-year university upon high school graduation? (circle one)

- Yes
- No
- Maybe

10) Would you recommend career technical education classes to your own child or a relative? (circle one)

- Yes
- No
- Maybe

11) Please list any reasons you **would not recommend** a high achieving student to take career technical education classes.

12) Please list any reasons you **would recommend** a high achieving student to take career technical education classes.

Appendix E
CTE Student Survey

TRACKING IN CAREER TECHNICAL EDUCATION

Career Technical Education Student Survey:

Please read each question and answer to the best of your ability. This survey should take approximately 5 minutes to complete. Please return this survey to you teacher when it is complete.

1) What high school do you currently attend? (Circle one)

- Costa Mesa High School
- Corona del Mar High School
- Estancia High School
- Newport Harbor High School

2) What is your current grade level? (Circle one)

- 9
- 10
- 11
- 12

3) Over all, what are your high school grades like? (Circle one)

- A's
- A's and B's
- B's
- B's and C's
- C's
- C's and D's
- D's and below

4) Have you ever completed a career technical education class while in high school? (Please reference the list of career technical education classes at you're your at the bottom of this survey)

- Yes
- No

If you answered No, please skip down to question 6

5) How many career technical education classes have you completed in high school? (Circle one)

- 1
- 2-4
- 5-6
- 7 or more

TRACKING IN CAREER TECHNICAL EDUCATION

6) Are you currently taking any career technical education classes? (Please reference the list of career technical education classes at your school at the bottom of this survey)

- Yes
- No

If you answered No, please skip down to question 8

7) Please list which career technical education classes you are currently enrolled in: (Please reference the list of career technical education classes at your school at the bottom of this survey)

- 1) _____
- 2) _____
- 3) _____

8) Please list all career technical education classes you have already completed in high school: (Please reference the list of career technical education classes at your school at the bottom of this survey)

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____
- 6) _____

8) If you **have not** taken a career technical education class: What factors influenced your decision not to take a career technical education class? (Check all that apply)

- Teacher advice
- Counselor advice
- Parent advice
- Friend advice
- No room in schedule
- I am not interested in the topics of the classes offered
- Classes do not relate to my future goals
- Classes are not designed for students like me
- None of my friends are taking these classes
- Taking these classes will hurt my GPA
- Taking these classes will decrease my chances of getting into the college I want
- Other: _____

TRACKING IN CAREER TECHNICAL EDUCATION

9) If you **have** taken a career technical education class: What factors influenced your decision to take a career technical education class? (Check all that apply)

- Teacher advice
 - Counselor advice
 - Parent advice
 - Friend advice
 - Needed to fill a hole in my schedule
 - I am interested in the topics of the classes offered
 - Classes relate to my future goals
 - Classes are designed for students like me
 - My friends are taking these classes
 - Taking these classes will help my GPA
 - Taking these classes will increase my chances of getting into the college I want
 - Other: _____
-
-

List of career technical education classes by school site:

Corona del Mar High School

Digital Media Arts

Animation

Film Production

Estancia High School

Construction Technology 1

Construction Technology 2

Virtual Enterprise

Sports Medicine

EMR/EMT

Engineering

Computer graphics

Newport Harbor High School

Business Economics and Finance

IB Business Management 1

IB Business Management 2

Foods

Culinary

Advanced Culinary

Baking and Pastry

Digital Art

Animation

Film Studies

Costa Mesa High School

Business Economics and Finance

Entrepreneurship

Virtual Enterprise

Environmental Science

Digital Media Arts

Music Technology

Video Production

TRACKING IN CAREER TECHNICAL EDUCATION

Appendix F IB Business Management Course Outline

TRACKING IN CAREER TECHNICAL EDUCATION

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Business Management IB HL2			Course Code	[Office use only]
Transcript Title:	Business Management IB HL2	Grades/Levels:	12	Board Adoption Date:	
Content Area:	Business/CTE	GPA Scale:	5.0	Date Course Submitted:	April 2016
Credential Req.:		Graduation Subject Areas:			
UC/CSU A-G Area Approvals:		School Site that wrote and submitted the course:	NHHS		
Prerequisite(s):	Business Management IB HL1				
Next Course(s):					

COURSE DESCRIPTION:

This course is designed to give the students an in-depth view of the business world through the use of the Virtual Enterprise coursework and the conceptualized framework of the International Baccalaureate Programme. Students will learn the principles of micro- and macro- economic and apply those principles by setting up and operating simulated business preparation for working in a real business environment. Students will study supply and demand, the Federal Reserve System, taxation by federal, state, and local entities, accounting, the stock market, marketing, and international transactions. Students determine the nature of the business, its products and services, the organizational structure, and practice the daily operations of the business. They use current business software and the Internet for business transactions. The focus is on business operations, basic economic principles, and communication, and employability skills. The concepts of change, innovation, ethics, globalization, strategy, and culture will be discussed as the key components of the IB Programme. In addition, guest speakers from many different backgrounds will come and speak to the students and provide insight for their plans for the future. This will be the capstone course for our CTE Business Pathway.

GOALS:

Upon completion of this course students will be able to:

1. Demonstrate knowledge of the basic concepts used by economics, particularly scarcity, allocation of resources, economic decisions, economic goods, and trade-offs, efficiency, price stability, and goals of the economic systems.
2. Demonstrate an understanding of the basic differences between the different types of economic systems that exist in the world today.
3. Demonstrate an understanding of the concept of a mixed economic system.
4. Demonstrate knowledge of how a market system pricing operates. They should be able to demonstrate how the laws of supply and demand interact to produce prices, which clear the market. They will demonstrate this knowledge through explanatory statements and construction of and reading of graphs and schedules.
5. Demonstrate an understanding of how consumers make decisions and what factors in the economic system affect the making of those decisions.
6. Demonstrate an understanding of credit and its use in the American economic system and how credit plays a role in the lives of most individuals, including those in other countries.
7. Gain skills necessary to calculate the cost of credit in typical credit agreements.

TRACKING IN CAREER TECHNICAL EDUCATION

Appendix G
Treatment site GPA Z Scores

TRACKING IN CAREER TECHNICAL EDUCATION

Treatment Site pre Z score	Treatment Site post Z score
0.51238	1.36937
0.76218	1.61744
0.26258	0.37707
0.51238	0.129
0.01277	1.12129
1.91128	-3.34403
-0.48683	0.129
0.01277	-0.11908
-0.05717	0.129
0.76218	0.62515
-0.31697	-0.03225
-0.88652	1.08408
0.84212	0.68716
0.31254	-0.36715
-0.15709	0.62515
-1.81579	0.37707
0.84212	-0.03225
1.71143	-1.11137
0.01277	0.37707
-0.48683	-0.50359
-0.98644	1.12129
-1.73585	0.87322
0.51238	0.99726
1.18185	0.16621
-1.31618	0.78639
	0.22823
0.01277	-0.8633
0.71222	-0.68964
0.31254	0.37707
0.71222	-1.07416
	0.99726
-1.68589	0.62515
-1.31618	-1.79357
-1.08636	-1.69434
0.26258	-0.8633
-1.88573	0.62515
0.68225	-0.15629
0.01277	-1.48348
-0.81657	-0.68964

TRACKING IN CAREER TECHNICAL EDUCATION

-1.48605	0.78639
-0.48683	1.25773
-0.48683	0.129
-0.48683	-1.11137
-2.08557	-1.07416
-1.48605	-0.61522
-1.68589	
-1.08636	
0.76218	
-0.48683	
0.51238	
-0.98644	
-0.48683	
-1.88573	
-0.48683	
1.11191	
0.68225	
-0.15709	
0.71222	
1.43166	
-0.48683	
0.51238	
1.51159	
-1.98565	
1.51159	
0.71222	
-1.08636	
-0.28699	
0.51238	
-0.68668	
0.31254	
2.0112	
1.01199	
0.11269	
0.11269	
-0.48683	
-1.98565	
0.91206	
0.71222	
-0.28699	
0.76218	

TRACKING IN CAREER TECHNICAL EDUCATION

1.84133
-0.88652
-0.81657
0.11269
-0.19706
1.11191
-0.48683
-0.31697
0.51238
0.84212
0.11269
0.51238
1.18185
1.91128
0.11269
-0.19706
0.51238
-0.15709
1.61151

Michael Sciacca –Curriculum Vitae

Education

Doctorate of Education: Johns Hopkins University
August 2017

Master of Fine Arts: Chapman University
May 2006

Bachelor of Arts: University of Arizona
May 2000

Certifications

Administrative Services Credential

Single Subject Teaching Credential - Social Science, Business

Cross-Cultural Language and Academic Development

Administrative/ Leadership Experience

[Newport-Mesa Unified School District](#)

Principal – Ensign Intermediate School:
July 2015- Present

- Instructional leader
- Three straight years of continued growth in SBAC ELA and math scores
- Writing across curriculum initiative
- Elective expansion

TRACKING IN CAREER TECHNICAL EDUCATION

Assistant Principal – Newport Harbor High School/Estancia High School:

July 2012 – July 2015

- Instructional Leadership
- CTE oversight
- Curriculum oversight
- Counseling team oversight
- Athletics oversight

District Office TOSA/Coordinator of CTE:

July 2011- July 2012

- Manage the NMUSD CTE office
- Increase the number of student CTE participants district wide through collaboration with site principals, district administrators and Coastline ROP.
- Design and implement the CTE literacy program
- Present CTE data and highlights to NMUSD School Board
- Instituted the best practice of incorporating quantitative CTE data into the decision making process
- Manage all three district CTE budgets (approx. \$200,000 per year)
- Provide communication between teachers, administrators and community

Business Academy Coordinator:

2004- 2011

- Provide leadership and vision for the Business Academy
- Write the annual California Partnership Academy Grant application
- Facilitate the collaboration of the Business Academy teaching team
- Lead all Academy meetings
- Manage both California Partnership Academy Budgets (\$80,000 per year)

Director of Intervention:

2010-2011

- Created and implemented a CST improvement plan that contributed to a 27 point increase in API
- Successfully led a committee to change the bell schedule to include a 30 minute tutorial period
- Designed a CAHSEE pullout program that contributed to an increase in the CAHSEE pass rate

CTE Department Chair:

2005 – 2011

- Increased the number of CTE course offerings to our students

TRACKING IN CAREER TECHNICAL EDUCATION

- Work with administration to find creative solutions to student scheduling conflicts
- Led all department meetings
- Served as a member of School Site Leadership Team

Smaller Learning Communities Steering Committee Member: *2006- 2008*

- Collaborated with other team members to incorporate the SLC model into our school

Head Track/ Cross Country Coach: *2006- 2008*

- Planned meets, made schedules, designed workouts and provided direction for the 7 assistant coaches

Teaching Experience

Business Teacher: Costa Mesa High School 2004- Present

Social Science Teacher: Costa Mesa High School 2009-2010

Accomplishments and Career Highlights

- “Teacher of the Year” California League of High Schools 2009-2010
- Led student team to national title in the National Business Plan Competition 2011
- Integrated a strong literacy component into career technical education curriculum across the district
- CTEoc executive team member
- Business Academy Golden Bell Award recipient 2012

Professional Development

International Bachelorette training

July 2017

TRACKING IN CAREER TECHNICAL EDUCATION

Pearson Master Schedule Training	<i>November 2010</i>
Newport-Mesa Unified School District Leadership Academy <i>Present</i>	<i>October 2011 –</i>
Common Core Standards Conference	<i>August 2011</i>
Professional Learning Communities Conference	<i>June 2011</i>
Educating for Careers Conferences	<i>March 2005-2011</i>
Smaller Learning Communities Conferences	<i>June 2006-2009</i>