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Examining the Relationship Between CBI Methods and Student Academic Achievement Scores in Higher Education

Jason Sibulkin
Concordia University - Portland, jjbulkin33@yahoo.com

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Concordia University–Portland

College of Education

Doctorate of Education Program

WE, THE UNDERSIGNED MEMBERS OF THE DISSERTATION COMMITTEE CERTIFY
THAT WE HAVE READ AND APPROVE THE DISSERTATION OF

Jason J. Sibulkin

CANDIDATE FOR THE DEGREE OF DOCTOR OF EDUCATION

Neil Mathur, Ph.D., Faculty Chair Dissertation Committee

Joel Davis, Ph.D., Content Specialist

Gerald Kiel, Ph.D., Content Reader

ACCEPTED BY

Joe Mannion, Ed.D.
Provost, Concordia University, Portland

Sheryl Reinisch, Ed.D.
Dean, College of Education, Concordia University, Portland

Marty A. Bullis, Ph.D.
Director of Doctoral Studies, Concordia University, Portland

Examining the Relationship Between CBI Methods and Student Academic
Achievement Scores in Higher Education

Jason J. Sibulkin

Concordia University–Portland

College of Education

Dissertation submitted to the Faculty of the College of Education
in partial fulfillment of the requirements for the degree of
Doctor of Education in Higher Education

Neil Mathur, Ph.D., Faculty Chair Dissertation Committee

Joel Davis, Ph.D., Content Specialist

Gerald Kiel, Ph.D., Content Reader

Concordia University–Portland

2018

Abstract

The international tertiary community continues to experience a substantial growth in ESL students, which represent a significant portion of total enrollment. To meet this demand for bilingual education EAP (English for Academic Purpose) programs such as CBI (content-based instruction) curriculum have been widely adopted as the preferred pedagogical approach to address this growing trend in higher education. Despite this popularity, there is a lack of longitudinal research on the efficacy of CBI courses, that link this approach to sustained improvement on student academic achievement scores. This study incorporates a mixed-methods design that investigates the academic performance of two sample groups over a 3-year (2014–2016) period, by using ex post facto academic GPA scores. The quasi-experimental sample is compared to the control group after receiving the CBI intervention in the second semester of the participants 2014 freshmen year. The findings suggest a positive sustained relationship between CBI curriculum and increased academic performance post intervention. Additionally, a survey and semi structured interviews were conducted on students and faculty to evaluate perceptions of CBI's efficacy to promote enhanced L2 proficiency and improved long-term academic achievement scores. The results of this effort support the quantitative analysis, and indicate the majority of participants strongly consider CBI methods as a suitable pedagogical technique, to acquire language and content knowledge while enhancing long-term academic performance. This study was unique because it investigated the longitudinal impact of CBI methods on student performance in Mainland China. This research may inform future practitioners, administrators, and policy makers when developing ESL programs in the higher education environment.

Keywords: CBI, achievement, higher education, long-term, GPA, ESL, intervention

Dedication

This doctoral journey is dedicated to the many people that supported me throughout this entire process. Their love, understanding, and at times financial support helped me achieve this great milestone. My pursuit for a terminal degree has been an arduous but all inspiring mission, in which I hope my sacrifices and achievements will encourage others to reach their dreams.

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I would like to express my gratitude towards the host University, for graciously allowing me to conduct this research onsite at their beautiful institution in Mainland China. I have worked at this public university for the last five years as a full-time adjunct professor in the School of Economics and Management. This research opportunity has given me a chance to contribute something to the institution and community, if only in a small way, as a token of my appreciation and admiration for their dedication to my success.

I would also like to acknowledge the administrative staff, and all student and faculty participants that provided me with unlimited access and support during this entire research study. As a result of this international partnership, a significant and meaningful contribution has been completed towards further understanding and advancement of ESL program development in higher education.

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Chapter 1: Introduction

At the end of the twentieth century, tertiary institutions began to implement Content-Based Instruction (CBI) programs, which is a pedagogical strategy that combines language and specific content, particularly in ESL courses, where English was commonly utilized as the medium of instruction for topic areas such as humanities, arts, and social sciences (Alamán, 2013; Coyle, 2008). More specifically, this was in response to a growing population of English Language Learners (ELL's) in the global higher education community, predicated by internationalization, and global competitiveness (Doiz, Lasagabaster, & Sierra, 2011). This method of ESL instruction is met with some skepticism in higher education; however, numerous studies have produced mounting evidence, which consistently indicates content-based instruction improves academic achievement, content knowledge, and acquisition of a second language, hereby referred to as L2 (Grabe & Stoller, 1997; Snow & Brinton, 1997; Song, 2006).

History of Content-Based Instruction

According to historians, bilingual education or learning in a second language can be traced back many centuries ago to ancient Sumeria (present day Iraq and Kuwait), when the Akkadians concurred this region, they wanted to learn the native language, this was done by using the local dialect as the medium of instruction in various content areas (Alamán, 2013). However, not until the late twentieth century did higher education institutions begin adopting similar methods, and one of the basic techniques originating from this ancient learning ideology was Content and Language Integrated Learning, or CLIL (Alamán, 2013). In today's modern higher education community, there continues to be a demand for bilingualism, and based on this need, content-linked ESL programs have evolved to improve student outcomes.

Most of the research conducted on the efficacy of CBI methods in higher education is considered short-term, comprising one academic semester or annual performance results. Recently, many researchers have noticed a potential relationship between CBI courses and a student's long-term benefits such as higher pass rates, enhanced academic achievement scores, and overall improvements on GPA (Andrade & Makaafi, 2001; Babbitt, 2001; Kasper, 1994; Winter, 2004). According to Kasper (1994) and Winter (2004), this latest trend also indicates that students receiving CBI intervention courses are comparable to, or in some cases outperform non-linked ESL students regarding overall GPA scores and language proficiency. This moves beyond the general notion of CBI courses as just another method of ESL pedagogy, by introducing discipline specific content with a student's L2, creating a rich contextual learning environment.

Song's (2006) study suggests, when comparing CBI intervention groups to their respective control groups, a statistically significant difference exists between graduation and retention rates, test scores, and overall GPAs. In particular, this is one of few recent studies outlining the long-term linear benefits of CBI programs on student outcomes, addressing a critical concern regarding underrepresented ESL students in higher education. As content-linked curriculum and language education continues to gain international popularity in tertiary institutions, the goal has remained the same, and is fundamentally aligned with the K-12 effort (Mearns, 2012). The cognitive and linguistic objectives of CBI methods are to create a richer and more contextualized environment for students, as opposed to traditional ESL instruction, which broadens language proficiency while supporting the acquisition of complex academic content areas (Crandall & Tucker, 1990). In this instance, linguistic and content knowledge gain

equal traction, with a positive trend beginning to emerge as more longitudinal studies are conducted.

Statement of the Problem

As evident by a recent study from Baik & Greig, (2009), preliminary findings illustrate a trend in CBI methods which suggests a positive link between ESL students receiving content-linked language instruction, and the ability of these courses to influence academic achievement. In this regard, many scholars and leaders in higher education cite a lack of longitudinal evidence that connects a student's improved academic achievement as a result of CBI interventions (Alamán, 2013; Ament & Pérez-Vidal, 2015; Coyle, 2007). In response to a shortage of relevant data, the underlining issue remains: to what extent does CBI methods in higher education influence a students' academic achievement scores?

Purpose of the Study

The objective of this quasi-experimental mixed-methods study is to establish a relationship between CBI methods, and the perceived benefits of this approach on academic achievement scores reported as GPAs (Grade Point Averages) among students in higher education. As a secondary measure, this research will focus on content-based instruction, and the efficacy of this approach on ESL students learning in their L2, as a viable medium in promoting enhanced content and linguistic cognition, by comparing overall academic GPA scores, defined by longitudinal data analysis. In a subordinate capacity, this study will explore various student and faculty perspectives towards CBI methods, and the ability of these ESL programs to influence and enhance academic achievement scores.

To facilitate this study and investigate the phenomenon, inferential statistics were used, including a two-independent sample *t-test* to determine if a positive relationship exists between

students receiving the CBI intervention, as compared to the control groups. To understand the student and faculty perspectives, this study also integrated a qualitative function by introducing a student survey, and questionnaire for a semi-structured interview with faculty members involved in the CBI intervention. The entire study was conducted on campus at a large undergraduate university in Guangdong Province, Mainland China; this is a public institution, indirectly administered by the government bureau known as the Chinese Ministry of Education. The student participants involved in this study were selected using a stratified random sampling technique; each student was enrolled in one of the humanities or social science majors offered at the selected university, between the academic years of 2014–2016, and all GPA scoring data is considered ex post facto in nature.

Research Questions

The following protocol and research questions guide this investigative inquiry:

1. Is there a relationship between CBI methods in higher education, and student academic achievement as measured by student GPAs?

Subordinate Questions:

1. What is the difference in overall GPA scores among students receiving content-linked/CBI courses, as compared to students not receiving CBI interventions?
2. How do student and faculty perceive the efficacy of CBI courses to promote improved content and linguistic cognition in higher education?
3. To what extent do students and faculty in higher education identify CBI methods as a viable practice to encourage higher academic achievement scores in students?

Hypotheses for GPA Scores

- (H₀): There is no relationship between ESL tertiary students receiving CBI interventions, as compared to their control group, regarding interim or longitudinal improvements in achievement scores between the academic period covering 2014, 2015, and 2016 respectively.
- (H₁): There is a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in enhanced interim academic achievement scores between the academic period covering 2014, 2015, and 2016 respectively.
- (H₂): There exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in achievement scores between the academic period covering 2014, 2015, and 2016 respectively.

Hypotheses for CET-4 Pass Rates

- (H₀): There is no relationship between ESL tertiary students receiving CBI interventions, as compared to their control group, regarding longitudinal improvements in CET-4 pass rate scores covering the 2017 academic year.
- (H₁): There exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in CET-4 pass rate scores covering the 2017 academic year.

Significance of the Study

The significance of this study is predicated upon the longitudinal data, which addresses the scarcity of available research on the efficacy of CBI methods, and the perceived benefits this ESL pedagogy has to influence student academic achievement scores using a linear model.

More specifically, this research isolates overall student performance by analyzing GPA scores over a 3-year academic period; hence, this study contributes to a broader understanding of content-based instruction in the higher education sector. The adaptation of a mixed-methods design also coincides with modern research theory, which introduces another investigative layer of analysis, yielding measurable statistics and perceptions. The acquisition of knowledge through this protocol will reveal influential factors regarding the efficacy of CBI, such as: student and faculty perspectives, graduation and retention ratios, pass rates, and overall long-term academic success.

This current study also contributes to a wider scope of research on CBI methods in higher education; in particular, it underscores associated relationships between this pedagogical approach and student outcomes. Essentially, the results from this research may be used in developing CBI programs in tertiary institutions within China and, to a larger extent, the global community. Additionally, this data may hold evidence suggesting a positive trend among students receiving content-linked ESL courses, which may align with many administrative policies in higher education.

Definition of Terms

Academic achievement. Within the context of this study, academic achievement refers to a student's grade point average GPA, unless otherwise specified by a differentiated classification.

Bilingual instruction/education. In the context of this study, the term bilingual instruction or education is defined by any program or course that promotes a student's second language as the medium of instruction.

Content-based instruction (CBI). Is defined as the general teaching/pedagogical strategy for ESL students, whereby specific content is used to learn a second language, thus both acquisition of the L2 and subject are emphasized together.

Content and language integrated learning (CLIL). Is similar in theory to CBI however, this method is also considered a predecessor of EMI.

Content and language integrated learning in higher education (CLILHE). Similar to the commonly known CLIL however, this version is specific to ESL students in higher education.

EAP/ESP English for academic purposes or English for special purposes. Is defined as early models of CBI, which focus on ESL students in K-12 and post-secondary education.

English medium of instruction (EMI). Is considered a form of second language instruction technique for ESL students, which predates many recent developments in this pedagogical segment.

L2/learner. In the context of this study, the term L2, or L2 learner is defined as any ESL student using their second language (usually English) as the medium of instruction.

Assumptions, Delimitations, and Limitations

In association with this research, several assumptions were made regarding the conceptual framework, methodology, and selected research topic, with each postulation corresponding to the rationale and overall validity of this investigation. In the first instance, all student performance data gathered during the study is assumed to be free of error, referring to the data entry, calculations, and possible miss representations made by faculty employed at the university. Additionally, all responses were free of deception, while participants answered questions during the online survey or at the time of completing the semi-structured interviews.

Ultimately, this study made inferences based on previous research by Kasper (1997), Skillen (2006), and Song (2006), that suggests the content-linked ESL approach, promotes the theory of causal relationship between CBI interventions and student academic achievement.

As a matter of common practice, most research will contain some latent and intractable extraneous variables within the parameters of the investigation. These errors are possible through bias and misrepresentation of the data, on behalf of the researcher or the participants. The objective of this study is to recognize certain limitations, and mitigate their impact on the study's results; hence improving the credibility while disclosing known limitations. One of the potential limitations of this research spawns from the use of only one university in Mainland China to draw participant sample groups; this strategy could impact the ability to generalize the results across other domestic and international tertiary institutions. In regards to the ex post facto design of this study, there was no active manipulation of the independent variable; thus, identifying extraneous variables is critical to making any casual conclusions.

Concerning other restraints, the first delimitation was restricting the participant groups to students enrolled in humanities and social science majors at the selected university. Additionally, the length of service was not considered regarding faculty involved in the experimental or control groups. By virtue of the ex post facto design of this study, the research was confined to interviews, survey responses, and relationship comparisons, which provide enough documentation to make direct inferences regarding the phenomenon being investigated.

Summary

While this review indicates many advancements have been realized in the field of content-linked ESL methodology, most of the early research is confined to compulsory education (Song, 2006). According to Genesee (1987) schools have a due diligence to provide bilingual or

multilingual education, and Arkoudis (2005) suggests CBI methods are critical in promoting ESL pedagogy, and linking both content and language together to achieve the goals of tertiary institutions. As student mobility continues to increase in higher education and internationalization links business with academia, the importance and efficacy of ESL programs become a principal concern for all interested parties. After evaluating the available research on the efficacy of CBI methods in higher education, it becomes evident that further exploration is needed to affirm any longitudinal benefits of content-linked ESL courses on a student's academic performance (Crandall & Tucker, 1990; Hu & Lei, 2014).

This particular study analyzed college academic achievement records, by evaluating a comparison of two ESL student groups, while gauging the significance of any linked benefits to CBI interventions, such as: higher pass rates, English proficiency exam scores, retention and graduation ratios, and overall GPA performance. The research conducted herein is denoted by a mixed-methods approach, including ex post facto data, student surveys, and semi-structured interviews with faculty. The research is segmented into various chapters and subsections.

The following segment (Chapter 2) will host the literature review that includes a discussion on the conceptual theory of CBI methods, policy review, higher education, challenges facing the pedagogical approach, and CBI within Europe and Asia. The third chapter considers the research methodology, the variables, limitations, and expected findings, while the fourth chapter introduces the sample groups, explains the data analysis, and displays results. The fifth and final chapter outlines major topics of discussion and forms the conclusion, it also develops certain inferences, regarding the efficacy of CBI methods in higher education, as a strategy to enhance student academic achievement.

Chapter 2: Literature Review

Introduction to the Literature Review

This research study examined the efficacy of Content-Based Instruction (CBI) methods, and the perceived relationship between this approach and student's academic achievement scores in higher education. In particular, this study compares academic performance data of two student groups over a 3-year period; all investigative activities will be conducted on campus at a large undergraduate university in Mainland China. According to Song (2006) longitudinal data analysis that directly links CBI methods to enhanced student performance is scarce, citing that most research focuses on provisional or short-term improvements. The objective of this investigation will be to examine the relationship between content-linked courses, and a student's academic achievements, with a focus on the long-term impact of CBI on GPAs. The inferences derived from this study have the potential to impact all tertiary institutions within China, and to a lesser extent, the global higher education system. This study will outline the universal benefits of CBI integration; more specifically, it will also aim to quantify China's successful and long-term application of these methods in their higher education curriculum.

To fully comprehend both the perceived and real benefits linking these two variables, I have reviewed empirical, conceptual, and theoretical evidence, while including historical references from the literature, to form a conceptual framework and to establish a baseline approach for this study. The literature search utilized in this study involved ProQuest, Sage, Eric, EBSCO, JSTOR, Gale, and other Concordia University database partners, such as Google Scholar, host University archives database, and interlibrary loan service, provided by the University of Southern California, and Cambridge Press. The documents reviewed include

educational periodical journals, eBooks, reports, theses, dissertations, academic publications, and major industry bulletins.

Conceptual Framework

Over the last few decades, globalization, competition, budget constraints, student mobility across the tertiary sector, and demands for improved academic outcomes have ushered in a new era for higher education and global citizenry. According to House (2013), universities and colleges around the world have responded to an influx of second language learners, also known as L2 learners (an adult consciously acquiring a second language) or ESL students, by creating academic programs based on the English language; this is because English is commonly the first choice as a foreign L2, and is considered the dominant language in academia—including research.

This includes students at western universities that attract many foreign students, that demand ESL courses be offered in the preferred L2 language, usually English (Moriyoshi, 2011). Also, House (2013) suggests the growth of CBI in higher education, using English as the favored medium of instruction, is based on student perceptions, while Ament & Pérez-Vidal, (2015) advocate the cause as the ability to function professionally and academically, including international business trends. Since the early 1990's industry leaders and researchers have attempted to quantify and comprehend the connection between CBI methods and any perceived academic achievement benefits experienced by students (Ament & Pérez-Vidal, 2015).

The term content-based instruction predates the modern content-based language teaching (CBLT) method, with both approaches spawning from Krashen's (1982) theory of the Monitor Model and comprehensible input, which suggests students learn language more effectively through dynamic and meaningful content, with less focus on grammar and linguistic structure.

For the purposes of this study, when referring to Content-Based Instruction methods, I will indicate this approach as CBI, regardless of any variation or modified version, unless expressly defined by major evolutions and changes in methodology. Several immersion studies have illustrated the significant contributions that CBI makes in language and content learning, with perceived benefits including improved L2 fluency, functional content knowledge suitable for analytical and problem solving capabilities, with enhanced motivation, engagement, and higher academic achievement (Genesee, 1987, 2004; Lambert & Tucker, 1972; Lazaruk, 2007; Stryker & Leaver, 1997; Turnbull et al., 2001). Many of these early studies focused on secondary education, with little reference to CBI's efficacy in higher education; hence, contributing to the scarcity of longitudinal research in the tertiary sector.

Much of the empirical research conducted on Content-Based Instruction (CBI), content based language teaching (CBLT), and Content-Language Integrated Learning (CLIL is a form of CBI, popular in high school and tertiary institutions), originates from the primary and secondary education community. In this instance, the majority of theories and concepts also cluster within this sector of education, with some researchers considering these variables malleable, extending beyond just this segment of education. In the early 1970's and 1980's various CBI pedagogical methods began to gain traction in the United States. This was as a direct result of low English proficiency levels, represented by student achievement scores within all tiers of education (Ament & Pérez-Vidal, 2015). In the 1980's and 1990's, shadowing the pedagogical achievements in CBI integration within primary and secondary schools, and in partial response to the internationalization of the global tertiary community, universities in the U.S. and around the world began to implement English for specific purposes (EAP) programs, which eventually

morphed into the various forms of CBI used in today's higher education classrooms (Hutchinson & Waters, 1987; Jordan, 1997).

This adaptation includes the international integration and modification of CBI into several tertiary learning environments, such as: English as a Second Language (ESL), English as a Foreign Language (EFL), English Language Learners (ELL's), and other variations of L2 higher education programs. Additionally, Asiatic countries such as China embraced the principles behind content-linked instruction in all tiers of education; more specifically, in 2001 the Chinese Ministry of Education mandated that universities integrate multilingual studies through CBI methods, which required full compliance of all government controlled tertiary institutions (MOE, 2001). As compared to Western education, China was quick to adopt CBI programs into their higher education system. Thus, beginning in the twenty-first century, various content-linked programs were offered throughout China in engineering, science, humanities, history, mathematics, and other specialties.

This study endeavors to answer the following: to what extent does utilizing CBI methods in higher education influence a students' academic achievement? The objective of this quasi-experimental mixed-methods study is to establish if a positive relationship exists between CBI methods, and the perceived benefits of this approach on student academic achievement scores (GPAs) in higher education. Additionally, the research will explore student attitudes towards content-linked instruction, and the efficacy of these programs to encourage higher academic achievement scores. This rigorous investigative research process will encompass a general policy review of content-linked pedagogy throughout various international tertiary institutions, and evaluate the impact of these strategies on the efficacy of CBI to enhance academic achievement scores in higher education.

CBI in Mainland China

When considering various aspects of multilingual instruction and content-linked integrative curriculum in higher education, China stands out as a staunch supporter of CBI methods, with their Ministry of Education strongly advocating associated programs; thus, it would seem practical to consider researching this phenomenon in Mainland China (MOE, 2011). In this instance, I will leverage my exclusive expatriate status as a higher education administrator and faculty member, living in China, to conduct this research. Specifically, I will then argue that China's multilingual programs offer a unique opportunity for this current study, to observe, gather data, and to measure the student academic gains from CBI methods at the tertiary level.

This review and evaluation process supports the selection of the host University, a Guangdong provincial level undergraduate school, in Mainland China, as the source of this study's data collection and analysis activities. This particular university hosts one of the largest populations in southern China, estimated to be over 23,000 students, offering several degree programs, with the School of Economics and Management hosting a majority of the ESL content-linked courses ("Huizhou University", 2017). According to the MOE (2011), China's Ministry of Education considers CBI methods an essential component of the student experience, mandating all public tertiary institutions provide content-linked programs. More specifically, this selected university is representative of the target population in China, matching demographic and socioeconomic variables, that identifies with the unusually homogeneous student populace.

Historically, when comparing major schemes where CBI is integrated and used in the classroom, the elementary and secondary education sector were quick to adopt these methods. However, tertiary institutions began to embrace multilingual instruction, at a much later date in the evolutionary timeline of content-based instruction. Many reports suggest that higher

education experienced an influx of ESL students much later than traditional K-12 institutions; thus, as student mobility increased, so too did the need for CBI programs in tertiary institutions (Doiz, Lasagabaster, & Sierra, 2011). I would then deduce and argue, the pedagogical approach known as CBI, is lacking substantive research, to ascertain the efficacy and value it provides within higher education. For the purposes of gaining a better perspective on the historical and conceptual structure of CBI methods, I have investigated both K-12 and post-secondary education, to trace the evolution and implementation of CBI programs around the world.

Although, some studies exist regarding the efficacy of these bilingual instructional methods in higher education, the volume pales in comparison to that of non-tertiary research. According to Song (2006), most research on content-based language instruction in higher education focuses on immediate effects over a short duration, possibly one or two semesters; however, longitudinal studies are scarce, with few researchers investigating the sustained or long-term benefits of CBI methods. This study intends to address the lack of research in CBI within the confines of higher education, and investigate the efficacy and perceived student benefits; such as, higher academic achievement scores, improved L2 fluency, and enhanced cognition and confidence, over a 4-year period.

As a means of conceptualizing content-linked instruction, and the perceived link between the intervention, and student academic achievement in higher education, this section of the study will analyze the evolution and reported efficacy of CBI. Additionally, the reviewed literature establishes the significance of various approaches to content-linked instruction, in support of L2 learning; I argue that CBI directly influences student academic achievement scores over a sustained period of time. I will then describe student and teacher perspectives regarding the perceived benefits of CBI, featuring aspects of quality assurance, best practices, and general

administrative policy review in tertiary institutions. In summation, I will close the literature review by outlining specific concerns from the academic community, and by outlining some potentially negative outcomes of CBI methods, concluding with the current status of content-linked ideology in Mainland China.

CBI and Academic Achievement

Over the last decade, several studies have provided evidence that suggests CBI methods benefit younger students by improving L2 proficiency, and also directly contribute to improved academic achievement (Francis, Lesaux, & August 2006; Rolstad, Mahoney, & Glass 2005; Slavin and Cheung 2005; Thomas & Collier 2002; Tong et al. 2008; Tong, & Shi, 2012). I would also argue the benefits of implementing CBI into higher education will result in similar outcomes, through comparative programmatic approaches, used both in the U.S. and Chinese tertiary institutions, through a mixed methods approach of English immersion, sheltered studies, and a transitional approach (Feng, 2005; Tong, & Shi, 2012). However, it should be noted that variations occur with some frequency within the dynamics of CBI integration, between different countries and within each institution.

When determining the efficacy of CBI, another major theory and evolutionary practice in higher education are the theme-based, sheltered, and adjunct models. According to Satilmis, Yakup, Selim, and Aybarsha (2015), the goal of these three models focuses on teaching course material to students on a regular interval, to achieve content knowledge and language proficiency. In this regard, the theme-based model of CBI is widely utilized in teaching L2 learners with lower proficiency, in content areas such as science and humanity courses, by selecting topics that are of interest to the students (Satilmis et al., 2015). This method is often combined with the sheltered and adjunct models of CBI; additionally, Satilmis et al. (2015)

explains that universities often employ a blended approach that usually incorporates the adjunct model, because studies have shown the intervention results produce increased academic achievement from the students involved in the program. These benefits have also been attributed to the defined characteristics of these three CBI models, as they all focus on specific academic topics and concepts, while integrating language learning in equal measures.

Both Richards and Rodgers (2001) suggest CBI methods are effective at promoting L2 proficiency and improving student academic achievement, because CBI multilingual instruction incorporates language learning and content, with the subject being utilized as a communication vessel to learn the L2 language. Satilmis et al. (2015) conducted research that involved 48 participants from a Kazakhstan university where the researchers investigated the relationship between the adjunct CBI approach, and measured the academic achievement of the participants over a short duration. While using inferential statistics, Satilmis et al. (2015) reviewed the standard deviation values applied to the experimental and control groups after receiving a pre and posttest on knowledge and language content; the results show that $p = 0.05$, with an alpha of $p = 0.015$, which illustrates a significant difference between the control group and experimental group. These results suggested that Satilmis et al. (2015) research supports the ideology that applying the CBI adjunct-model is an efficient medium for teaching science content to undergraduate students using English as the L2, while also improving their academic test scores.

Additional research was conducted by Cuervo (1991) in the early 1990's using a comparison based statistical significance research design, looking at short-term benefits of multilingual CBI methods in a U.S. tertiary institution. According to Cuervo (1991), the research investigated the measured improvements in academic test scores, after implementing the CBI intervention method, on university students in a mathematics course over one semester. The

study incorporated 118 participants between the experimental and control groups, while applying a one-tailed t test, to reject or affirm the null hypotheses. The option to select a two-tailed t test could evaluate the significance in both directions of significance; however, Cuervo's (1991) decision to analyze the significance of the students' test scores was appropriate for this level of variable control, having opted to examine the data at a .05 ratio of significance. The main findings from Cuervo's (1991) study suggested that CBI methods show a significant and positive effect on student test scores, as compared to traditional instruction. When Cuervo (1991) reviewed the second null hypothesis, the data results indicated that multilingual CBI methods also appear to promote better student retention. This probability is important to mention, as student retention is not addressed in many studies regarding CBI's efficacy.

In prior studies, enhanced self-esteem and reading proficiency levels have also been associated with improved academic achievement in students; in Ghaith's (2003) research, this concept was tested against 56 randomly selected ELL secondary students in Lebanon. This study employed a questionnaire and experimental pre-test and post-test design, with a control group, analyzing the covariant scores between self-esteem, and the students' measured feelings of alienation as L2 learners, (Ghaith, 2003). While applying descriptive statistics and a Likert scale for the survey scheme, this study indicated no significant improvement on immediate attributed gains, concerning better student self-esteem, resulting from the cooperative learning CBI intervention; however, the data reveals a marked improvement between the two reading achievement group scores, using a $p < .05$ alpha, in favor of the experimental group $F(1,53) = 7.69, p = .00$. Although not surprising, these outcomes suggest further longitudinal studies need to be performed for a deep understanding of the effects of CBI on achievement and other attributed benefits.

Within the realm of bilingual instruction, many studies have examined the short-term efficacy of CBI to promote academic success among L2 learners; however, few researchers have addressed the long-term sustained benefits of content-linked programs in higher education (Xi, Xiao, & Yang, 2013). Overall, most of the early investigation into tertiary education and ESL content-linked instruction has consistently demonstrated that content-based teaching methods encourage second language acquisition, and improved academic achievement through enhanced GPAs (Grabe & Stoller, 1997; Kasper, 1994; Krueger & Ryan, 1993; Snow & Brinton, 1997; Stryker & Leaver, 1997; Wesche, 1993). To realize such benefits, many CBI programs move beyond this simple linking arrangement between content and language; more specifically, they integrate additional components into the curriculum, such as social events, academic, and personal advising, to create a rich immersive experience with student centric support.

Song (2006) investigated the link between content-linked instruction and student academic performance, by reviewing the effects of one specific type of CBI approach, known as EAP (English for Academic Purposes). His research focused on 770 participants from an undergraduate community college in New York; the study examined the long-term effects of CBI, by comparing the academic data of two experimental groups of students, one that received the content-linked intervention, and the other non-linked ESL group, over a 4-year period (Song, 2006). To mitigate any extraneous variables, Song (2006) used a stratified random sampling technique, and compared student groups that were identical, other than being exposed to the content-linked ESL course. The academic data from both experimental groups was gathered by assessing the students' American College Testing (ACT) results, and by reviewing overall GPA scores.

After applying a Chi-squared test, the results ($X^2 = 38.3$, $df = 1$, $p < .001$) indicated the CBI intervention group were significantly more likely to pass the individual courses (Song, 2006). He then utilized a T-Test and compared the overall GPA means of each experimental group; the results ($t = 4.72$, $df = 768$, $p < .001$) indicated a significant difference, suggesting that students receiving the CBI intervention achieved higher GPA scores (Song, 2006). This study is important, because it analyzed the longitudinal relationship between CBI and students' academic performance, suggesting that bilingual instruction methods consistently elevate academic success over a sustained period.

Kasper (1997) also used inferential statistics when assessing the significance of CBI, and the impact it has on student academic performance; he was building a case, based on previous research by Benesch (1988), also Brinton, Snow, and Wesche (1989), which suggested Content-Based Instruction courses for ESL students resulted in academic performance gains. Kasper (1997) conducted the study at a community college in the U.S., using an experimental design with a total of 184 student participants divided evenly among the experimental and control groups. One group received the CBI intervention, while the other students were exposed to traditional teaching methods for L2 learners. Within the construct of Kasper's (1997) investigative protocol, the researcher limited extraneous variables by ensuring all participant demographics were uniform in both comparison groups, such as gender, age, and grade level; additionally, all teachers were limited to a certain number of students to ensure consistency. At the end of the semester all participants were administered a final exam; after using a t-test analysis, the results ($t = 5.58$; $p < .0005$), indicated a significant difference, in favor of the CBI intervention (Kasper, 1997).

These results are vital to my study, because they corroborate earlier research with similar variables, documenting the efficacy of CBI on academic achievement in tertiary institutions. As described in Brinton et al. (1989) the preferred research design for investigating the efficacy of CBI methods is through quantitative analysis, when evaluating the differences between experimental groups; however, I would argue that additional univariate analysis or multivariate inferential statistical measurements will yield more support and credibility. Also, by incorporating questionnaires, observations, semi-structured interviews, and focus groups, this mixed methods design allows the researcher to differentiate the data collection process, and consider other perspectives that influence the variables and outcomes.

In comparison, Baik and Greig (2009) conducted a similar study that also tracked the academic performance of undergraduate architectural students at a university in Melbourne, Australia. The study was comprised of 149 participants, divided into three sub-groups based on how much they attended the ESL content-based instruction course for the Architecture program; these groups include high, moderate, and low attendees of the class (Baik & Greig, 2009). After using univariate and bi-variate descriptive statistics to analyze the data, Baik and Greig (2009) suggested the results showed the high attendee student group performed markedly better when compared to the poor attendee group. Additionally, and perhaps more noteworthy, is the longitudinal element incorporated into this study, Baik and Greig (2009) also tracked the overall academic GPA performance for all participants over a 1-year period following the original CBI intervention. The outcome of this data depicts a similar scenario; the high and moderate student groups continued to illustrate significantly higher pass rates at 65.8% compared to the 51.8% from the low attendee student group (Baik & Greig, 2009).

Another remarkable aspect of this study, involved the measurement of student retention rates in the Architecture program during the following year after receiving the intervention; the retention rates of the high and moderate participants yielded a 100% retention rate in the program; however, several students withdrew from the low attendee group, in further support of the benefits of CBI courses in tertiary institutions (Baik & Greig, 2009). The traditional use of descriptive statistics and central tendency have also proven useful in similar research on the academic benefits of CBI, and these results confirm previous outcomes that have been replicated and reported by (Skillin, 2006; Song, 2006; Winter, 2000). As higher education institutions continue to endeavor and develop support programs for L2 learners, and in partial recognition of specific research, the benefits of CBI suggest a robust relationship between the interventions and student academic performance.

In Duffy's (1999) study, 16 intermediate L2 learners from an undergraduate university in the U.S., were tracked over one semester while they received a CBI intervention, known as Content-Based Language Instruction (CBLI), facilitated through a mode known as the adjunct model. Duffy's (1999) study was designed using a pre-test and post-test methodology, using essay scores to track content knowledge and retention. This study is relevant, because it links CBI methods with the enhancement of ALP (Academic Language Proficiency) which, according to Grinstead (1997), can provide the engagement and motivation to enrich content language, in the pursuit of English for a specific purpose.

The findings in Duffy's (1999) research indicate a strong correlation between CBI interventions, and the student's improvement in the post-test exam, which lends credibility to the assumption of CBI's efficacy; perhaps the inferential bi-variate correlation analysis would prove more persuasive if the researcher included another form of statistical method of evaluation, such

as a multiple regression modal, because it can distinguish between the independent and dependent variables. In this instance, my research on the efficacy of CBI methods in higher education could integrate this type of analysis to understand how much variation in GPA performance is associated with gender, attendance, or other relevant independent variables.

Some of the research done in secondary education may also have implications in the tertiary community, such as Mearns (2012) study, which investigated the CLIL form of CBI, and the connection between improved test scores after receiving the intervention. In this study, 30 students aged 13–14 from a secondary school in England were randomly selected, and according to the national curriculum assessments, each student was considered a high-level participant (Mearns, 2012). In general, this study used a common research design, implementing a pre-test and post-test strategy that has been replicated in previous CBI research, including the results, derived from descriptive statistical analysis. The findings suggest that a majority of participants improved their national curriculum score by one level, which is considered significant, because of the short duration of this CBI intervention. These results echo prior outcomes where similar researchers employed comparable analytical evaluation processes, also lending further creditability to earlier studies (Coyle, 2006; Coyle, 2007; Smith & Paterson, 1998). Additionally, Mearns (2012) conclusion also advocates for more longitudinal research to measure the efficacy of CBI over a longer period of time.

In consideration of the various perspectives on the efficacy of CBI, and the impact it has on student success, Garcia-Vazquez, Vazquez, Lopez and Ward (1997) suggest that most bilingual education research focuses on student cognition and academic language proficiency. However, to gain a better perspective some modern studies have enhanced their efforts into divulging CBI's ability to promote more than just improved cognition. Genesee (2004) explains

that content-based instruction methods are an advanced pedagogical strategy for creating meaningful collaboration in challenging content areas of various curriculums.

Other industry experts and policy makers have cautioned the use of CBI methods, in fear that any form of bilingual instruction could reduce or detract from a student's native language proficiency (Thomas & Collier, 1998). In direct rebuttal of these concerns, Zhang (2003) suggests that the rewards of bilingual instruction far outweigh the costs, with such benefits as improved cognition, communication using their L2, and also enhanced confidence within specialty content areas. Previous studies have resulted in persuasive evidence that illustrates the importance of CBI methods, but also highlights the data that demonstrates bilingual students consistently outperform their monolingual peers (Collier, 1998). There remain various perspectives on the efficacy of CBI methods, to promote L2 proficiency in specialty content areas; however, some researchers have identified this pool of data, and investigated the perceptions of CBI through the eyes of faculty, administrators, and students.

Student and Teacher Perspectives

According to Liu, Shi, and Dong (2013), the student perspective is motivational and empowering ESL learners to acquire an L2 through the enrichment provided by content-linked courses. Li and Wang (2010) conducted a study that addressed the efficacy of CBI methods on tertiary students at Northeast Forestry University, Harbin, Heilongjiang Province, China; the research investigated the positive aspect of these bilingual teaching programs from the students' perspective. The researchers employed a qualitative survey methodology, and administered this questionnaire to 360 fourth year undergraduate students; each participant was randomly selected and the survey was divided among the engineering, science, and arts department (Li & Wang, 2010). The participants had all taken at least one content-linked course during their respective

degree programs, and the survey results indicated a general trend that suggested at least 90% of the students from all three groups, believed that CBI intervention contributed to higher academic achievement scores in content specific areas, including a marked improvement in L2 proficiency (Li & Wang, 2010).

While this study produced persuasive data, one must also question the research design, having used only a simple quantitative design to illicit responses and evaluate data.

Incorporating a more rigorous investigative approach, such as a survey that is coded with qualitative features, or the introduction of other descriptive or inferential statistics may reveal additional trends and data subsets that lend to other conclusions. As a result of this evaluation, my study will incorporate a student survey and include semi-structured interviews with faculty involved in the CBI intervention, this includes central tendency and multivariate analysis of the data to determine any underlying relationships. The results of this study are significant, because they demonstrate a link between student perceived benefits of enhanced academic achievement, after receiving a content-linked course (Li & Wang, 2010). This data helps further the argument that suggests various content-based instruction methods have a direct effect on students' academic performance; thus, contributing to the efficacy of CBI programs in higher education.

According to the Ministry of Education (2001), China continues to support bilingual education, therefore, many academic studies have originated here regarding the efficacy of CBI methods on student performance; another modern study by Liu et al. (2013) investigates bilingual teaching of mathematics content to undergraduate students at Qinghai University in Mainland China. In order to understand this phenomenon, Liu et al. (2013) conducted a survey of all student participants that attended a semester long mathematics course using CBI methods to learn content in the L2 language of English. Each student in the experiment was randomly

selected to participate in the survey, and all students in the course were considered high-level performers, as evident by their ability to pass the College English Test (CET) 6, prior to the intervention (Liu et al., 2013). From the ten question survey administered by Liu et al. (2013), a particular trend among all of the students emerged, which is that consistently, over 50% of the participants felt content-based instruction in English was an efficient mode of acquiring professional knowledge, vocabulary, and a base for future L2 cognition. Liu et al. (2013) research is significant, because it points to a pattern of thinking, where student perspectives become reality as they compound bilingual talents through content-linked pedagogical methods.

Another recent empirical study that investigated CBI via the perspectives of faculty and students was Hu and Lei's (2014) research, which utilized a case study methodology with qualitative features. This research is meaningful and relevant to my study, because it further clarifies the relationship between English Medium of Instruction (EMI) programs and other types of CBI methodologies within tertiary institutions, and analyzes the expectations and perspectives from the vantage point of various stakeholders involved in the process. One prominent aspect of Hu and Lei's (2014) study incorporated a holistic approach to investigating CBI, with semi-structured interviews and observation between faculty and students.

More specifically, Hu and Lei (2014) identified ten students and five faculty members as participants, through purposeful sampling techniques, which according to Yin (2009), is a common data collection procedure for qualitative case studies. Hu and Lei's (2014) case study design is not a common approach in Content-Based Instruction research, however it does offer a contextual and unique investigation into understanding the perceived efficacy of CBI, from the perspective of students and faculty members in higher education. The interviews revealed that both students and professors consider EMI/CBI programs to add value by offering better career

opportunities, enhanced English proficiency, competitiveness, more competence with technical content, improved analytical abilities, qualifications to study abroad or pursue terminal degrees, and the capacity to engage in academic research (Hu & Lei, 2014). Another unique component of this holistic case study was Hu and Lei's (2014) revealing evidence, which suggests students consider CBI methods effective because they perceive value through cultural identity factors, and symbolic gestures attributed from these bilingual programs. This case study is significant, because it exposed latent perceptions, based on students receiving CBI interventions, which indicate higher order thinking beyond language acquisition.

Strotmann et al. (2014) study reviewed the teachers' perspective regarding their satisfaction with Content and Language Integrated Learning (CLIL) courses, which are a form of CBI methods in higher education. This study was designed by applying a mixed methods approach, utilizing an online survey that was distributed to faculty from the Universidad Europea de Madrid (UEM), which is a group of higher education institutions in the Laureate network in Spain. The questionnaire was distributed via email, and the researchers received 168 responses from faculty, with 79% of the participants coming from only four universities within the Laureate network. The quantitative function was applied to analyze the data retrieved from the surveys; additionally, this study included semi-structured interviews, classroom observations, focus group discussions, and student surveys (Strotmann et al., 2014). In retrospect, this study fails to triangulate the data, which is a pivotal aspect of mixed methods designs; however, Strotmann et al. (2014) does call for additional research addressing these shortfalls.

The results of this study illustrate a trend in CBI program management, which suggest that teachers enjoy instructing these courses 80% (n = 120), and nearly 50% (n = 70) agreed that receiving pre-training on CBI methods would benefit student outcomes (Strotmann et al., 2014).

The significance of this study is based on the information gleaned from the results, which point to a lack of in-service training on CBI pedagogical techniques that would allow teachers to perform with a higher efficacy rate in promoting language and content. While this study lacked quantitative data to support the effectiveness of CBI interventions, it was particularly valuable to the academic community because it underscores a lack of training for teachers on various skills such as, scaffolding, adapting content to a bilingual classroom, and best practices. This perspective is uniquely qualified as baseline data that further guides the development of CBI in tertiary institutions.

Another unique perspective was a recent study by Costa and Coleman (2013) that investigated the Integrated Content and Language in Higher Education (ICLHE) approach, to L2 acquisition; it was modeled after the original CBI method, specifically for tertiary institutions. Costa and Coleman's (2013) article analyzes a questionnaire that was conducted in 38 universities around Italy, consisting of seven private and 31 public universities. This case study analysis followed previous work by Wachter and Maiworm (2008), which utilized a related survey design, and shadowed Capozio's (2004) research on internationalization and CBI in European higher education institutions. Specifically, Costa and Coleman's (2013) use of descriptive statistics and comparison design identified that most respondents, including faculty and university administrators, consider CBI an effective approach that delivers content and language to L2 learners, by preparing them for a global market place, improving English proficiency, and enhancing cultural awareness.

Overall, this case study analysis is significant because of the scope and longitudinal approach, and the results are representative of several questionnaires, administered over several years; thus, in summation, this study uncovered numerous trends and perceptions in CBI, that

confirm previous research. Research design is usually indicative of several factors including area of study, desired results, and many other variables; however, each method contains inherent flaws. Costa and Coleman's (2013) decision to use a qualitative design while conducting their research could have the potential to skew some of the results; perhaps, incorporating other statistical tests to measure responses would reduce some biased information. In retrospect, this study could also consider focusing on particular groups of respondents, in favor of drilling down further into the subgroups that make up the participants; however, that was beyond the scope of this study.

In comparison, Moriyoshi's (2011) research involved the inquiry into how CBI courses are taught in higher education in Japan; more specifically, one of the questions addressed in the study was the effectiveness of CBI in ESL courses, as seen through the perspectives of students and faculty. This research is particularly relevant to my study because the environment and approach to the CBI phenomenon is similar; thus, both investigations used comparable inquiry and analysis techniques. The participants in Moriyoshi's (2011) study included 76 students from the Geography and Sociology departments, also featuring two EFL teachers, all from a private university situated in northern Japan. Each student's English proficiency was assessed as intermediate, as evident by their individual scores in the TOEIC (Test of English for International Communication), with average results ranging between 447–515 (Moriyoshi, 2011). While this study is comparable in technique with my research, these findings need to be expressed conservatively, as the outcome may be skewed with limited access to a diverse participant sample.

The methodology of this study is considered an exploratory observational study, where the researcher coded answers to a questionnaire that was administered to all participants;

additionally, class observations occurred to establish behavior patterns from both teacher and student interactions (Moriyoshi, 2011). The results of the questionnaire suggested that out of (n = 76) student participants, 95.1% would recommend the CBI course, 70.5% believed the class would improve their content knowledge in the topic, and over 50% were inspired to research the course topic outside of class (Moriyoshi, 2011). During the interview process, both teachers agreed that CBI is effective as a method to develop L2 proficiency, listening skills, and content knowledge, but less likely to improve writing or speaking abilities—this was also analogous of the student perceptions (Moriyoshi, 2011; Skillen, 2006). This qualitative study utilized investigative practices, where observation and survey data were gathered to support the hypothesis that CBI is effective at promoting L2 development, but the significance of the research moves beyond this inquiry, advocating that other variables, such as pedagogical technique, teacher experience, and initial expectations can alter the perceptions of CBI's efficacy.

Tan's (2011) study is another informative analysis that is both germane to CBI research, and to the development of pedagogical standards associated with these methods. In particular, Tan's (2011) research is a mixed methods approach that exploits the benefits of this transformative design, by collecting data via semi-structured interviews and coding the responses, while incorporating classroom observations. This research was an intensive investigation into behavior, expectations, and perspectives of teachers involved in executing CBLT (Content-Based Language Teaching) in secondary math and science courses in Malaysia. The difference between CBLT and CBI are merely in name only, the goal is the same, both imply learning content through an L2 medium—usually English. Tan's (2011) study concluded

that a teacher's expectations, training, and pedagogical behavior in the CBI classroom have a significant impact on the efficacy of these ESL and ELL programs.

Tan's (2011) results lend credibility to previous research, which suggests CBI methods are drastically improved when instructors are trained in content areas and language acquisition (Cammarata, 2010; Fortune, Tedick, & Walker, 2008). The mixed methods approach is a modern design that overcomes limitations that hinder univariate statistical examination; however, the choice to proceed with multiple methods often requires additional time and consideration when collecting data or during the analysis phase. In both regards, this research contributed towards the advancement and awareness of CBI methods, by providing evidence that professional development is required in all content and language programs.

Kong and Hoare's (2011) case study explores prior research that focused on CCE (Cognitive Content Engagement) as a necessary step in the CBI learning model. According to McLaughlin, McGrath, Burian-Fitzgerald, et al. (2005), CCE is a required element in L2 learning process, along with in-depth content matter; without this component in the CBI classroom, cognition and language acquisition is unlikely to occur. To address this concern, Kong and Hoare's (2011) case study utilized 29 grade 7 and 8 lesson transcripts, taught by 12 different teachers, including post-lesson teacher interviews, and 3 live classroom observations. The students involved were between 12 and 14 years old, all participants and data originated from middle schools in the northwest provinces of Mainland China, and the topics used during the intervention were derived from science and nature topics (Hoare, 2011).

The main theme of Kong and Hoare's (2011) research is to identify what induces CCE during the CBI intervention, and how the teacher's perspective and pedagogy affect the L2 transference. The results of Kong and Hoare's (2011) study indicate that pedagogy technique is

more significant than other variables, such as time on task, in shaping student outcomes in CBI courses. Specifically, the interview findings and observations provide evidence that suggest when teachers are technically proficient in language acquisition, and establish content objectives, these targets relate to increased CCE, thereby improving cognition and L2 comprehension.

This study intentionally focused on pedagogy and teacher input that supports student language development; the results also suggest that identifying appropriate content and language goals in the CBI classroom is imperative to improving student L2 outcomes. Additionally, similar research by Solis (2008) and Voke (2002) also offers the same conclusion, which advocates creating professional development programs for teachers involved in CBI, to boost efficacy. The choice to use a case study design is often appropriate in sequencing multiple research studies; however, Kong and Hoare's (2011) study relied heavily on a small sample of data to reach certain conclusions, which could have skewed the analysis; however, the results seem to run parallel with comparable CBI research.

Regarding a different approach to CBI research, Cammarata's (2010) phenomenological study outlines the teacher's perspective, by investigating their experience after receiving in-service training from a program specifically designed to enhance pedagogy skills of K-16 educators; this involves the creation of content-linked curriculum and becoming aware of the core principles behind CBI methods. The participants in this study were selected based on prior enrollment in the CBI professional development program, and for their experience with foreign language curriculum; the study gathered data from one middle school, two high schools, and one college teacher (Cammarata, 2010). This study is significant because it addresses the lack of awareness on using content as a medium for L2 acquisition, which Lyster (2007) suggests is

necessary to develop efficiency within CBI, by merging both meaning and form as the primary instruction goals in the programs.

The results of Cammarata's (2010) research suggest many teachers fail to connect with the core principles of CBI, which impedes the basic objectives of content-based learning. The design of CBI challenges traditional L2 curriculum, and Cammarata's (2010) findings indicate that professional development programs must be developed to reduce the learning curve, helping teachers identify more effective pedagogical techniques associated with CBI. These results are important, because they underline the lack of formal in-service training on CBI's methodology in the classroom, from the teachers' perspective, this seems imperative to the longevity and success of meaning-based curriculum approaches such as CBI.

While phenomenological studies are essential when interpreting certain phenomenon, perhaps a mixed methods approach to CBI research would allow for a more succinct understanding of the measured impact it has on student L2 outcomes. Cammarata's (2010) study is a departure from the customary approach to researching the efficacy of CBI; however, the findings discussed herein introduce a valuable prospective that is rarely discussed in content-based instruction methods. There is also a lack of training available to educators that can equip them with suitable, professional, and developmental practice that assists teachers with the implementation of CBI into mainstream language programs (Chunjing, 2008).

Another unique student perspective of learning content from an L2 is the motivational factors that influence the cognition of language and content. Lasagabaster's (2011) study investigated the relationship between motivation, language proficiency, and content knowledge gained through two approaches, CLIL (Content and Language Integrated Learning) and EFL (English as a Foreign Language). This cross-sectional study collected data from 191 secondary

school students from Spain; each participant was given language proficiency exams and questionnaires after the intervention was administered (Lasagabaster, 2011). As a means to compare the efficacy of both CLIL and EFL methods, and to analyze the relationship between student motivation and language competence, a correlation analysis was performed.

The results obtained from this research illustrated that students from the CLIL experimental cohort were significantly more enthusiastic about learning a new language; thus, a strong correlation exists between the CLIL approach and motivational factors to learn content and language together (Lasagabaster, 2011). Both Dekeyser (2000), and Coyle (2008) consider the CLIL approach a highly effective immersive experience, that exposes learners to a second language at a much higher rate than traditional instructional methods.

Similar to Li and Wang's (2010) study on the attitudes and predictive benefits of students receiving CBI interventions; Tong and Shi's (2012) report is a comprehensive quantitative study on bilingual instruction within China's higher education system; the descriptive research examined the link between students' attitudes towards CBI and the perceived benefits, such as improved academic achievement. Tong and Shi's (2012) research used a convenience sampling technique with 153 third year undergraduate science majors from a university in southeastern China; the researchers administered a paper questionnaire to all participants, and conducted three classroom observations over a 2-year period, to document the proportion of L2 instruction. Additionally, semi-structured interviews were conducted with each bilingual course instructor at the university, to ascertain their perspective of any perceived links between the (CBI) intervention and student academic achievement (Tong & Shi, 2012). Through correlation analysis, the data suggests a significant relationship between student perception, when considering the duration of bilingual instruction, and the direct benefits in student academic

performance. These findings are of importance to this review of literature because they establish a common belief and trend among students receiving (CBI) interventions, which demonstrates a perceived and real benefit measured by academic achievement.

Policy Review

Over the last decade, (Sierra, 2011) suggests tertiary institutions around the world have compartmentalized and packaged various forms of CBI programs, making them available to ESL and L2 learners regardless of their degree specialty, but have administrative policies developed at the same pace as the methodology? Doiz, Lasagabaster, and Sierra (2011) take a different approach to CBI research by addressing higher education policy, regarding multilingual programs in European institutions. Specifically, this study included five teachers from the University of Basque Country in Spain, and utilized a qualitative function and discussion group format, which lasted 1 hour and 12 minutes—it was also recorded for later analysis (Doiz, Lasagabaster, & Sierra, 2011). One of the leading research questions presented by Doiz, Lasagabaster, and Sierra's (2011) study involved the impact on learning and pedagogy by integrating a CBI program, which in some academic communities is referred to as a multilingual program.

Collectively, the findings reveal that teachers in some foreign universities feel CBI courses are an effective model for learning content and language, and stress the importance of balancing the implementation and training to ensure a smooth integration, yielding better student outcomes (Doiz, Lasagabaster, & Sierra, 2011). Additionally, this research indicated that higher education administrations should consider sustaining CBI courses throughout a student's entire degree program, with clear policy language, avoiding some false assumptions and faculty misconceptions of the multilingual programs purpose (Doiz, Lasagabaster, & Sierra, 2011).

Previous research in this area also indicates that CBI methods are impacting more than just learning content through an L2 modality; the research community is just beginning to interpret the dynamics of content-based learning in higher education (Airey & Linder, 2008; Holdsworth, 2004; Iglesias-Álvarez & Ramallo, 2002). This study's design, centered around a qualitative approach, has established a unique perspective, which has revealed potential policy issues and solutions regarding the development of CBI programs in tertiary institutions.

Lo's (2013) study also addresses academic policy and the effective management of CBI programs in academic institutions; the research focuses on the lack of programmatic uniformity when applying an L2 language to a specific content area. Lo (2013) argues that little to no empirical evidence has surfaced, which suggests the humanities are more suitable for CBI integration than other academic disciplines such as math or science. In particular, this research addresses a critical element in policy decision making; how do academic institutions efficiently balance the need to facilitate CBI courses, against individual student needs, or different learning opportunities in various academic subjects (Y. Lo, 2013; Y. Lo & E. Lo, 2014).

Lo's (2013) study was designed with a mixed methods approach that provided certain distinctive benefits; it allows for triangulation of findings, which help support data sets underpinned by just one methodology, yielding a sharp conclusion to the research questions. The participants in Lo's (2013) study included nine teachers from two English Medium secondary schools in Hong Kong, with the average teacher's experience more than 12 years instructing CBI classes; the 503 student participants were part of the 13 grade 9 and 10 humanities, science, and mathematics courses that were observed, with the students' age between 14–16. The data was analyzed from all 22 observed lessons, of which lasted 35–40 minutes, spread across various days of the week and different times of the day; each lesson was

transcribed and coded using a quantitative structure, comparing the portion of student talk time, initial-response-feedback (IRF) sequences, and the measured language learning opportunities in the Humanities, Science, and Mathematics courses (Lo, 2013). The results indicate the Humanities lessons facilitated higher mean scores compared to Science and Math, (“Humanities” $M = 3.26s$ / “Science & Math” $M = 2.06s$), suggesting more student talk time in the Humanities courses (Lo, 2013). The comparison also yielded higher IRF scores in Humanities courses, where teachers elicited more student responses and provided feedback regarding their L2 output, also denoting the CBI humanities lessons offered more learning opportunities for L2 cognition; the researcher also identified this content area provided more deep contextualized interaction, causing higher order thinking (Lo, 2013).

This study by Lo (2013) was significant to the field of CBI research, because it stressed the importance of focusing academic policy around a balanced CBI program, that incorporates certain subject areas into the specialized content-based learning method. However, this study does not negate or suggest that L2 cognition is unattainable in Science and Math disciplines; however, this study provides some evidence that Humanities content allows for better CBI program outcomes.

The Arkoudis (2005) case study reviews the CBI / ESL policy in a secondary school in Victoria, which is a state in Australia. The research addresses the relationship between language and content learning in various subjects; more specifically, Arkoudis (2005) analyzes the CBI curriculum planning of an ESL and Science teacher for grade 10 students. This research is meaningful, as it underscores the factors that influence the balancing of content and language, including the dichotomy involved in this process, for consideration when adopting academic CBI policy. Arkoudis (2005) observed and recorded several curriculum planning sessions over a

period of two years between the Science and ESL teachers, and utilized a qualitative function to further examine the collaborative efforts involved in the process.

From the perspective of policy inception, Arkoudis's (2005) study revealed a power struggle that exists between the subject content area and the language objectives of CBI curriculum, despite the perception of a merged dynamic that is uncontested. Another emergent discovery from this case study suggested that content area is a crucial element in L2 cognition, and based on this paradigm some pedagogical tension seems to build, which depends on the discussion-based or experimental-based nature of the topic (Arkoudis, 2005). Additionally, during all the course lesson planning sessions, the two teachers frequently discussed language and content; however, there were very few recorded exchanges regarding the balancing of content versus language in the curriculum (Arkoudis, 2005).

In totality, these findings suggest to academic policy makers that a paradoxical condition remains in CBI curriculum that needs to be addressed before implementation of any program, and certainly before curriculum is planned by language and content faculty. In this regard, Arkoudis (2005) identified potential barriers to the successful implementation of CBI programs in any academic institution; thus, leading the way for much deeper research to explain the issues that influence language and content pedagogy. This is critical to the policy design of CBI and the integration of these methods into the classroom.

Common Ground in CBI Research

Early qualitative research on CBI methods illustrates an emergent trend, or common ground, where similar techniques are often applied to evaluate the efficacy of content-linked ESL pedagogy. Such practices usually include interviews, discussion groups, surveys, observations, and document analysis, which help identify assumptions and establish evidence to support these

claims (Creswell, 2014). These qualitative features imbedded throughout CBI research are critical to providing researchers with understanding of the phenomenon, based on each participant's perspective and involves a rigorous investigative process. Snow and Brinton (1997) suggest this approach is necessary when evaluating the multitude of perspectives in the development of content-based instruction. Booth, Colomb, and Williams (2008) advocate qualitative measures for field research, with characteristics suitable for classroom, school, and clinical environments. Davison (2006) employed a qualitative and interpretive design when administering a questionnaire, followed by semi-structured interviews to investigate the link between CBI, the design, and cooperative efforts when planning curriculum with language and content teachers. In this regard, the qualitative approach to CBI research and development is vital in case studies, and participant observations, which are common themes discussed and utilized as a methodology, as it provides context to explain and support data analysis and hypotheses.

Additionally, CBI research often incorporates quantitative design aspects, as seen in Thomas and Collier's (2002) study, where student test scores and demographic information was analyzed to ascertain the efficacy of CBI methods on ESL participants. Based on this literature review, my findings indicate most studies conducted on CBI methods involve nonexperimental designs; Creswell (2014) advocates ex-post facto, casual comparative, and correlational techniques as a means to acquire and analyze data between variables either before or after various interventions—this seems specifically and immeasurably suitable for the environment in which CBI exists.

Unfortunately, according to both Creswell (2014) and Booth et al. (2008), qualitative and quantitative measures as discussed earlier, have particularly inherent defects within their

functionality, such as: unknown variables causing the data to skew in quantitative research, also being rigid and fixed in nature. However, qualitative measures have the tendency to contain bias from the researcher and are subjective in nature, and the sample size is often smaller than quantitative designs creating a situation where the data results cannot be generalized to the total population, making this method difficult to represent the entire populace (Booth et al., 2008). The risks associated with both methodologies create concerns for the researcher when evaluating a design to investigate CBI schemes. To resolve this internal dilemma, modern content-based instruction studies have turned to a mixed-methods approach.

Current attempts to investigate CBI have adopted modern techniques, such as mixed method approaches, to assess student outcomes after receiving content and language based interventions within secondary and tertiary institutions. According to McMillan (2012), this third approach to investigating various phenomena is efficient, when identifying both the product and purpose, or in the case of CBI research, the process, outcomes, and explanations of these results. For example; Marshall's (2009) research reviewed two mixed-method studies, this case study relied on data gathered from surveys, student performance records, and semi-structured interviews, which yielded a deeper perspective and expanded results, to capture a broader understanding of the impact on ESL participants after receiving the CBI intervention. Also, in regards to the development of appropriate CBI policies for K-12 and post-secondary institutions, Tollefson and Tsui's (2004) case study draws inference from using mixed-method studies as a reference, to support their findings on content and language learning, and suggest this method of data collection and analysis is more comprehensive than any one process.

CBI Methods in Higher Education

In review of these selected research studies on CBI methods in higher education, there is an overwhelming sense of cohesion among student outcomes and data collection methods. In particular, when researchers aim to measure student achievement based on participants receiving one of the many forms of CBI interventions, test scores and GPA averages are analyzed against control groups to assess the direct relationship between the bi-variate samples. García-Vázquez et al. (1997) employed this technique when evaluating the efficacy of CBI on secondary students in California; or in a similar study, Song (2006) highlighted the academic achievement of first semester ESL students, by comparing testing pass rates and long-term academic success by analyzing retention rates and overall GPA, through descriptive and inferential analytics. When assessing the effectiveness of direct CBI intervention, both research in secondary and tertiary environments seem to indicate a positive impact on student outcomes; specifically, the evidence suggests content-based instruction methods enhance language proficiency and content knowledge.

To further address the relationship between CBI methods and academic achievement, researchers such as Kasper (1997) have concluded that ESL students benefit the most after receiving these interventions, with data that supports long-term academic performance enhancements, leading up to the attainment of a degree at university. Baik and Greig (2009) also concluded with similar results, both researcher's findings indicate that content-based ESL programs promote better language cognition, and lead to positive student outcomes. However, in comparison to other similar studies, CBI methods appear to yield ongoing student academic benefits, but few longitudinal studies have investigated this concept (Baik & Greig, 2009; Song, 2006). Student achievement as a result of L2 acquisition is a focal point of many academic

studies, and modern research is also considering motivation as a variable in the efficacy of CBI methods.

Motivation is a complex emotion, which contains various constructs that direct a person's actions and behaviors. Lasagabaster (2011) considers motivation a key element in CBI programs, and suggests this factor influences a student's success in foreign language learning. Collectively, motivation is now regarded as a primary benefit of the CBI approach to L2 acquisition, and in a direct comparison, many studies yielded similar findings, based on the participants' measured levels of intelligence and academic success (Seikkula-Leino, 2007; Mearns, 2012). Additionally, Seikkula-Leino's (2007) research data suggested that while motivation levels increased while receiving CBI interventions, student's self-confidence in learning a second language was not always positive.

The continuance of this emergent trend captured in the reporting of many studies reviewed in this section, connect motivation with student academic achievement; this compounds earlier evaluations suggesting the significant value CBI programs provide in higher education. The research on tertiary students presented in Moriyoshi's (2011) study, suggests that student perceptions of motivation toward the CBI class experience, is a critical factor in a student's decision to begin or continue learning in this style of L2 acquisition. Again, many student participants in secondary and tertiary studies have reflected positively on their motivation to attend CBI courses, with the content subject being a major contributor in the decision process (Moriyoshi, 2011). Additionally, students' perceived motivation was enhanced when the topic was instructed in the target language; Moriyoshi (2011) also reported increased self-confidence while receiving CBI interventions.

The available research on CBI methods regarding academic policy compares and investigates specific outcomes to establish program objectives that meet the needs of individual institutions. The purpose of this approach is to fully understand the intricacies and dynamics of CBI development, and successfully implement this ideology into both the secondary and tertiary institutions. Creating deep immersive and cooperative based CBI programs are essential to enhancing L2 acquisition, and according to Doiz, Lasagbaster, and Sierra (2011), higher education institutions often administer language policies that promote CBI programs as a means of contending with internationalization, student mobility, and economic conditions for gainful employment. Throughout the world, the tendency for higher education institutions to promote policies that favor CBI programs has increased over the past decade (Doiz, Lasagbaster, & Sierra, 2011). Policy makers in the higher education community have attempted to blend the CBI approach, as a resource to bridge the gap with L2 learners, while creating a balanced ecology within the many diverse and unique multilingual universities.

The response to international mobility and globalization of higher education has universities scrambling to cater to student-centric needs, which vary culturally and linguistically by region. Most research on CBI methods in higher education has concluded that content and language programs integrated into the curriculum improve student outcomes in many forms; such as academic achievement, motivation, and encouraging sustained enrollment at the tertiary institution (Li & Wang, 2010; Liu, Shi, & Dong, 2013; Strotmann et al., 2014). The research in this area of content and language development also gleans several key inferences; both students and faculty perceive content-based instruction curriculum as efficient, but faculty stress the lack of in-service training on CBI best practices and pedagogical technique (Kong & Hoare, 2011). Many program leaders in content and language development call for such measures, citing

professional workshops as a framework for evolving CBI engagement practices, and distributing talent in the field of L2 acquisition.

According to Cammarata (2010), within the scope of program and policy review, administrative leaders fail to address a lack of teacher training opportunities. Many academic institutions align CBI methods with their mission, to promote meaning-based curriculum; however, decades of neglect on training content-linked skills to in-service teachers have left a void—especially regarding higher education ESL faculty (Cammarata, 2010). Multiple studies report that ESL and FL (foreign language) teachers experience a psychological confrontation when conceptualizing CBI methods in the classroom; essentially, educators struggle with the notion of teaching language through content, and experience frustration with reformatting traditional curriculum (Cammarata, 2009, 2010). It becomes evident that, perhaps, more scaffolding efforts are needed to train in-service teachers, where the connection between language and content cognition is reinforced, along with creating more textbook resources for curriculum development.

Another relatively common deduction after reviewing CBI research is the introduction of well-defined program objectives; many studies have investigated and established that clearly defined content and language goals are paramount to obtaining positive student outcomes. In particular, Genesee (1999) found that teachers consciously assimilate elements of language development into content, when the language objectives align with students' sequential pattern of learning, which supports and reinforces emerging knowledge of the L2 and content area. This involves appropriate lesson planning that Genesee (1999) emphasizes as a successful CBI scaffolding technique. This sector of CBI research leads to a formal awareness, regarding the application of administrative policy to content and language programs. Specifically, several

studies have concluded that humanities subjects offer more opportunities of successful student outcomes after receiving CBI interventions (Lo, 2013). Although multiple studies have been conducted that address implementing CBI methods on various subject areas, Lo (2013) suggests that much of the evidence is inconclusive, and advocates further longitudinal studies to investigate the policy concerns.

Challenges Facing CBI

CREDE, (Center for Research on Education, Diversity & Excellence), outlined several challenges impacting CBI's success in K-12, and post-secondary institutions; the main factor in content-based instruction program success was choice (Thomas & Collier, 2002). There are several styles and forms of L2 acquisition such as two-way immersion, sheltered, one-way, transitional, ESL, and CBI approaches. Some studies have indicated that content-based instruction methods benefit students by offering more learning opportunities, with the focus split between language and content; however, Seikkula-Leino's (2007) data reveals that fewer students will excel in CBI courses when compared to one-way instruction in L1 classes. Additionally, Seikkula-Leino's (2007) research found that pupils were more likely to exhibit lower self-confidence in CBI programs than compared to one-way language centered courses, and learning goals can be missed for lower level students because the content is too challenging in the L2.

In much of China, CBI is also known as Chinese-English bilingual education, and according to Hu (2008), there are misconceptions and misinterpretations as to the ability of this method to produce the desired or advertised benefits. Another specific problem facing CBI in Asia is the socioeconomic and educational inequalities, where the promotion of bilingual education is not spread equally, causing an elitist perspective by some stakeholders (Qiang,

2000; Hu, 2008). This has less to do with the efficacy of CBI; in essence, the availability of bilingual education in China and Asia has caused a supply and demand curve, similar to the international economic concept of human capital.

Hu (2008) postulates that by perpetuating bilingual education in the form of content and language instruction, people are unknowingly contributing to this notion of inequality, based on one's ability to gain command of their L2 or even L3, for the purposes of attaining a degree or gainful employment. However, Hu's (2008) research is based on casual comparison, and the evidenced produced is lacking significant structure to accommodate the conclusions reached by the author. In response to this speculation, the MOE (Chinese Ministry of Education) has made further precautionary adjustments to policy that mandate ESL courses be offered at all public institutions, promoting the content-linked ideology; thereby, propagating L2 proficiency in the general population, regardless of socioeconomic status (MOE, 2001).

In opposition to Hu's (2008) problematic perspective on CBI and bilingual education, Dor (2004) proposes that content-based learning, and to a larger extent, multilingualism, is a benefit, not only to society, but also culturally, through the cognition of linguistic nuances that shape understanding of different cultures. However, some research indicates that promoting CBI methods may hinder L1 development, although Seikkula-Leino's (2007) study negates these concerns, with evidence that displays student achievement levels that are unaffected by CBI curriculum. Another divergent factor impacting CBI efficacy is that content and language instruction produces superior cognitive skills and divergent thinking in various participant experiments (Seikkula-Leino, 2007). This seems to dismiss the few concerns or challenges that some experts have identified as problematic areas in the development of CBI as the dominant methodology in L2 acquisition in tertiary institutions.

CBI Methods in Europe and China

As the tertiary communities in Europe and Asia rise to the challenge of meeting the demands of globalization and the internationalization of language, CBI programs are often integrated into the curriculum as a specific measure to address the need to acquire proficiency in L2 languages—usually English (Van Leeuwen, 2004). Many of these multilingual universities that provide content and language courses can be distinguished by the students' native language, or the language of instruction, the language of the administration, the environmental language, and perhaps the language of the labor market (Van Leeuwen, 2004). In essence, these subtle differences in multilingual universities face didactic and unique challenges, because difficulties arise from this operational linguistic divide, especially when there is less symmetry between languages.

Much of Europe adopted CLIL (Content and Language Integrated Learning), which is a form of CBI methods in their secondary education system, and developed immersive language and content programs, incorporating this into the core curriculum; Lasagabaster (2011) suggests, that because of the positive language proficiency and academic improvements attributed by the CLIL method, it supports opportunities for combining language and content learning into a functional structure—easily merged with traditional methodologies. Wesche and Skehan (2002) have described various CBI methods as a two-for-one process, where students receive an integrated language and content rich experience, which is more effective than traditional language learning. As more studies reveal the benefits of CBI in language and content learning, the tertiary industry can also use this approach as an opportunity to develop programs that expose students to highly conceptualized and relevant learning models, that promote

communicative language learning, where isolated topics help build functional academic knowledge in a given area of discipline.

According to Costa and Coleman (2013), in the late 1990's much of Europe's higher education community responded to globalization and student demand for L2 acquisition by implementing CBI and CLIL programs; this predicated a quasi-universal bilingualism that is now prevalent among many European institutions. While content and language programs have gained popularity and continue to expand, Costa and Coleman (2013) suggest the need to approach this L2 methodology with some uniformity to ensure program quality. English medium instruction and CBI pedagogical techniques continue to impact faculty and student outcomes across Europe; specifically, because of the widespread perception of CBI's efficacy to enhance L2 cognition and academic performance.

Concerning the immersive nature of CBI and CLIL programs in Europe, various governments have decided to lower the age of students exposed to this intervention, because of the perceived benefits (Lasagabaster, 2011). Additionally, the consortium of European K-12 and tertiary institutions led a CBI initiative, because the positive linguistic results from the increased exposure in the target language is easily integrated into busy curriculums (Lasagabaster, 2011). The content-linked language courses are thought to enrich the learning experience, in ways that are more difficult to put into practice within traditional language classrooms (Coyle, 2008; Doiz, Lasagabaster, & Sierra, 2011; Lasagabaster, 2011). These content and language programs are popular among most stakeholders in Europe, therefore educators have pushed for universities to offer these courses in many different subject areas, to develop practical knowledge via this innovative approach to L2 acquisition.

China is particularly sensitive to bilingual instruction at all levels of education, and according to Leung (2005), Lin (2008) and Kuo (2005), bilingual instruction in Mainland China begins in kindergarten and continues into university, with the general expectation of building content knowledge in L2, to improve academic achievement. I would argue this policy and practice establishes China's higher education sector as a suitable venue for research in the area of content and language instruction; the abundance of CBI programs throughout the country's tertiary system allows for access to student performance data, which can yield some valuable insight. More specifically, because of China's long history and government mandates, which require educational institutions to offer bilingual instruction at all levels; this practice has allowed content-based instruction programs ample time to evolve and become part of the approved curriculum in higher education.

According to the Ministry of Education of the People's Republic of China (2001), the government has required all tertiary institutions to promote bilingual education, which has translated into a widely accepted practice of integrating CBI programs into both public and private higher education establishments. Li and Wang (2010) concluded in their study that bilingual education including CBI methods are still under development in China; to some extent, the country is experiencing growing pains regarding L2 acquisition. Some consider it a regional problem, particularly in the northeast provinces. In the last few years China has undergone a significant change; now, most consider bilingual education a necessity, and several mandatory bilingual assessments are administered to fourth year students in certain areas of study.

The cities that are located within special economic zones concentrate their effort and resources to accomplish the task of enhancing students' foreign language proficiency; to accomplish this achievement, CBI courses are offered to learn content in their target L2, and to

attract and retain students at higher education institutions (Feng, 2005, 2007). For these reasons, I argue that China has aggressively pursued content-linked pedagogy, thus providing a unique opportunity for research to analyze CBI's impact on student academic achievement at the tertiary level. Overall, Feng (2005) concluded that despite the accomplishments of CBI methods in China, the perceived short and long-term benefits are often misinterpreted, with certain barriers still effecting the value of content and language learning, such as: in-service teacher training, appropriate textbooks, pedagogy techniques, all of which impede development of CBI methods in higher education. The results described herein have established a general consensus, that China has successfully implemented content and language learning objectives with positive student outcomes, yielding advantageous academic policies to support L2 acquisition—meeting the demand to create global citizens.

Summary

From the very inception of content and language learning, content-based instruction has been credited with both successes and some questionable failures; however, further development in program policy and pedagogical techniques have spawned this phenomenon, and thrust it into mainstream education around the globe (Gilroy, 2001). Studies that focused on measuring the direct link to CBI interventions and student achievement over a sustained period of time are reporting similar findings, which advocate content and language learning as a premier choice when promoting L2 cognition (Alanis, 2000). This ascension throughout the years has attracted attention from various stakeholders, and inspired many studies on the efficacy of CBI methods.

Aleman's (2013) research identifies a consistent trend observed by many stakeholders, this is in regards to the causal relationship between CBI methods and enhanced student academic achievement scores, L2 proficiency, and improved cognition of academic terminology, germane

to specific content areas, which is necessary for rich contextualized awareness. Exploring new ways to acquire language skills while meeting the burden of standardized testing and other required achievement objectives is a tedious assignment; however, Nieto (2002) and Cohen, (2014) agree that CBI methods fit this niche, and conveniently address language and content learning, supporting the mission of higher education institutions.

This literature review also highlights the student and teacher perspective on CBI's ability to stimulate cognition and enhance academic achievement, while focusing on content and language in a balanced approach. The statistical information contained herein creates a unique vantage point; these results seem to indicate not only immediate performance enhancements, but the few longitudinal studies are beginning to differentiate the long-term benefits associated with CBI interventions. The historical data on content and language programs also suggest CBI programs are on the rise in higher education institutions, with policy makers taking notes from the success found in K-12 content and language programs. The globalization and internationalization of the tertiary market has forced universities to adopt L2 acquisition courses to remain competitive, this has created challenges for CBI integration.

While these programs have been in development for many years, they vary in name, but all have similar objectives, and China is one of the counties devoted to implementing and further advancing CBI's efficacy in higher education. China has a long history of experimenting and executing content and language programs in the curriculum, which illustrates that firm government and administrative policy in favor of L2 acquisition, will play host to positive student outcomes. The challenges of successful content-based instruction curriculums are realized on a global scale, the issues trending seem to emerge in research from all hemispheres, within all levels of education; these concerns are, quality control, textbook publications,

pedagogical technique, in-service training, and clear administrative policy language and program objectives. As tertiary institutions continue to integrate CBI measures into their course roster, standardization and quality control will be enhanced by the popularity and availability of this methodology in L2 acquisition. At present, the cause and effect relationship between CBI and student academic achievement is heating up, and more longitudinal research is needed to assess the impact of CBI on student performance over their academic careers.

In summation, the next chapter will outline an ex-post facto, mixed method design methodology, with the purpose of establishing a relationship between CBI interventions and student academic achievement, along a 3-year academic period. At a large public university in southern China, this investigation will also evaluate student perspectives on the efficacy of CBI courses, as a means to enhance student performance. I currently hold an administrative and faculty position at this university and have access to historical data on all student participants involved in the experiment. Considering the catalyst for student academic achievement is critical to the evolution of CBI programs, and the evidence gathered in this study is reported within chapter 4; this data includes a comparison of GPA scores from two participant groups, a student survey, and semi-structured interview with faculty regarding the perception of CBI's efficacy to enhance student outcomes.

Chapter 3: Methodology

This study is predicated upon my understanding of the perceived relationship between CBI (content-based instruction methods), and the benefits this approach provides on the outcome of students' academic achievement scores in higher education. Additionally, the literature reviewed in the previous section indicates a positive trend among tertiary students receiving CBI instruction; more specifically, this regards the efficacy of content-linked instruction to advance L2 cognition and academic achievement scores, which suggests a correlation, evident by several experimental studies and some longitudinal research (Alamán, 2013; Ament & Pérez-Vidal, 2015; Coyle, D. 2007).

The research surveyed in this study necessitates further investigation into the efficacy of content-based instruction, as a sustainable method of promoting L2 acquisition in ESL students within tertiary institutions. Additionally, the literature also advocates CBI methods as a viable practice in higher education to enhance L2 cognition, while enhancing a student's overall scholastic achievement (Li, & Wang, 2010). In association with the surveyed literature, a subordinate relationship was revealed, which indicates both student and faculty perspectives, expressing a high level of assurance that CBI methods promote enhanced cognition and improve student academic achievement scores (Grabe & Stoller, 1997; Lambert & Tucker, 1972; Tan, 2011; Tong & Shi, 2012). Based on the evidence disclosed in the literature, and a systematic analysis of the applied models, I have evaluated several techniques in the application of theory into practice.

The applied methods described in this chapter are aligned with the previous studies presented in the extant literature. In response to this evaluation of theoretical practice, I endeavor to expand upon earlier studies, by applying a mixed-methods approach; primarily,

adhering to quantitative standards, while embracing some qualitative techniques to assess the efficacy of CBI methods on influencing student academic achievement scores in higher education. This chapter describes the purpose of the study, research questions, and hypotheses; additionally, I then detail the specific instruments used, the target population, and outline the data procedures. To conclude this chapter, I review limitations, validity, the research findings, and ethical concerns of this investigation.

Purpose of the Study

The objective of this quasi-experimental mixed-methods study is to establish a relationship between CBI methods, and the perceived benefits of this approach on academic achievement scores reported as GPAs (Grade Point Averages) among students in higher education. Additionally, this research focuses on CBI methods, and the efficacy of this approach on L2 learners, as a viable practice in promoting success on a student's overall scholastic achievement, defined by longitudinal data analysis. In a secondary capacity, this research endeavors to explore various student and faculty perspectives toward CBI methods, and understand the capacity for these programs to influence and enhance academic achievement scores.

This ex post facto study contains three segments, with the initial phase commencing during the 2014–2016 academic school years, which involved students from two sample groups. The quasi-experimental group that received the CBI intervention occurred during the second semester of their first academic year at the University, and the control group is compared along the same linear track. In the next phase, I will conduct a survey using participants from the experimental groups that received the CBI interventions; additionally, this includes semi-structured interviews with faculty to identify meaningful perspectives and reliable in-depth

qualitative data. During the final stage of the data collection efforts, I will conduct necessary follow-up interviews, and begin the data analysis and computations, to meet the goals of this study.

Research Questions and Hypotheses

The following protocol and research questions guide this investigative inquiry:

1. Is there a relationship between CBI methods in higher education, and student academic achievement as measured by student GPAs?

Subordinate Questions:

1. What is the difference in overall GPA scores among students receiving content-linked CBI courses, as compared to students not receiving CBI interventions?
2. How do students and faculty perceive the efficacy of CBI courses to promote improved content and linguistic cognition in higher education?
3. To what extent do students and faculty in higher education identify CBI methods as a viable practice to encourage higher academic achievement scores in students?

Hypotheses for GPA Scores:

- (H_0): There is no relationship between ESL tertiary students receiving CBI interventions, as compared to their control group, regarding interim or longitudinal improvements in achievement scores between the academic period covering 2014, 2015, and 2016 respectively.
- (H_1): There is a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in enhanced interim academic achievement scores between the academic period covering 2014, 2015, and 2016 respectively.

- (H₂): There exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in achievement scores between the academic period covering 2014, 2015, and 2016 respectively.

Hypotheses for CET-4 Pass Rates:

- (H₀): There is no relationship between ESL tertiary students receiving CBI interventions, as compared to their control group, regarding longitudinal improvements in CET-4 pass rate scores covering the 2017 academic year.
- (H₁): There exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in CET-4 pass rate scores covering the 2017 academic year.

Research Design

Based on a systematic review and evaluation of previous literature on CBI methods, this study will incorporate a mixed methods approach to investigate the aforementioned phenomenon. The quantitative aspect of this research will rely on inferential statistics, utilizing an ex-post facto design, based on the difference between two populations (student sample groups), and the mean GPA scores, analyzed by two-independent sample t-tests. This research will also include a two-sample t-test to investigate the difference between the two-independent population proportions. These two quantitative measures will assist in the evaluation of the post intervention student data, which covers a 3-year academic period.

Many experts in the field of scholastic research suggest the use of inferential statistics to glean insight when comparing relationships, and since the interventions in this study have already occurred, the most appropriate comparison method is the ex post facto design (Adams &

Lawrence, 2014; McMillan, 2012). This particular research method is on par with the customary and routine study methodologies, commonly retained as the primary research design in quasi-experimental and non-experimental studies (McMillan, 2012). This method is specifically suited for the type of data and phenomenon I wish to measure within the higher education environment. However, as noted in this study's literature analysis section, most of the modern research conducted on CBI in the tertiary community has adopted a mixed methods approach (Grinstead, 1997; Lasagabaster, 2011). As evident by this study's literature analysis, the previous research indicates a trend in the practice of investigating the relationship between CBI interventions and student academic achievement; in consideration of this methodological approach, my research design will also incorporate a survey with randomly selected participants, and semi-structured interviews during a focus-group session with faculty.

According to McMillan (2012), the use of surveys has become a popular method for the collection of data in non-experimental research; in this instance, I argue that a survey is one of the best ways to introduce another layer of data collection and analysis. For the purposes of this study, I will include both qualitative and quantitative functions within the survey design, with the objective of establishing supporting evidence regarding the relationship between CBI methods and the students' perspective on their academic achievement related to the intervention. Specifically, Adams and Lawrence (2014) suggest that correlation and regression research methods lack the detail needed to form conclusions about cause and effect relationships. In observance of this characteristic, my research will focus on causal-comparative methods, such as a two-independent sample *t-test* with independent and dependent variables, while also analyzing some descriptive statistics regarding mean scores and other central tendency measurements.

Participants and Sampling Procedures

The experimental sample group for the first segment of this study included students enrolled in the content-linked ESL courses, which included various humanities and social science disciplines at the selected university. The students qualified for participation in the study if they enrolled in one of the approved CBI courses offered during the second semester of their 2014 freshman year. The students in the control groups qualified for the study if they were enrolled in the same humanities and social science majors, but never enrolled in any content-linked ESL courses during the entire academic period from 2014–2016. The target population for this research consisted of undergraduate students enrolled in CBI courses offered through the selected university, totaling approximately 12,476 full-time students (Huizhou University, 2017). Within this sampling frame, six student groups were identified totaling 300 participants, comprised of 150 female and 150 male subjects, with three of the groups receiving the intervention, as compared to the three non-content linked control groups; all participants are similar in age, between 18–22 years old, and have comparable socioeconomic status.

This evaluation process in the previous literature review section supports the candidacy of the host University, a Guangdong provincial level undergraduate school, in Mainland China, as the source of this study's data collection and analysis activities. This particular university hosts one of the largest populations in southern China, estimated to be over 23,000 full and part-time students, offering several degree programs, with the humanities and social science majors hosting a majority of the ESL content-linked courses ("Huizhou University", 2017). According to the MOE (2001), China's Ministry of Education considers CBI methods an essential component of the student experience, mandating all public tertiary institutions provide content-linked programs. More specifically, this selected university is representative of the target

population in China, matching demographic and socioeconomic variables, that identifies with the unusually homogeneous nature of this student populace.

To further ensure continuity within the participant groups, students were excluded from selection if they reported any additional ESL instruction at the university after their second freshman semester, or received private L2 training off campus during the aforementioned academic time-line. As indicated by each participants' English entrance exam prior to their freshmen year, all students from the sample groups were ranked intermediate proficiency level for their (English) L2. Each of the six student participant groups were then tracked over their freshmen, sophomore, and junior year at the university, and student information was gathered on their senior year for graduation and retention statistics. On average, four years is the standard time spent on attaining an undergraduate degree at this university. In correlation to the general population and according to Huizhou University (2017), the institution currently has over 12,000 full-time students enrolled in undergraduate programs; however, CBI related courses are not offered in every major, thus a 2.5% sample size of the target population will allow for a reasonable interpretation of findings, especially when considering the homogenous student populace (McMillan, 2012). After performing several calculations using (SPSS) software, while keeping a 95% confidence interval and an alpha of .05 margin of error, a sample of size of 300 participants is large enough to attain statistically significant results.

In China's higher education environment most Government-controlled public institutions operate with similar standards, and also promote CBI courses by decree, which is officially communicated and evaluated by the provincial government (Chinese Ministry of Education, 2001). According to the MOE (2001), approximately 92% of the undergraduate students attending 4-year undergraduate schools in China are of Han ethnicity, this statistic carries over

into this study's pool of participants. In regards to the student groups participating in this study, all subjects reported as being of native Han ethnicity, which exceeds the government's estimated statistic for the student populace. Additionally, only 30 participants from the sample groups reported their home was outside Guangdong Province, which is one of the largest and most densely inhabited regions in southern China.

The overall design of this study is a mixed methods approach, with a stratified random sampling and purposeful selection of all participants, to compensate both quantitative and qualitative measures, respectively. Moriyoshi's (2011) investigation into CBI corresponds with many studies described in the literature section of this study, which commonly illustrates selecting participants based on some type of probability sampling technique for quantitative functions. With regard to qualitative operations, the majority of the CBI inquiries indicate nonprobability sampling procedures as the favored approach, such as purposeful selection of participants (Ament, Pérez-Vidal, 2015; Coyle, 2006; Cuervo, 199; Lasagabaster, 2011; Song, 2006). More specifically, McMillan (2012) suggests this sampling strategy accommodates a mixed methods design, and encourages enhanced triangulation by blending various sources to address the same phenomenon.

Prior to any contact with participants or the University, a formal written notice of intent to conduct research was delivered and signed by authorized personnel within the administrative leadership team at the institution; additionally, all student and faculty participants received written notification regarding the pending research, which all subjects reviewed and signed—referenced in Appendices A through F.

Instrumentation

The instruments applied in this study include an online survey hosted by Survey-Monkey, and a semi-structured interview questionnaire. According to Survey-Monkey (2017), the commercially supplied software falls within a 95% confidence interval, regarding the overall accuracy and reliability of the company's software. During the second phase of this study, a 10 question, objective and Likert-type survey is scheduled to be administered to 100 randomly selected participants from the three groups receiving the CBI intervention. This research tool is referenced in Appendices H and I, which represent the printed English and Mandarin Chinese versions of the online survey, respectively. Additionally, four of the adjunct teaching staff responsible for instructing the content-linked courses during the study, will be randomly selected for semi-structured interviews, where a questionnaire referenced in Appendix G will guide this focus group session. To further validate the reliability of these two instruments, both tools have been piloted during the first phase of this study with non-participants.

Data Collection

During the second semester of the 2014 academic school year, the six participant groups at the university attended humanities and social science courses; at this time, three of the experimental groups received the content-linked intervention, and three control groups that were selected did not receive the content-linked intervention. In this instance, each of the six participant groups were then tracked over the next three academic school years. Under special authority granted by the University, the researcher will request all final GPAs for each participant from the academic coordinator; this data covers only the applicable date range for the current study. The GPA data consists of a numerical percentage grade, where this university considers a 60% a passing grade in any subject, with some courses offering 1-3 credits and each

major requiring 147 credits in total to graduate. Coinciding with the collection of each participants' final grades, an emailed survey will be conducted via Survey-Monkey. During a closed door focus group session with four teachers, a semi-structured interview will be conducted utilizing the guided questionnaire.

Operationalization of Variables

This study identifies CBI classes as humanities and social science courses instructed by native English speaking adjunct faculty, using content to learn an L2 language. Each student participant was a native Chinese citizen, enrolled at the 4-year undergraduate university in southern Guangdong Province, China. The control groups included analogous student participants, with all subjects drawn from a pool of applicants attending at the university between the 2014–2017 academic years. The experimental groups receiving the CBI intervention were exposed to the same content-linked pedagogical methods; however, the student outcomes varied slightly based on the objectives of the individual course syllabi, but the L2 medium of instruction was English verses Mandarin Chinese in the non-content linked courses.

More specifically, this study measures the GPAs of all students from the experimental and control groups; this data is a major indicator of L2 cognition, content retention, and longitudinal academic success within the test subjects. Additionally, the GPA average for each participant group will be calculated for further analysis and comparison. Also, other variables being analyzed between the sample groups are the participant's individual scores and pass rate on the CET-4 (College English Test that assesses English proficiency of undergraduate students in Mainland China), which is traditionally administered during a student's junior year in undergraduate studies. For the purposes of this investigation, only student results from the CET-4 will be included in this data set, any participant that qualified with the CET-6 exam was

excluded from the analysis. In a split comparison, an analysis of all data will be evaluated based on gender, to understand if any significant difference emerges based on this single variable. During the qualitative phase of this study all student surveys will be translated and coded into both qualitative and quantitative data points

Data Analysis Procedures

Quantitative. The quasi-experimental data collected in this study is reported as a multivariate inferential statistic, using two-independent sample *t-tests*; this involves the GPA scores and CET-4 pass rates from both experimental and control groups. These calculations will be done using a commercially offered statistical package for the social sciences (SPSS) software. This data is displayed in Tables (1–5), in Chapter 4, and referenced as a chart within Appendices L and M. This process will also reveal any statistical significance between the relationship of each participant group, relating to the content-linked intervention—which for the purposes of this study, is considered the independent variable. Through this analysis, I sought to identify any underlying relationship between students attending CBI courses, and their final GPA scores for the class. The longitudinal statistics compare the experimental groups overall GPA scores over the study’s 3-year investigative period. After performing t-tests with the data, each group will be compared using descriptive statistics, relying on central tendency measurements to analyze the various participant groups.

In Table (3) I present each students’ final GPA scores as a decimal, from all participant groups between the academic years of 2014–2016. Additionally, I attempt to understand the students’ perspective and dynamic motivation that addresses the potential relationship between CBI courses, and any improvements in academic achievement scores. After administering this study’s online survey, which will capture objective and Likert-type data; each question will be

coded, then averages calculated using central tendency tabulations. While computing the mode and mean for the survey results, the standard deviation will also be calculated to measure the spread between the values. Through this inquiry process, any parallel connections between CBI courses, and a student's enhanced academic performance will be revealed, predicated upon the participant's perception and motivations.

Qualitative. In the initial phase of this study, a mixed-method approach was implemented to address a wider scope of inquiry, and to enhance my understanding regarding the relationship between CBI, and students' academic performance. With the introduction of another investigative layer, I combined several analytical methods such as a survey and semi-structured interviews. These interviews are scheduled to be conducted during a focus group session, immediately following the deployment of the emailed online student survey, and only apply to four randomly selected adjunct faculty that instructed the content-linked courses at the university during the study's investigative period.

During each interview a questionnaire will guide the discussion, which is referenced in Appendix (G); additionally, all participants have authorized the audio recording of their interview session for later examination. Throughout the entire interview session, the emic and etic data will be collected for coding and analysis, concluding with the interpretation of the data. According to McMillan (2012), focus group interviews lead to richer understanding about the phenomenon being researched, and provide vast amounts of data that needs to be synthesized for interpretation. This coding process involves establishing categories and sub-codes that divide major themes into their smaller units. As the information begins to align within a manageable body of data points, I will begin the recursive process of constant comparison, to achieve certain generalizations and draw some inferences.

Limitations of the Research Design

In any study or research design, there are latent possibilities for bias and error, by way of the researcher, participant, or misinterpretation of the data. However, as stated by many prominent leaders in educational research, there will always be a chance for error in any design or methodological approach (Adams & Lawrence, 2014; McMillan, 2012). The objective is to recognize these limitations, mitigate their impact on the research, and fully disclose any possible influence these extraneous variables pose on the study's validity and credibility. Despite my efforts to select an appropriate combination of effective methodologies that accommodate this study's objectives, some limitations persist and are reported herein.

Regarding this study's ex post facto design, the participants within the experimental and control groups were selected to participate based on their enrollment in one of the CBI courses being offered during the 2014 academic year. In the Chinese public university system, it is uncommon for students to attend classes outside their major, or out of sequence from their predefined cohorts; hence, this study does not take into consideration other students from every possible major within the university, and only identified potential subjects within the humanities and social sciences discipline. In association with teacher performance or time in-service, neither variable was considered while collecting or analyzing the data, which could skew the results of this study.

Sample size was determined by availability of comparable courses offered at the university during the investigative period, this included CBI and non-content linked courses that ran concurrently with the intervention courses in the second semester of 2014. As a result of this arrangement, the sample size was reduced; however, because of the analogous nature of the participant groups, the target population is still representative of the larger populace.

Additionally, I have exclusive access to the humanities and social sciences student data system, which allowed for unfettered access to participants that enrolled in one of the majors offered by these departments.

In addition to the selection of participants, this study did not consider the length of each course between the sample groups, which ranged from 16–18 weeks in duration; this depended on class structure, government holidays, and student/faculty attendance. More specifically, this study did not focus on the length or maturity of the CBI program within the university. These decisions were based on the lack of available data to deduce any definitive conclusion of the ex post facto data, thereby requiring this study to exclude these incomplete extraneous variables.

While each student participant had similar demographics and socioeconomic status, this study did not focus exclusively on gender, or consider any additional tutoring, independent content learning, or language acquisition that was not reported at the time of participant enrollment. As mentioned earlier, these constraints were omitted from this study because of unverifiable data, with no way of categorizing the possible outcomes, or measuring how these conditions would influence the results.

In particular, one parameter of this study that was a delimitation was the small sample group used to pilot test the online student survey, and faculty interview questionnaire. This decision was based on controlling time constraints, and access to the participants. The ex post facto design of this study also involves another delimitation, by virtue of the inability to conduct a pre-test of any kind with the content-linked participants, or remove all extraneous variables from the statistical tests. As mentioned earlier in this section, the participant pool in this study is unusually homogeneous, due in part to the overwhelming consistency throughout the general

public attending undergraduate university in southern China, which suggests each subject is matched by socioeconomic and academic L2 proficiency (MOE, 2011).

Another perspective that was not folded into this study's design or analysis was the quality, experience, or skill-set of each faculty member involved in the course instruction of both experimental groups. While some generalities have been assumed regarding the syllabi and content of the CBI intervention and control group courses, none of the actual classes were observed, as protocol dictates this style of data collection in ex post facto research designs. The limitations and delimitations of my proposed methodology are fixed; however, some of the inherent boundaries will be mitigated through revision of variables, selection of participants, and pilot testing.

Validation

Internal. The purpose of this quasi-experimental design is to examine and establish if a relationship exists between CBI courses in higher education and a student's academic achievement, measured by evaluating their GPA scores, pass rates, and retention. The causal conditions in this study have already occurred in this ex post facto research, thus the intervention was not implemented by the researcher, and occurred prior to any data collection efforts. The sample size for this study was determined based on a probability sampling technique, which according to McMillan (2012), lends credibility to the analysis of data, and enhances the accuracy made from the inferences about the larger population.

To further control the differences between subjects, and reduce the influence of potential extraneous variables, a matching design process was applied in the selection of all participants in both the experimental and control groups. This procedure ensures that each participant in one group complemented the other; in particular, the subjects were equivalent in age, L2 proficiency,

and course content knowledge prior to the intervention—as evident by the university’s entrance exams, administrative processing, and specific departmental placement schemes.

When reviewing the uniformity among all participants in this study, each member in the quasi-experimental groups belong to a cohort that was predefined based on their L2 proficiency level, and initial entrance exam, which was administered by the university. The pre-selection process occurred prior to this study, and addresses some potential extraneous variables that hold latent or plausible threats to the independent variable. More specifically, each participant’s demographic and socioeconomic status was similar, as evident by the statistical data collected during the students’ administrative enrollment process. Beyond these counter measures, the credibility of this quasi-experimental study was also challenged by factors that potentially influenced the external validity.

External. This study was conducted in Mainland China, and because of the standardized nature of the populace, many university campuses host a very analogous student body. This study was no exception, the university hosting this research featured a student population that ran parallel to the overall general society. Because of this unique trait the sample group and research conducted herein, is suitable for generalization within a larger group; and perhaps, other universities in China, East Asia, and beyond with careful consideration. However, this research loses some transferability among very diverse sub-groups, particularly in universities with highly varied socioeconomic conditions.

Expected Findings

During each stage of this investigation the anticipated results are projected to reveal both latent information, and have the potential to divulge some significant findings. The quantitative analysis of the experimental groups aims to explore the relationship between CBI methods in

higher education, and a student's academic achievement scores. The subsequent online student survey and semi-structured interviews with critical faculty members will attempt to complement and support the investigation, by examining perspectives and attitudes towards the efficacy of CBI methods in higher education. In the subsequent chapters, I will report these findings and evaluate their relevance, to include a discussion on appropriate generalizations.

Ethical Issues

Overall, there is no deliberate or calculated bias in this study, and the potential for any conflict of interests are negligible. At no time during this study was compensation received or benefits negotiated, based on the outcome of this research. Throughout this entire investigation, I held a faculty position at the university, including management responsibilities within the administration. This role allowed unfettered access to student academic records, socioeconomic information, and the benefit of physical locality to accommodate the research investigation.

The objective of this study is to establish a relationship between CBI methods in higher education courses, and the perceived effect on student achievement scores. Recognizing the efficacy of content-based instruction methods as a viable practice in the promotion of L2 cognition and content knowledge, while enhancing a student's academic achievement, would lend additional credibility to these programs, and isolate several best practices. Similar studies have replicated this scenario and produced comparable results (Kasper, 1997; Moriyoshi, 2011; Song, 2006; Tong & Shi, 2012). This research is particularly interested in ascertaining program level strategies, which could also be derived from the supplemental data analysis utilizing the mixed-methods approach.

While developing this study and throughout the duration of the data collection and analysis phase, my role in the investigation remained constant—as the lead researcher and

interviewer, with no participant function. Additionally, this research design did not adopt any deceptive techniques, and the participants were not provided any misleading information during the intervention. Prior to any data collection or analysis efforts, this research was sanctioned by relevant university administrative leaders, and approval was given to conduct research at the university. All participants were given a written or electronic notice of consent form in English and Mandarin Chinese referenced in Appendices J and K, describing the research and expectations of each subject. Upon receiving a signed authorization form, either printed or through electronic signature, participants were provided further instructions on procedural steps and research time-lines. Regarding the semi-structured interviews with faculty, I also debriefed each subject prior to receiving signed consent forms, and subsequently arranged the interview schedule.

Researcher's position. Specific consideration was taken when addressing possible bias which could potentially influence this research, such as professional acquaintances in the participant pool, including multiple colleagues, and prior students under my charge. While every effort was made to avoid any negative influence on the outcome of this investigation, it is possible that some participants responded to the survey, or interview questions, with a predisposition or some reluctance to answer. To counter this plausible effect on the research results, I conducted all meetings, interviews, and information sessions in neutral locations. Additionally, information security and confidentiality was emphasized during the induction process, by elucidating the importance of keeping all personal records and collected data anonymous, throughout the entire lifecycle of the study.

Summary

This chapter is dedicated to outlining the methods and protocol applied in this study, which investigates the relationship and perception, regarding the efficacy of CBI methods to promote improved academic achievement scores (GPAs) in higher education students. This investigation was conducted in Mainland China, at a 4-year undergraduate university in Southern Guangdong Province. This inquiry relied on contemporary research techniques; additionally, the study applied a mixed-methods approach, with ex post facto academic data records supporting the quantitative analysis phase, while a survey and semi-structured interviews delivered quantitative and qualitative information. Another critical aspect of this investigation is the longitudinal measurement of the participants' academic achievement scores over the 3-year investigative timeline.

The methodological design for this study was developed pursuant to a systematic review of the extant literature on CBI methods in academia. Information captured from the student records, survey, and interviews will be compiled and analyzed based on this study's research protocol. With the operationalization of multiple research techniques, this study uses contemporary practices to examine the phenomenon, while considering various data points. The subsequent chapter will present research findings, and detail the data analysis sequence.

Chapter 4: Data Analysis and Results

Introduction

In chapter four the results of this mixed-method, comparison investigation are presented through graphic diagrams, charts, and numerical representations. The overall purpose of this study was to examine the efficacy of CBI (Content-Based Instruction) methods, and the perceived relationship between this approach and student's academic achievement scores in higher education. The target population was undergraduate students attending a mid-tier university in southern Guangdong Province, China, which represented the sample group, consisting of 300 student participants and four faculty members. Students' overall GPA data and CET-4 test scores (College English Test-4) were used and tracked over a 3-year academic period between 2014–2016; this data was then compared to the control group after the experimental group received the content-linked course intervention in the second semester of their freshmen year. According to Jin (2005), the CET-4 was introduced nationwide in China between 2005–2006, and is considered a benchmark reporting tool for the assessment of tertiary students' English language proficiency.

CBI related courses are not offered in every major at the university selected in this study, thus a 2.5% sample size of the target population allows for a reasonable interpretation of findings, especially when considering the homogenous student populace (McMillan, 2012). Utilizing (SPSS) software to perform the quantitative computations, while keeping a 95% confidence interval and an alpha of .05 margin of error, a sample of size of 300 participants is large enough to attain statistically significant results. Within the framework of this investigation, there are a few delimitations that may have impacted the results, such as non-delineation of teacher experience, student gender, or consideration for length of individual class exposure to

CBI instruction. Additionally, based on the program design of the selected university, only students from humanities and social science majors qualified for the study, because CBI courses are restricted to certain disciplines. The principal research question that guided this investigative inquiry was:

1. Is there a relationship between CBI methods in higher education, and student academic achievement as measured by student GPAs?

The underlying hypotheses of the study are as follows:

Hypotheses for GPA Scores

- (H₀): There is no relationship between ESL tertiary students receiving CBI interventions, as compared to their control group, regarding interim or longitudinal improvements in achievement scores between the academic period covering 2014, 2015, and 2016 respectively.
- (H₁): There is a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in enhanced interim academic achievement scores between the academic period covering 2014, 2015, and 2016 respectively.
- (H₂): There exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in achievement scores between the academic period covering 2014, 2015, and 2016 respectively.

Hypotheses for CET-4 Pass Rates

- (H₀): There is no relationship between ESL tertiary students receiving CBI interventions, as compared to their control group, regarding longitudinal improvements in CET-4 pass rate scores covering the 2017 academic year.

- (H₁): There exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in CET-4 pass rate scores covering the 2017 academic year.

The use of a student-centric online survey and semi-structured faculty interviews assisted this investigation in gathering perceptual data for analysis. The use of two-independent sample *t*-tests, central tendency computations, and confidence intervals assisted with the analysis of quantitative data, while coding interview questions assisted in the organization of the qualitative data to establish recurrent themes from the semi-structured interviews. This chapter describes the sample groups and methodological approach. It also outlines the results and analytical efforts before closing with a summary of the presented content.

Description of the Sample

The overall theme of this investigative study was to examine if a relationship exists between CBI methods, and the perceived academic benefits of this approach on ESL tertiary students, as reported by their cumulative GPA scores. In a subordinate capacity, this study explored various student and faculty perspectives towards CBI methods, and the ability of these ESL programs to influence and enhance academic achievement scores. To achieve these goals a probability random sampling technique was introduced; adhering to these parameters, each participant's ex post facto data was then retrieved, where 2.5% of the target population was sampled (n = 300), which included subjects designated for the online student survey.

This study's initial proposal called for three experimental and control groups; however, after considering the homogenous nature of the sample, it was deemed appropriate to divide the groups evenly without any consideration towards course content area or student's selected major. This decision reinforced the internal validity by allowing for a broader range of student

participation, increasing the confidence interval across each of the data sets. The overall student GPA data was collected across three academic years 2014–2016 to assess the single variable correlation factor, and the student participants' CET-4 scores were gathered in 2017 during their final year of studies.

To further explore the secondary research question, this study examined the student and faculty perceptions regarding the efficacy of CBI methods by conducting an online survey with (n = 100) student participants, and semi-structured interviews via a guided questionnaire with four faculty members. Each of these data collection tools utilized subjects with direct exposure to the content-linked ESL course interventions, also this protocol was enforced to increase internal validity by focusing on the target population. Because of the direct access to the online survey using cellphone website browsers, the student participants completed the task while in class, resulting in a 100% response rate. To reduce the chance of bias during the survey, the researcher left the classroom before the students began the survey, and subjects were randomly selected from the experimental group to participate in the questionnaire. Both sample groups reported higher than 98% Han Chinese ethnicity, this translates into an extremely homogenous participant group, and all student subjects were similar in age, between 18–22 years old, and had comparable socioeconomic status as reported by the university's annual internal demographic statistics report.

To address the research questions in this investigative study, ex post facto student GPA scores were retrieved from the University's Student Academic Affairs Department. Through international research protocol standards, approval was granted and the administrative specialist uploaded the data on to a 128-bit encrypted USB, which was immediately downloaded to the researcher's private computer. Each student's GPA scores were then isolated to the correct

academic year and course type according to the research parameters. The entire randomly selected participant sample groups were transferred using Excel files, and all student identifying information was coded to protect all personal data (referenced in Appendix C). Student participants that were removed from the study based on the selection process criteria were then deleted from the active Excel spreadsheet, and remained only on the original Excel files.

In previous mixed-methods research where a relationship was analyzed regarding the influence that content-linked courses had on a students' academic performance, two-independent sample t-tests, central tendency computations, and confidence intervals were used to analyze the quantitative data (Ament, Perez-Vidal, 2015; Coyle, 2006; Lasagabaster, 2011). In this study the Statistical Package for the Social Sciences (SPSS) software was used to analyze the independent and dependent variables. Coding techniques aided in the organization of the questionnaire: this qualitative data from the semi-structured interviews was then evaluated to establish recurrent themes. The student GPA data from the experimental and control groups were compared using the p-values from the *t-tests* with a predetermined alpha of (.05), and the standard deviation results assisted in determining the significance between samples. According to McMillan (2012), this approach allows for a comparison between the variables when using a two sample *t-test*, including the CBI intervention and academic performance reported as the students' overall GPA scores.

Summary of Results

This study attempted to limit confounding variables by ensuring sample group demographics were identical, such as age range 18–22, pre-intervention English proficiency, and by ensuring that ethnicity was evenly distributed among test subjects. The original research protocol limited the participant sample groups to students enrolled in humanities or social

science majors; this proved challenging and may have skewed the results, thus all majors were considered in the selection process. According to McMillan (2012), the nature of ex post facto data does not permit active manipulation of the independent variable, thus several adjustments were made to mitigate confounding or extraneous variables.

In particular, all students were surveyed prior to the data collection efforts to ensure no outside L2 language training occurred during the study's investigative period, other than the prescribed CBI intervention. Also, to address reliability and further improve validity, gender was divided evenly among sample groups, and the scheduled content-linked ESL intervention courses were verified to ensure regular intervals and duration, as compared to the non-intervention courses. This was accomplished by reviewing the official course syllabi and verbal confirmation from actual faculty members responsible for content-linked course instruction.

According to Baik and Greig (2009), previous studies on CBI methods utilized inferential statistics and ex-post facto data, while investigating possible relationships between two populations (student sample groups) post CBI intervention. Several studies examined and measured this phenomenon by utilizing two-independent sample *t-tests* to investigate the effects of the CBI intervention on the dependent variable (Kasper, 1997; Song, 2006). These quantitative measures are routinely computed in studies collecting post intervention student performance data, hence the reliance on these methods of operation within this study.

Many experts in the field of scholastic research suggest the use of inferential statistics to glean insight when comparing relationships, and since the interventions in this study have already occurred, the most appropriate comparison method is the ex post facto design (Adams & Lawrence, 2014; McMillan, 2012). This particular research method is on par with the customary and routine study methodologies, commonly retained as the primary research design in quasi-

experimental and full-experimental studies (McMillan, 2012). This method is specifically suited for the type of data and phenomenon slated to be measured within the higher education environment.

According to McMillan (2012), the use of surveys has become a popular method for the collection of data in non-experimental research; in this instance, I argue that a survey is one of the best ways to introduce another layer of data collection and analysis. For the purposes of this study, one modification was implemented in the participant selection process; in the original protocol six sample groups were arranged however, due to administrative limitations imposed by the host experimental university, only two sample groups are quantified herein. This adjustment had no effect on the actual participants within the study other than limiting sample size, and the objective remained the same—to establish supporting evidence regarding the relationship between students' academic achievement related to the CBI intervention.

Additionally, Adams and Lawrence (2014) suggest that correlation and regression research methods lack the detail needed to form conclusions about cause and effect relationships. In observance of this statistical inference, my research will focus on causal-comparative methods, such as a two-independent sample *t-test* with independent and dependent variables, while also analyzing some descriptive statistics regarding mean scores and other central tendency measurements.

The initial research analysis indicates a strong correlation among the variables, which examined if any relationship exists between the sample groups after receiving the CBI interventions. Upon further data analysis across the three years, when combining data from the 2014–2016 academic years, a strong positive correlation continued as outlined by the quantitative calculations *p*-value (0.0001) using an alpha of (.05). Based on these results, the

evidence supports rejecting the null hypothesis (H_0) in favor of the alternative hypothesis (H_2) that a positive relationship exists between the sample group receiving CBI interventions, as compared to the control group, resulting in overall long-term improvements in academic achievement scores. However, using GPA data from only the 2016 academic year reveals the content-linked ESL intervention's influence weakened on the third academic year, with the p-value (0.5197) using an alpha of (.05) suggesting no statistically significant difference between sample group means.

The subordinate research questions address the actual difference among sample group GPA scores, and investigate the student and faculty perceptions of CBI methods to influence student academic achievement scores. The overall student survey results indicate a strong perceptual benefit from content-linked ESL courses, to promote improved content and linguistic cognition in students' L2, along with the perceived notion of a positive effect on overall academic achievement scores. The semi-structured interview questionnaires with faculty members involved in the CBI interventions supported the student survey findings, and revealed a theme, which suggests acceptance among respondents regarding content-linked courses as a positive influence on student performance over traditional linguistic instruction methods.

Detailed Analysis

Under the direction of this study's research protocol, the central research question examines if a relationship exists between CBI methods in higher education, and observes provisional improvements in ESL students' academic achievement as reported by their overall GPA scores. Before conducting this analysis, each calculation was cross referenced for accuracy and reliability of the instrument or prescribed method of evaluation. In the first instance, the

(H₀) hypothesis was tested, which suggests there is no relationship between higher education students receiving CBI interventions, as compared to the control group, regarding interim or longitudinal improvements in academic achievement scores.

In observance of this hypothesis, a causal-comparative methods approach was employed to measure the interim relationship between the IV (independent variable = experimental group) and the DP (dependent variable = control group) over the recorded timeline. The GPA data set from the second semester 2014 academic year was analyzed by using a two-independent-samples *t-test*, which was run to determine if there were differences in GPA scores after receiving the CBI (content-linked) course intervention between the ESL student experimental and control groups. Data is expressed as mean ± standard deviation, unless otherwise stated. The experimental group GPA scores were higher (79.87 ± 3.5671) than the control group (79.08 ± 2.8938), a statistically significant difference of 0.789 (95% CI, 0.050 to 1.527), $t(298) = 2.104$, $p = 0.0362$ (see Table 1).

Table 1

Summary of Independent Two Sample t-test between CBI Intervention Group and Non-Content Linked Control Group (2014–Second Semester Overall GPA Data Set)

Variables	Experimental Group	Control Group	Total
N	150	150	300
Mean	79.87	79.08	
SEM	0.2913	0.2363	
SD	3.5671	2.8938	
t-Test (<i>t</i>)			2.104
<i>df</i>			298
<i>p</i> -value			0.0362
<i>r</i> ²			0.01464

$p < 0.05$

Based on the evidence in Table 1, we can reject the null hypothesis (H_0), in favor of the alternative hypothesis (H_1). The p -value of (0.0362) is less than the predetermined alpha (.05), making it statistically significant. According to Adams and Lawrence (2015), any p -value that is less than the corresponding alpha is statistically significant. The evidence suggests we can reject the null hypothesis, and indicates there is a statistically significant difference in the mean GPA scores between the ESL student sample groups after receiving the CBI interventions.

After conducting the two-independent-samples t -test between the experimental and control groups for the 2014 academic year, a scatter plot graph was created using the same data set. The diagram (see Figure 1.) revealed heavy saturation in the upper quartile of the independent variable, indicating a positive relationship between the CBI intervention and the GPA scores of the experimental group as compared to the control group.

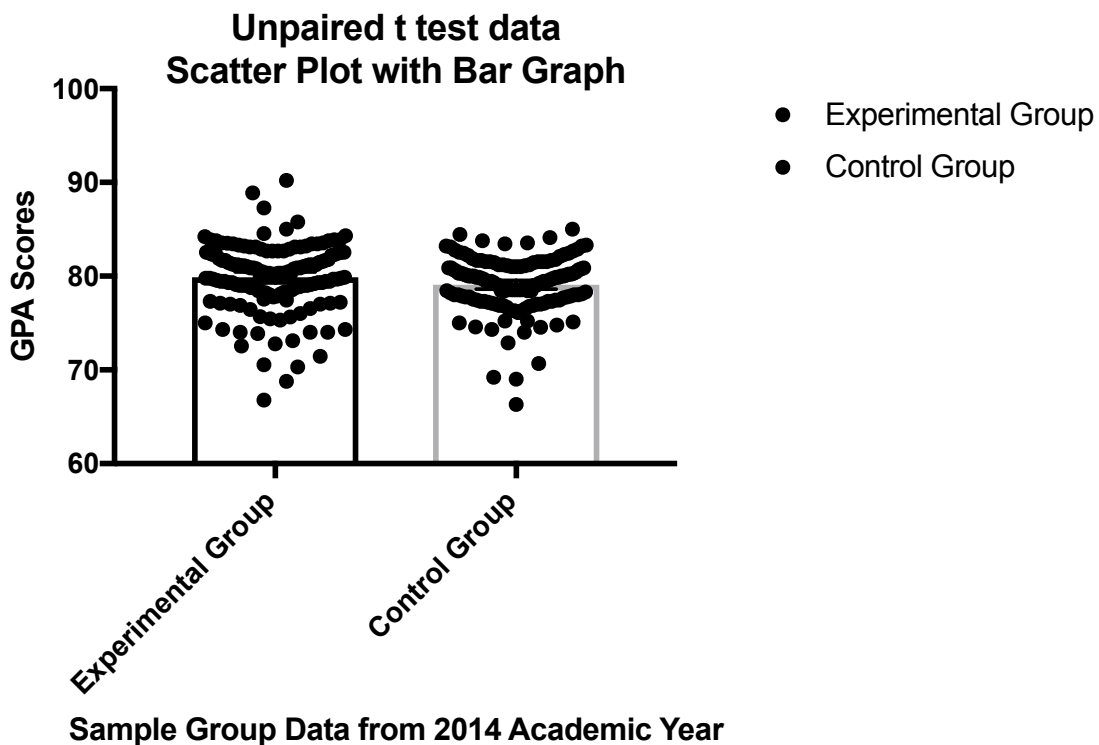


Figure 1. Scatterplot with bar graph of student GPA scores comparing Experimental and Control Groups.

Considering the confidence interval for the GPA data set from the second semester 2014 academic year, when the gap expands or narrows, it has a corresponding effect on the confidence level percentage (Adams & Lawrence 2015). In the case of a very wide interval, this could indicate more data is needed before any conclusions can be reached about the parameters. It also appears that from this example there are no significant outliers that effect the elliptical progression of the identified variables; McMillan (2012) suggests this further validates that no errors were caused during the experiment.

In the next data set this study reviews the longitudinal effects of the CBI intervention by analyzing the GPA scores from the second semester 2015 academic year. The data is analyzed by using a two-independent-samples *t-test*, which was run to determine if there were differences in GPA scores after receiving the CBI (content-linked) course intervention between the ESL student experimental and control groups. Data is expressed as mean \pm standard deviation, unless otherwise stated. The experimental group GPA scores were higher (81.75 ± 2.7373) than the control group (79.45 ± 0.251), which is considered to be a statistically significant difference of 2.300 (95% CI, 1.638 to 2.961), $t(298) = 6.844$, $p < 0.0001$ (see Table 2).

Table 2

Summary of Independent Two Sample t-test between CBI Intervention Group and Non-Content Linked Control Group (2015–Second Semester Overall GPA Data Set)

Variables	Experimental Group	Control Group	Total
N	150	150	300
Mean	81.75	79.45	
SEM	0.2235	0.251	
SD	2.7373	3.0736	
t-Test (<i>t</i>)			6.844
<i>df</i>			298
<i>p</i> -value			<0.0001
<i>r</i> ²			0.1358

* $p < 0.05$

Based on the evidence in Table 2, we can reject the null hypothesis (H_0), in favor of the alternative hypothesis (H_2). The p -value of (<0.0001) is less than the predetermined alpha ($.05$), making it statistically significant. According to Adams and Lawrence (2015), any p -value that is less than the corresponding alpha is statistically significant. The evidence suggests we can reject the null hypothesis, and indicates there is a difference in the mean GPA scores between the different ESL student sample groups after receiving the CBI interventions.

After conducting the two-independent-samples t -test between the experimental and control groups for the 2015 academic year, a scatter plot graph was created using the same data set. The diagram (see Figure 2.) revealed heavy saturation in the upper quartile of the independent variable, indicating a positive relationship between the CBI intervention and the GPA scores of the experimental group as compared to the control group.

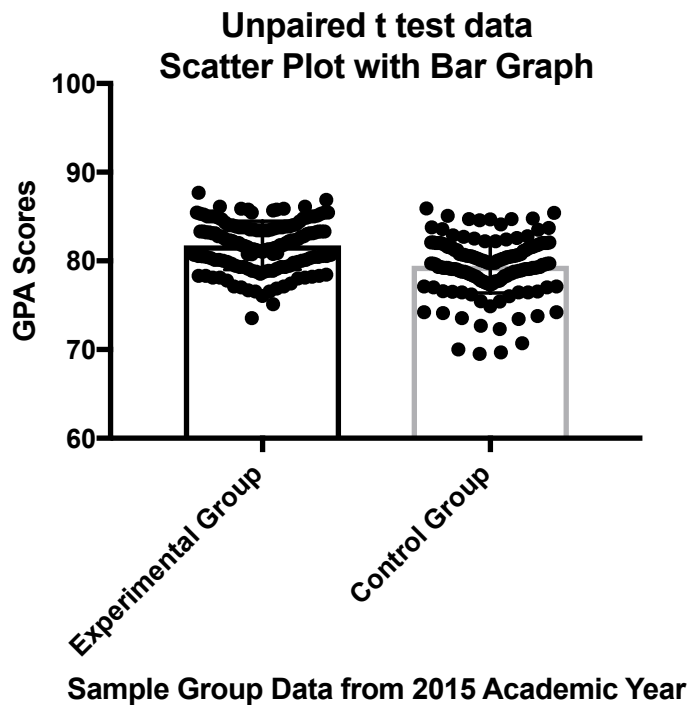


Figure 2. Scatterplot with bar graph of student GPA scores comparing Experimental and Control Groups.

Considering the confidence interval for the GPA data set from the second semester 2015 academic year, when the gap expands or narrows, it has a corresponding effect on the confidence level percentage (Adams & Lawrence 2015). In the case of a very wide interval, this could indicate more data is needed before any conclusions can be reached about the parameters. It also appears that from this example there are no significant outliers that effect the elliptical progression of the identified variables; McMillan (2012) suggests this further validates that no errors were caused during the experiment.

In the next data set this study reviews the longitudinal effects of the CBI intervention by analyzing the GPA scores from the second semester 2016 academic year. The data is analyzed by using a two-independent-samples *t-test*, which was run to determine if there were differences in GPA scores after receiving the CBI (content-linked) course intervention between the ESL student experimental and control groups. Data is expressed as mean \pm standard deviation, unless otherwise stated. The experimental group GPA scores were slightly higher (81.01 ± 3.6835) than the control group (80.67 ± 5.308), which is considered not to be a statistically significant difference of 0.340 (95% CI, -0.698 to 1.378), $t(298) = 0.6445$, $p = 0.5197$ (see Table 3).

Table 3

Summary of Independent Two Sample t-test between CBI Intervention Group and Non-Content Linked Control Group (2016–Second Semester Overall GPA Data Set)

Variables	Experimental Group	Control Group	Total
N	150	150	300
Mean	81.01	80.67	
SEM	0.3008	0.4334	
SD	3.6835	5.308	
t-Test (<i>t</i>)			0.6445
<i>df</i>			298
<i>p</i> -value			0.5197
<i>r</i> ²			0.02322

* $p > 0.05$

If based exclusively on the evidence in Table 3, we cannot reject the null hypothesis (H_0), in favor of the alternative hypothesis (H_a). The p -value of (0.5197) is more than the predetermined alpha (.05), making it not statistically significant. According to Adams and Lawrence (2015), any p -value that is greater than the corresponding alpha is not considered statistically significant. The evidence suggests we cannot reject the null hypothesis, and indicates there is little difference in the mean GPA scores between the different ESL student sample groups after receiving the CBI interventions in the 2016 academic year.

After conducting the two-independent-samples t -test between the experimental and control groups for the 2016 academic year, a scatter plot graph was created using the same data set. The diagram (see Figure 3.) revealed heavy saturation in the upper quartile of both the IV and DP variables, indicating a weak relationship between the CBI intervention and the GPA scores of the experimental group as compared to the control group.

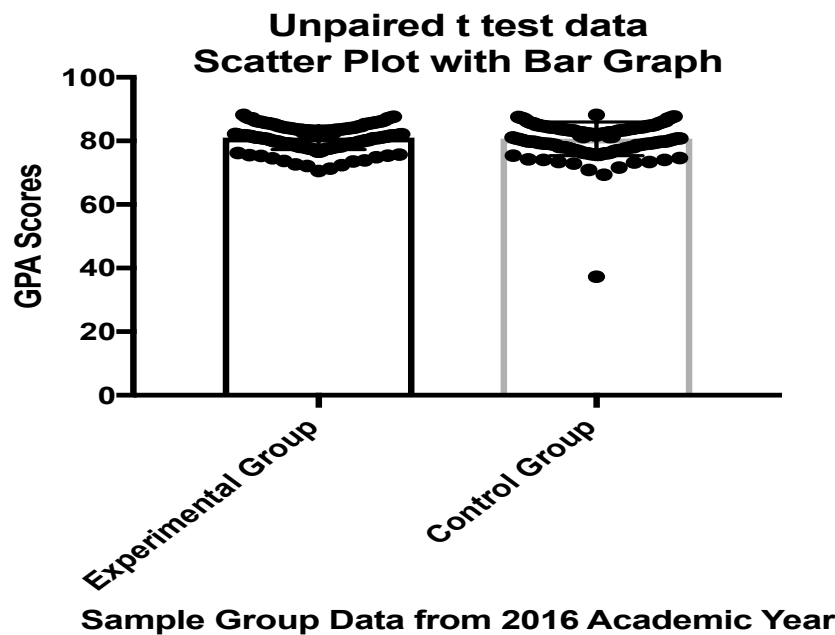


Figure 3. Scatterplot with bar graph of student GPA scores comparing Experimental and Control Groups.

When considering the confidence interval for the GPA data set from the second semester 2016 academic year, if the gap expands or narrows, it has no effect on the confidence level percentage as symmetry exists between the two sample proportions. In the case of a very wide interval, this could indicate more data is needed before any conclusions can be reached about the measured parameters. It also appears that from this example there are no significant outliers that effect the elliptical progression of the identified variables.

In the next data set this study reviews the longitudinal effects of the CBI intervention by analyzing the combined GPA scores from the second semester 2014–2016 academic year. The data is analyzed by using a two-independent-samples *t-test*, which was run to determine if there were differences in GPA scores after receiving the CBI (content-linked) course intervention between the ESL student experimental and control groups. Data is expressed as mean \pm standard deviation, unless otherwise stated. The experimental group GPA scores were higher (80.88 ± 3.437) than the control group (79.73 ± 3.9657), which is considered to be a statistically significant difference of 1.143 (95% CI, 0.656 to 1.629), $t(898) = 4.62$, $p = 0.0362$ (see Table 4).

Table 4

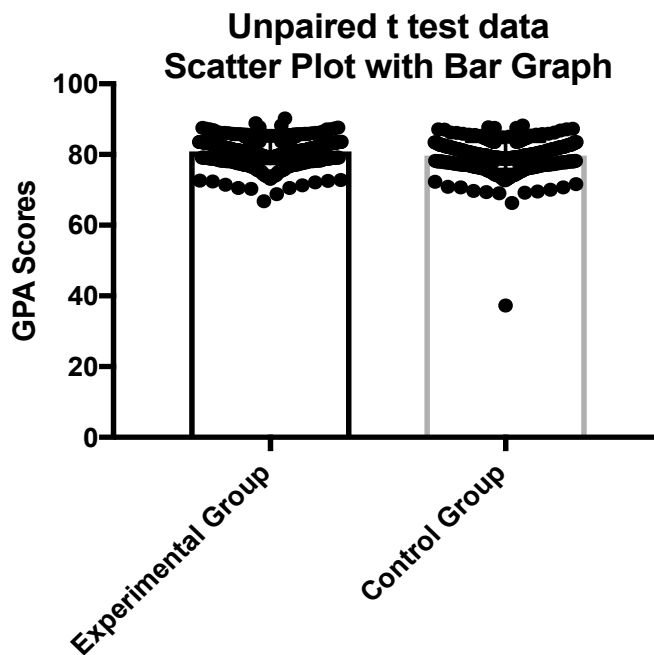
Summary of Independent Two Sample t-test between CBI Intervention Group and Non-Content Linked Control Group (2014-2016 Overall Summary GPA Data Set)

Variables	Experimental Group	Control Group	Total
N	450	450	900
Mean	80.88	79.73	
SEM	0.162	0.1869	
SD	3.437	3.9657	
t-Test (<i>t</i>)			4.62
<i>df</i>			898
<i>p</i> -value			0.0362
<i>r</i> ²			0.01464

* $p < 0.05$

Based on the evidence in Table 4, we can reject the null hypothesis (H_0), in favor of the alternative hypothesis (H_2). The p -value of (0.0362) is less than the predetermined alpha (.05), making it statistically significant. According to Adams and Lawrence (2015), any p -value that is less than the corresponding alpha is considered statistically significant. The evidence suggests we can reject the null hypothesis, and indicates there is a statistically significant difference in the mean GPA scores between the different ESL student sample groups after receiving the CBI intervention, when combining the data sets that include the 2014–2016 GPA scores.

After conducting the two-independent-samples t -test between the experimental and control groups for the combined 2014–2016 academic years, a scatter plot graph was created using the same data set. The diagram (see Figure 4.) revealed heavy saturation in the upper quartile of the independent variable, indicating a positive relationship between the CBI intervention and the GPA scores of the experimental group as compared to the control group.



Combined Sample Group Data Between 2014–2016 Academic Year

Figure 4. Scatterplot with bar graph of student GPA scores comparing Experimental and Control Groups.

Considering the confidence interval for the combined GPA data set from the 2014–2016 academic years, if the gap expands or narrows, it has a corresponding effect on the confidence level percentage (Adams & Lawrence 2015). In the case of a very wide interval, this could indicate more data is needed before any conclusions can be reached about the parameters. It also appears that from this example there are no significant outliers that effect the elliptical progression of the identified variables.

In the next data set this study reviews the longitudinal effects of the CBI intervention by analyzing the CET-4 pass rate scores from the 2017 academic year. The data is analyzed by using a two-independent-samples *t*-test, which was run to determine if there were differences in CET-4 test scores after receiving the CBI (content-linked) course intervention between the ESL student experimental and control groups. Data is expressed as mean \pm standard deviation, unless otherwise stated. The experimental group CET-4 test scores were higher (80.07 ± 3.5849) than the control group (78.86 ± 3.0311), which is considered to be a statistically significant difference of 1.2069 (95% CI, 0.452 to 1.961), $t(298) = 3.1487$, $p = 0.0018$ (see Table 5).

Table 5

Summary of Independent Two Sample t-test between CBI Intervention Group and Non-Content Linked Control Group (2017 Overall Summary CET-4 Data Set)

Variables	Experimental Group	Control Group	Total
N	150	150	300
Mean	80.07	78.86	
SEM	0.2927	0.2475	
SD	3.5849	3.0311	
t-Test (<i>t</i>)			3.1487
<i>df</i>			298
<i>p</i> -value			0.0018
<i>r</i> ²			0.0021

* $p < 0.05$

Based on the evidence in Table 5, we can reject the null hypothesis (H_0), in favor of the alternative hypothesis (H_1). The p -value of (0.0018) is less than the predetermined alpha (.05), making it statistically significant. According to Adams and Lawrence (2015), any p -value that is less than the corresponding alpha is statistically significant. The evidence suggests we can reject the null hypothesis, and indicates there is a difference in the mean CET-4 test scores between the different ESL student sample groups subsequent to receiving the CBI interventions.

After conducting the two-independent-samples t -test between the experimental and control groups for the 2017 academic year, a scatter plot graph was created using the same data set. The diagram (see Figure 5.) revealed heavy saturation in the upper quartile of the independent variable, indicating a positive relationship between the CBI intervention and the CET-4 test scores of the experimental group as compared to the control group.

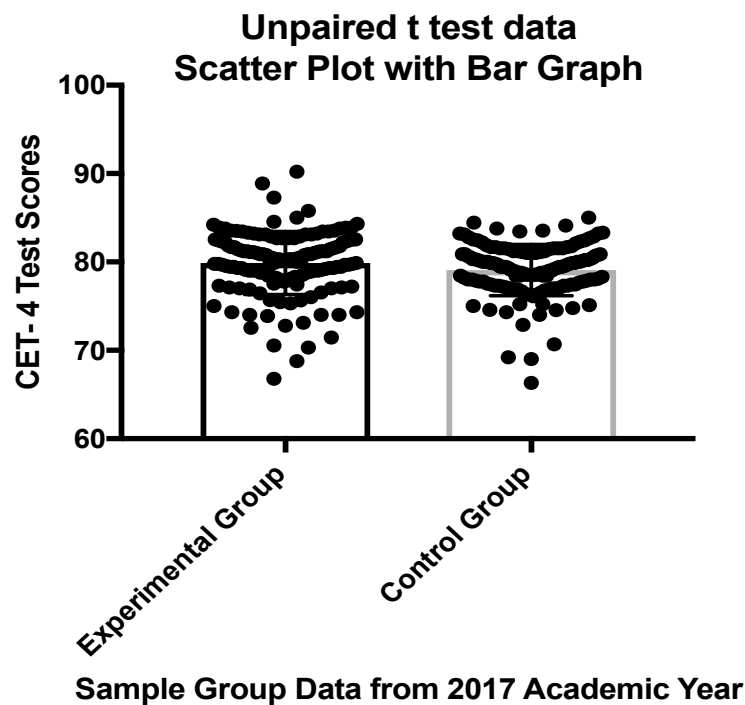


Figure 5. Scatterplot with bar graph of student GPA scores comparing Experimental and Control Groups.

When reviewing the confidence interval for the CET-4 data set from the 2017 academic year, if the gap expands or narrows, it has a corresponding effect on the confidence level percentage (Adams & Lawrence 2015). In the case of a very wide interval, this could indicate more data is needed before any conclusions can be reached about the parameters. It also appears that from this example there are no significant outliers that effect the elliptical progression of the identified variables; McMillan (2012) suggests this further validates that no errors where caused during the experiment.

In the next segment, quantitative data was generated by the online student participant survey, and semi-structured interviews with faculty members involved in the content-linked courses. This data was then analyzed and is displayed herein as descriptive statistical illustrations, summary briefings, and categorized by a chart containing numerical representations (see Figure 6). All participants for the qualitative data portion of the study were selected using purposeful sampling techniques, with the objective of identifying only those subjects with valid insight into the investigated phenomenon. More specifically, I used my understanding of the target population and selected participants that had received only one semester of content-linked intervention to qualify for the survey. This approach was repeated for the semi-structured interviews, where faculty members qualified based on their direct involvement in CBI courses. The focus of this Likert-type scale survey was to understand the ESL students' perception, regarding the efficacy of CBI methods to promote enhanced L2 cognition and improve academic achievement scores.

The online survey reported a 100% response rate from the pool of participants, which included equally assorted gender demographics (n = 150, 75 male/75 female), and involved only those subjects exposed to the CBI intervention from the experimental sample group (see

Appendix L and Figure 6). Based on the target population at the host university, the survey’s calculated margin of error is 9.76% at CI = 95%. In this example, it can be suggested that if a similar method was used to gather different samples and compute the CI for each sample, it should fall within the interval estimate 95% of the time (Adams & Lawrence, 2015). In (Figure 6) the two highest response rates have been highlighted from the survey result, which clearly summarizes the frequency distribution value of each question.

STUDENT PARTICIPANT SURVEY (RESULTS)

2017 Participant Survey (n=150, 75 Male / 75 Female), (100% Response Rate), (Target Population n=12,476), (CI=95%, Margin of Error 9.76%)

Questions (in order)	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
1st Half of Survey					
In your opinion, do courses utilizing content-based instruction methods (bilingual Instruction), improve second language proficiency, better than traditional teaching methods?	1%	2%	7%	62%	28%
Do you agree, that content-based instruction methods (bilingual instruction), focuses more on learning content, than on learning language proficiency?	0%	41%	21%	33%	5%
Do you think colleges and universities should make content-based instruction methods (bilingual instruction) programs, available to all second language learners, regardless of their major?	0%	22%	17%	51%	10%
In your opinion, do content-based instruction (bilingual instruction) courses in higher education, improve second language proficiency?	0%	4%	4%	65%	27%
In your opinion, are content-based instruction (bilingual instruction) programs in higher education, effective at improving both content knowledge and second language proficiency?	0%	5%	15%	59%	21%
2nd Half of Survey					
In higher education, do content-based instruction (bilingual instruction) programs, motivate students to achieve better grades?	1%	10%	35%	45%	8%
Do content-based instruction (bilingual instruction) courses, give students more confidence in their second language, compared to traditional instruction methods?	0%	5%	8%	74%	13%
In your opinion, are teachers in higher education well trained on content-based instruction methods?	0%	6%	19%	45%	30%
Do you think students are more likely to achieve higher scores and better grades, as a result of taking content-based instruction (bilingual instruction) courses in higher education?	1%	8%	45%	37%	9%
Do you think content-based instruction (bilingual instruction) courses, positively encourage a student’s long-term academic achievement scores?	2%	4%	21%	60%	13%

Figure 6. Graphic chart highlighting student participant survey results from all questions, displayed as percentages.

The major theme derived from analyzing the survey suggests that over half the respondents consider CBI methods as a positive influence on academic achievement and L2 cognition, as compared to traditional approaches to ESL in higher education. More specifically, questions 1, 6, and 10 of the survey clearly illustrate a trend as outlined in (Figure 7), which advocates that over 50% of the target population perceives CBI methods as a positive influence on L2 proficiency and longitudinal academic achievement scores. In general, over half the respondents (>70%) agreed or strongly agreed that CBI methods enhance a student's long-term academic achievement. This emergent trend in the data corresponds with similar research results examined in Chapter 2, it also validates previous findings through a mixed-methods approach (Li & Wang, 2010; Liu et al., 2013). Additionally, similar studies such as Kong and Hoare (2011) have reported in-service training deficiencies that effect student perceptions of CBI methods; however, the data from question seven of this study's survey dispute these findings by reporting over (>70%) of respondents being confident in the content-based training of teachers in higher education. This divergent statistic is exclusive to the tertiary community; however, more evidence is developing across all levels of education to support this shift in perception, which will be discussed more in Chapter 5.

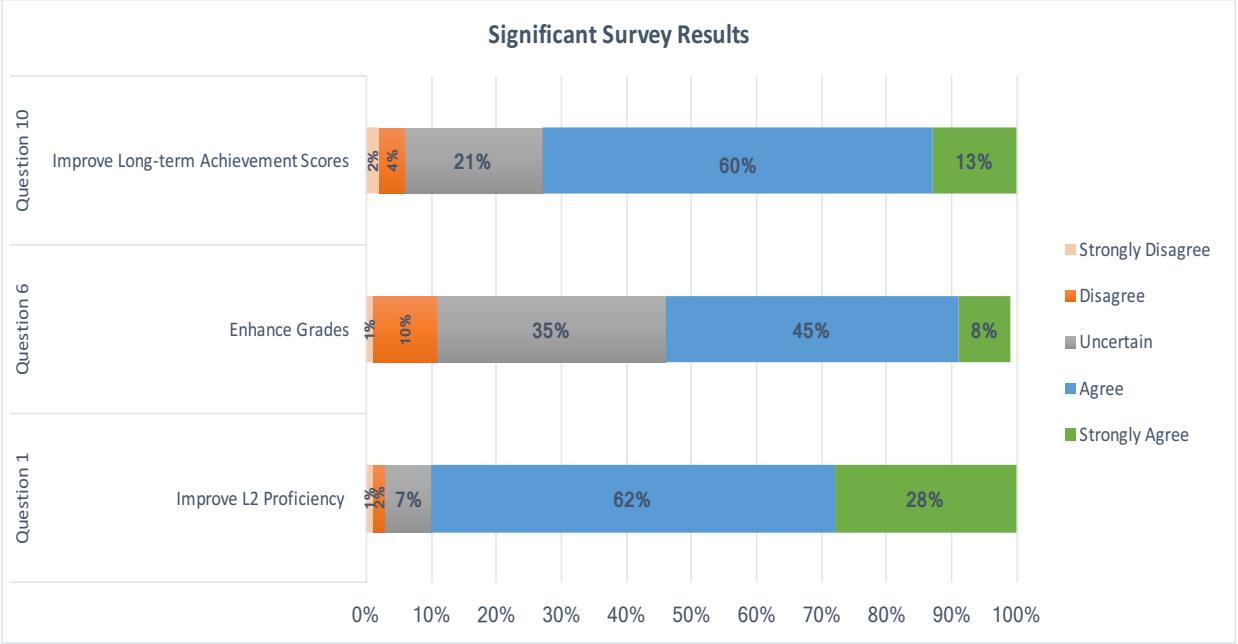


Figure 7. Graphic chart highlighting significant participant survey results from questions 1, 6, and 10; which are displayed as percentages.

In this subsection the semi-structured interviews are discussed and the results are reported as four emergent trends. Based on this study’s theoretical framework, data was coded and categorized according to patterns or themes that emerged during the analysis phase. Regarding teacher/instructor perceptions on the efficacy of CBI methods in higher education classrooms; this inquiry revealed several prominent themes in parallel with existing research on content-based course outcomes. According to the coding scheme and categorized responses from the interviews, the first emergent theme isolates a convergent supposition that suggests all the teachers in the study found CBI methods focus on content more than language dynamics, and promotes L2 acquisition better than traditional ESL approaches in higher education. Ultimately, all four teacher participants indicated confidence in their preference for CBI methods over traditional means of ESL instruction.

The second congruent theme tracks closely with other studies conducted on CBI methods, which advocate that training and pedagogical resources are scarce in content-based tertiary programs (Cammarata, 2010; Kong & Hoare, 2011). In relation to this study, the second theme is widely accepted by all interviewed participants; each instructor reported problems obtaining qualified teaching material, or cited general difficulty in the availability of formal CBI training courses for in-service teachers within higher education. In this instance, several of the interviewed participants anticipated some level of failure as a CBI instructor, which they anticipate impacted teacher self-efficacy in the classroom—inevitably affecting student outcomes. However, it should be noted that a stark contrast exists among the student and teacher perceptions on this issue, as demonstrated in this study’s student survey question eight (see Appendix L & Figure 6). Overwhelmingly, the survey results indicate a positive observation from students, concluding that CBI instructors are well trained and prepared for their ESL content-linked courses.

The third theme originating from the interview analysis is impacted by the first trend, as perceptions of CBI’s efficacy in the classroom carry over to the perceived student outcomes. When each participant was asked “Do you believe there is a positive relationship between a student’s overall academic scores, and the use of CBI methods in higher education courses?” all respondents responded in the affirmative. In particular, participant number three was definitive in their answer, “I find the differentiated learning platform in CBI methods alters the students’ connection between the content and their L2, resulting in better retention and higher academic performance”. In comparison, participant number two claimed to have witnessed firsthand results of CBI methods as a catalyst for enhancing student test scores. Collectively, each participant confirmed the underlined argument, which supports the efficacy of content-based

courses over traditional methods to promote L2 proficiency and improve overall student test scores. As a result of the first three trends, a cumulative effect began to emerge that aligns with this study's preliminary analysis of the quantitative data.

The fourth and final theme establishes a baseline for understanding the perception many content-based instructors have regarding the efficacy of CBI to positively impact a students' long-term academic performance. Each of the interviewed participants in this study highly endorsed the CBI approach to ESL and content learning. More specifically, participant number four regarded the perceived enhancement of students receiving content-based courses as a longitudinal academic tool that has a sustained effect. There is clear support for this conceptual trend as seen in this study's student survey results and in previous research (Andrade & Makaafi, 2001; Babbitt, 2001; Kasper, 1994; Winter, 2004). These interviews identified several relevant and insightful perspectives, as experienced by qualified instructors using CBI methods in their ESL courses at the site location of this study. While this analysis reflects the assessment of each participant, it should be noted that a small pool of applicants created this stream of data for the qualitative input.

Summary

In chapter, four data analysis results were presented from this quasi-experimental mixed methods study, which was designed to investigate if a relationship exists between CBI methods and students' academic performance in higher education. To explore this phenomenon a random sampling of ex post facto student GPA records were collected from ESL students in a large public undergraduate university in Mainland China; after receiving the CBI intervention, each sample group was compared over a 3-year academic period, that correlated with end of term grades to assess the significance of any existing relationships between variables. Additionally,

this study reviewed CET-4 pass rates for the sample groups and compared them over the same investigative timeline. This study also incorporated a student survey of all participants involved in the experimental group, and semi-structured interviews with four faculty members that directed the CBI interventions during the study's assessment period.

The main research question in this study probed the possibility of a relationship existing between CBI methods in higher education, and improved student academic achievement as reported by overall GPA scores. The underlying hypothesis followed this supposition, while the two alternate hypotheses compared the results among sample groups after receiving the CBI intervention, evaluating interim and longitudinal affects between variables. This comparative analysis revealed that post intervention interim results indicated a positive relationship between variables, with a p -value of (0.0362) which is less than the predetermined alpha (.05), making it statistically significant. (see Table 1). This figure supports rejecting the null hypothesis in favor of the alternative hypothesis, which suggests there is a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in enhanced interim academic achievement scores.

The overall long-term figure also indicated a similar result, the p -value of (0.0362) is less than the predetermined alpha (.05), making it statistically significant (see Table 4). This figure supports rejecting the null hypothesis in favor of the alternative hypothesis, which suggests there exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in academic achievement scores. However, it should be noted that in the third year proceeding the intervention, the data analysis illustrates no significant difference between sample groups, although the overall 3-year computations support the second alternative hypothesis (H_2).

The qualitative data supports these quantitative findings, and the student survey and semi-structured interviews with faculty members represent a unified theme and positive attitude towards CBI methods. This perspective is evidenced through teacher experience, firsthand accounts, reported GPA scores and student perceptions regarding the efficacy of CBI methods, as compared to traditional ESL pedagogical techniques. This chapter presented a detailed description of the methods used to attain these findings, and also provided a visual presentation to comprehend the outcomes. In chapter five, the final section of this study, further inquiry and exploration will lead to specific inferences and draw conclusions based on the results described herein.

Chapter 5: Discussion and Conclusion

Introduction

This study investigated if a relationship exists between CBI methods and the perceived benefits of this approach to influence academic achievement scores, reported as GPA's (Grade Point Averages) among students in higher education. As a secondary measure, this research also gauged the efficacy of this approach on ESL students learning in their L2, as a viable medium in promoting enhanced content and linguistic cognition, by comparing overall academic GPA scores, defined by longitudinal data analysis. In a subordinate capacity, this study explored various student and faculty perspectives towards CBI methods, and the ability of these ESL programs to stimulate and enhance academic achievement scores. Although content-based courses are not the only approach to ESL learning, it has become a popular and effective program strategy for tertiary institutions (Davies, 2003; Meehan, 2010). In this final chapter, I will briefly recap the results and outline the methodology as it relates to the research questions and hypotheses. After establishing this baseline approach, and upon reviewing the presented material, certain interpretations will emerge forming the basis for this chapter's discussion.

In this section I will first summarize the results generated by the investigative measures, then discussion will lead to informative awareness on the efficacy of CBI methods in higher education. This review will consist of synthesizing prominent literature on CBI methods and identifying limitations within the boundaries of this study. Next, this unit considers the implications of CBI methods as reflected by the published results; further inferences are then deliberated regarding policy, practice, and theory within the higher education community. In the final summation, recommendations for further research on the topic are proposed, and the study

concludes with a brief outline of significant advancements established by evaluating the outcome of this innovative exploratory study into the efficacy of CBI methods in higher education.

Summary of Results

The objective of this study is to establish a relationship between CBI methods and student performance, including understanding the perceived benefits of this approach on student academic achievement scores (GPA's) in higher education. The following research questions and hypotheses guided this investigative inquiry:

Main Research Question:

1. Is there a relationship between CBI methods in higher education, and student academic achievement as measured by student GPAs?

Subordinate Questions:

1. What is the difference in overall GPA scores among students receiving content-linked/CBI courses, as compared to students not receiving CBI interventions?
2. How do student and faculty perceive the efficacy of CBI courses to promote improved content and linguistic cognition in higher education?
3. To what extent do students and faculty in higher education identify CBI methods as a viable practice to encourage higher academic achievement scores in students?

Hypotheses for GPA Scores

- (H₀): There is no relationship between ESL tertiary students receiving CBI interventions, as compared to their control group, regarding interim or longitudinal improvements in achievement scores between the academic period covering 2014, 2015, and 2016 respectively.

- (H₁): There is a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in enhanced interim academic achievement scores between the academic period covering 2014, 2015, and 2016 respectively.
- (H₂): There exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in achievement scores between the academic period covering 2014, 2015, and 2016 respectively.

Hypotheses for CET-4 Pass Rates

- (H₀): There is no relationship between ESL tertiary students receiving CBI interventions, as compared to their control group, regarding longitudinal improvements in CET-4 pass rate scores covering the 2017 academic year.
- (H₁): There exists a positive relationship between sample groups receiving CBI interventions, as compared to control groups, resulting in overall long-term improvements in CET-4 pass rate scores covering the 2017 academic year.

According to Wesche and Skehan (2002), since the early 1990s tertiary institutions have established CBI methods as the main approach to ESL programs, although many formats now exist, all were developed on the basis of the three original models (Brinton et al., 1989). Additionally, several studies (e.g., Andrade & Makaafi, 2001; Baik, & Greig, 2009; Kasper, 1997) on CBI methods identified short-term benefits to a student's academic performance after receiving content-linked course interventions. Other empirical evidence that focused on longitudinal effects of CBI methods produced by (Burger, et al., 1997; Murie & Thomson, 2001; Song, 2006) support the primary argument that content-based courses in higher education influence ESL students' academic performance over a sustained timeline. Many of these modern

research studies have incorporated several layers of investigative inquiry to assess the efficacy of CBI methods on students' academic achievement scores, which have yielded substantive advancements in the field of bilingual education.

In this study, a quasi-experimental mixed methods design was implemented and the corresponding data was collected through a variety of methods such as surveys, semi-structured interviews, and by gathering ex post facto student data in the form of GPA scores and CET-4 pass rates. This research sought to establish quantitative evidence of CBI's efficacy on ESL tertiary student's academic performance, including qualitative data to support the perceptual findings behind the interpretation of results. To facilitate this study and investigate the phenomenon, inferential statistics were used including a two-independent sample *t-test* to determine if a relationship exists between students receiving the CBI intervention, as compared to the control group. These quantitative measures assisted in the evaluation of the post intervention student data, which covers a 3-year academic period.

The findings of this research study suggest that overall, the experimental group GPA scores were higher (80.88 ± 3.437) than the control group (79.73 ± 3.9657), which is considered to be a statistically significant difference of 1.143 (95% CI, 0.656 to 1.629), $t(898) = 4.62$, $p = 0.0362$ (see Table 4, Chapter 4). This longitudinal evidence supports a positive relationship existing between content-linked ESL courses and students' academic GPA scores. The significance of this link between variables was replicated in the first and second year of the experiment; however, in the third academic year measured by this study, the experimental group GPA scores were only slightly higher (81.01 ± 3.6835) than the control group (80.67 ± 5.308), which is considered not to be a statistically significant difference of 0.340 (95% CI, -0.698 to 1.378), $t(298) = 0.6445$, $p = 0.5197$ (see Table 3, Chapter 4). This indicates a weak but positive

relationship between the independent and dependent variables among the sample groups after receiving the CBI intervention. Additionally, as the evidence in the third year GPA scores indicate a drop in the interventions ability to influence the students' long-term academic achievement, the 2017 CET-4 pass rates support the theory of a positive relationship between the variables. Despite this rebuttal evidence outlined in the CET-4 pass rates, making any definitive suppositions regarding the longitudinal impact of the CBI interventions should be guarded.

In particular, this linear observation of the student sample groups may indicate a cooling effect, where in the third year of the investigation the results illustrate a weak correlation, suggesting over time, the effects of the initial intervention may be diminished ($r = .02, p > .519$). This fading or declining influence seen in the third year of the study may be a result of a shift in program design, where in most Chinese universities students have limited or in some cases no option to continue learning in their L2 during the third and fourth year of undergraduate studies. However, based on a linear regression analysis, in coordination with the findings from the combined 3-year overall GPA data, a trend illustrating a significant relationship emerges between variables. The results from this study further support the hypothesis, that content-linked course interventions positively influence student academic performance as represented by GPA scores.

The subordinate inquiry in this study, regarding student perceptions on the efficacy of CBI methods in higher education yielded decisive evidence validating the quantitative extrapolations herein. This substantive result lends credibility to the study's main focus; these qualitative measures also advocate that over 50% of the target population perceives CBI methods as a positive influence on L2 proficiency and longitudinal academic achievement results. Additionally, after analyzing the semi-structured faculty interviews, a similar outcome

developed, suggesting corresponding ideologies among both teaching staff and students surveyed in this study. According to McMillan (2012), using multiple analytical methods form a rigorous methodology, which has provided a more comprehensive interpretation of the results than either approach could do alone.

Discussion of the Results

The findings described in this study indicate a significant relationship between content-linked courses, as a pedagogical approach to positively influence tertiary students' academic achievement as reported by their GPA scores. The results reported herein are consistent with several other study's focusing on CBI methods, all using contemporary methodologies to investigate the efficacy of content-linked courses, to enhance student academic performance in tertiary students (Babbitt, 2001; Murie & Thomson, 2001; Winter, 2004). In this instance, a mix-method design was deemed suitable for exploring the relationship between the variables, and the tertiary institution in Mainland China was found to be an appropriate venue to host the research. China has a long standing history of embracing the principles behind content-linked instruction in all tiers of education; considering that in 2001, the Chinese Ministry of Education mandated that universities integrate multilingual studies through the use of CBI methods, which required full compliance by all public tertiary institutions (MOE, 2001).

More specifically, in the first two years (2014, 2015) covered by this study's investigation, the experimental group GPA scores were consistently higher (79.87 ± 3.5671) and (81.75 ± 2.7373) than the control group (79.08 ± 2.8938) and (79.45 ± 0.251) respectively. Based on the sample group comparison from 2014 *p*-value of (0.0362), and 2015 *p*-value of (0.0001), with a predetermined alpha of (.05), the evidence suggests a positive relationship between the content-linked intervention and student GPA scores. This outcome is sustained by

also analyzing the overall 3-year combined data sets, which deliver a broader snapshot of the influence CBI methods has on student performance.

In this instance, the experimental group GPA scores were higher (80.88 ± 3.437) than the control group (79.73 ± 3.9657), which is considered to be a statistically significant difference of 1.143 (95% CI, 0.656 to 1.629), $t(898) = 4.62$, $p = 0.0362$. In both examples, the main research questions were answered in the affirmative by the analysis, which revealed a relationship exists between the variables after the CBI intervention as compared to the control group, thus demonstrating a positive influence on students' long-term academic performance. Although the results in the third year of the study are not considered statistically significant at p -value of (0.5197), which is more than the predetermined alpha (.05), the margin is very close to a significant value; therefore, the combined 3-year analysis is a better predictor of longitudinal influence on student academic achievement than any single year observed in this study.

Based on the results from both sample group's 2017 CET-4 test scores (College English Test) with a p -value of (0.0018) using a predetermined alpha of (.05), the evidence corroborates earlier results that suggest a relationship exists between CBI methods and student's longitudinal academic achievement. Comparable results were replicated in the scatter plot diagrams for 2014, 2015, and in the overall combined 3-year historical GPA data in chapter four, which illustrate consistently higher scores in the upper quartile of the experimental group as compared to the control group. This evidence lends further credibility to the positive influence that CBI methods has on ESL tertiary students' long-term academic performance.

As with many quasi-experimental studies, extraneous variables must be mitigated and validity enhanced through specific measures. In order to limit extraneous variables from skewing the statistical tests, several active methods were implemented to overcome these

potential obstacles. Participants were divided equally by gender into the sample groups (n = 300) and students from all disciplines qualified for the study, while the initial strategy only considered humanities and social science majors. As compared to a single approach relying on only one protocol tool to generate evidence, this study used diverse and redundant methods known as triangulation. This technique allows for deeper inferences and more appropriate measures that impact the validity of the findings (McMillan, 2012). To generate a higher degree of validity more empirical evidence was introduced, including a participant survey and semi-structured interview session with faculty.

The secondary findings in this study also yielded supportive evidence, that suggests ESL tertiary students and faculty members perceive CBI methods as a viable practice to improve language cognition and enhance academic achievement scores. The online survey (n = 100, 50 male/50 female) clearly demonstrates a trend among ESL students, which reveals that over 50% of the target population perceives CBI methods as a positive influence on L2 proficiency and longitudinal academic achievement scores. In particular, over half the students in the online survey (>70%) strongly agreed that CBI methods enhance a student's long-term academic achievement. These results align with the quantitative data extracted from the experimental comparison, and adds further value to these findings.

Another subordinate measure in this study was the semi-structured interviews conducted with faculty involved in the CBI intervention at the host institution. The four congruent trends that emerged from this process indicate that each instructor highly endorses the CBI approach in ESL courses, and their perceptions support the premise that students receiving content-based courses benefit longitudinally from enhanced academic achievement scores. The interview analysis reports significant perceptual data among faculty members; however, it was derived

from a small sample group, thus it should be used with caution as a standalone measurement, although it consistently aligned with the student perceptual data regarding CBI methods.

Overall, the findings in this study indicate that a relationship exists between CBI methods and students' academic achievement scores, and this positive influence has longitudinal effects on performance, which is corroborated in the perceptual beliefs of most respondents.

Discussion of the Results in Relation to the Literature

According to Alamán (2013), the demand for bilingualism in contemporary higher education institutions continues to grow at an exponential rate; in response to this need, content-linked ESL programs have evolved to improve student outcomes. In the last decade, many studies have reported a potential relationship between CBI courses and a student's long-term benefits such as higher pass rates, enhanced academic achievement scores, and overall improvements on GPA (Andrade & Makaafi, 2001; Babbitt, 2001; Kasper, 1994; Winter, 2004). Most of the seminal research conducted on the efficacy of CBI methods in higher education is considered short-term, thus leaders in the tertiary community encounter a knowledge gap when evaluating sustained effects of content-linked ESL courses on student academic performance. As evident by this study's data analysis, the experimental group's overall 3-year GPA scores ($M = 80.88$) were statistically higher as compared to the control group's scores ($M = 79.73$). Additionally, the CET-4 pass rate scores were significantly higher in the experimental group ($M = 80.07$) as compared to the control group ($M = 78.86$). Based on the longitudinal mean test scores from the sample group data sets, the results suggest CBI methods influence ESL student performance by a marked improvement in GPA scores and CET-4 pass rate averages.

More specifically, this moves beyond the general notion of CBI courses as just another ESL program, by introducing discipline specific content with a student's L2, creating a rich

contextualized learning environment that enhances academic performance. Research from Kasper (1994) and Winter (2004) corroborate this concept, by suggesting students that receive content-linked course instruction are comparable to, or in many instances outperform non-linked ESL students regarding overall GPA scores and L2 proficiency. This research study isolates overall student performance by analyzing GPA scores over a 3-year academic period; hence, this study contributes to a broader understanding of content-based instruction in the higher education sector. In this regard previous studies including the evidence described herein, contributes to the lack of longitudinal data, by establishing a relationship between improved academic achievement, as a result of CBI interventions (Alamán, 2013; Ament & Pérez-Vidal, 2015; Coyle, D. 2007).

This study also investigated the perceptual expectations of CBI methods, through the observations of ESL students and faculty members regarding its efficacy to promote L2 cognition, and to positively influence academic achievement in tertiary students as compared to traditional approaches. The results of this study's student survey and semi-structured interviews with content-linked course instructors indicated a high degree of confidence in CBI methods, as a viable practice to promote L2 cognition and academic performance (reference figure 7, chapter 4). This predictive concept and linear measurement of the expected outcomes of students receiving content-linked courses, profoundly supports the quantitative findings of this inquiry, and addresses the need for longitudinal evaluation of CBI's efficacy in higher education. More specifically, this study provides a wider scope of awareness concerning content-based instruction in higher education, it also underscores the associated relationships between this pedagogical approach and the perceived benefits. Potentially, the results from this research may be used in developing CBI programs in tertiary institutions within China, Southeast Asia, and to a larger

extent the global tertiary community. In this instance, the analysis described in the investigation holds evidence that indicates a positive academic performance trend among students receiving content-linked ESL courses, which align with many administrative policy objectives on student outcomes in higher education.

For over 15 years, the host institution involved in this study's inquiry has consistently offered content-linked courses for undergraduate students, and the Chinese Ministry of Education has mandated this approach to ESL learning in all public venues (MOE, 2001). These highly homogenous institutions in China use similar CBI formats in their ESL programs, which are structured to broaden L2 proficiency, and acquire more formal decontextualized cognitively challenging and complex academic language (Crandall & Tucker, 1990). This widely accepted practice of bilingual education, otherwise known as ESL learning, is supported by formal program outlines and administrative staff to promote the process in multiple disciplines. In particular, over the last decade China's investment in content-linked programs have contributed to the improved bilingualism of tertiary students.

In modern higher education classrooms, bilingualism is considered an intersect between sociocultural theory and the actual field of language education (Cammarata, 2010). To realize the full potential of ESL students, programming is based on teacher training, available resources and peer interaction. Additionally, both Dueñas (2004) and Met (1999) suggest that despite several variations within CBI methods, the idea or concept is usually aligned with the theme-based instruction continuum. Thus, the key principles behind a successful ESL environment is designed with the acquisition of new forms of discourse at the core, and through cooperative learning strategies and scaffolding techniques, students are motivated with support systems to improve L2 proficiency in parallel with academic performance. Cammarata (2010) further

advocates that ESL programs benefit when students are regarded as agents of discourse, and content-linked courses use context as the foundation for any meaning making activities, essentially allowing these principles to guide the learning process.

The prevalence of ESL programs in China's tertiary institutions is met with a common ideology, that content-linked courses should be offered in most disciplines e.g., math, sciences, humanities. One particular strategy used to meet the needs of ESL students in China, is to provide the option for content-linked courses over multiple semesters to all grade levels. This results in a supportive ESL environment where students consistently outperform non content-linked peers in areas such as higher pass rates, improved academic performance, retention and graduation rates (Song, 2006).

Multiple studies have reported similar findings; Kasper (1997) Murie and Thomson (2001) also conclude, CBI methods have a lasting impact on a student's ability to transfer into another university or continue onto graduate studies. Indeed, these highly structured content-linked tertiary courses have an impact on more than academic performance. Recent literature on CBI methods has documented additional psychological and pedagogical benefits that include reduced anxiety, increased motivation, improved connection to language and content with enhanced cognition (Chamot & O'Malley, 1992; Iancu, 1997; Pally, 2000; Stoller, 1999). In comparison to this pivotal research, the tertiary institution in this study exposed ESL students to content-linked courses through an intervention process, the effects of this CBI exposure was then compared against their peers to measure any relationships. Based on this dynamic, the study herein revealed that students receiving CBI courses had significantly improved academic achievement scores as compared to their peers not receiving the content-linked intervention, further demonstrating a positive influence and relationship between variables.

Limitations

According to Adams and Lawrence (2014), most inquiries contain inherent restraints based on the design or the instruments used to measure the phenomenon. Additionally, the results or conclusions of a study are impacted by the boundaries established through the use of certain participants, environmental factors, and features of the investigation (McMillan, 2012). In particular, this study which examines the efficacy of CBI methods, and the influence of this approach on ESL student's academic performance includes several limitations. Regarding the mixed-methods approach to this investigation, some aspects of the quantitative measures expose the results to certain confines. The first example involves the use of ex post facto student data within the quasi-experimental design.

The participants only qualified for the study based on their enrollment in one of the CBI courses offered during the 2014 academic year. Additionally, in the Chinese public university system, students rarely attend courses offered outside their major, or out of sequence from their predefined cohorts; hence, this study does not take into consideration students from every possible major within the university, and only identified potential subjects within math, humanities, and social science disciplines. Based on several similar studies (e.g., Baik & Greig, 2009; Kasper, 1997; Song, 2006) CBI interventions have been linked to increased student academic performance using either a causal comparison or ex post facto methodology. Similar to a causal-comparative study, an intervention is administered and a comparison of sample groups is then analyzed; however, in this research no active manipulation was given, as the participants experienced the conditioning previous to this investigation. In this instance, further case studies or active inquiries may provide additional insight into the cause and effect nature of the variables.

Many scholars and leaders in higher education cite a lack of longitudinal evidence that connects a student's improved academic achievement as a result of CBI interventions (Alamán, 2013; Ament & Pérez-Vidal, 2015; Coyle, D. 2007). To address this lack of long-term assessment and evaluation on the efficacy of CBI methods, McMillan (2012) suggests that an ex post facto design is suitable, if the objective is to investigate a relationship when the possibility of any active experiment is not achievable. One crucial limitation of this method is the ability to control all extraneous variables that could affect the results. Although every attempt was made to address extraneous variables, inevitably all causal conclusions made under the quasi-experimental approach should be accepted as tentative, but more accurately express trends or cause and effect relationships.

Another limitation in this study was the availability of comparable courses offered at the university during the investigative period, which included CBI and non-content linked courses that ran concurrently with the intervention courses in the second semester of 2014. The result of this parameter equated to reduced sample sizes; however, because of the analogous nature of the participant groups, the target population is still representative of the larger populace. To address this issue, future research should attempt to increase sample size across multiple higher education institutions, which could better reflect the target population and provide a higher degree of validity.

In general, the availability of active manipulation studies involving the efficacy of CBI methods as reported by longitudinal analysis are scarce (Ament & Pérez-Vidal, 2015; Coyle, D. 2007). The higher education environment presents many challenges for data collection; however, the homogeneous nature of the Chinese tertiary community allows for improved generalizations from a smaller sample size, with less impact to results and their interpretations.

Although the data used from the random samples collected during this investigation were limited based on student major and availability of CBI courses offered; the sample size remains within a 95% confidence interval, as 2.5% of the target population is represented in this experiment, which allows for a reasonable interpretation of the findings.

Additionally, because many variations exist concerning the administration of content-linked courses; and overall, many studies report findings based on small sample sizes, generalizations are limited to a relatively small subgroup of the entire populace. In response to this study's limited sample size, and the general lack of longitudinal research on CBI methods, further studies are needed that incorporate larger participant groups. The suggested research should follow an active manipulation protocol for the interventions, including the observation of participants over a sustained period of time to continue building an archive that emphasizes the long-term benefits of CBI in higher education. Baik and Greig (2009) advocate a mixed-methods design for a more informed approach to CBI inquiry, and McMillan (2012) regards this sequential explanatory scheme as the preferred method when researchers need to support quantitative findings with other reliable qualitative instruments.

Implications of the Research for Practice, Policy, and Theory

In the past decade Baik & Greig (2009) describe a popular trend among higher education institutions, suggesting that bilingual education is crucial to future growth, as most international tertiary institutions report over 110% increase in ESL student enrollment. In many universities this increase accounts for more than 25% of all student enrollments, and CBI is widely accepted as the preferred pedagogical approach to meet this demand (Birell, 2006; Bretag, 2007; Song, 2006). Essentially, many of the prevailing researchers (viz., Babbitt, 2001; Winter 2004) on content-based ESL curriculum indicate a strong cause and effect relationship between the CBI

intervention, and improved student academic performance as measured by higher pass rates, better test scores, including enhanced graduation and retention rates.

This study pursued an investigation into the efficacy of CBI methods on ESL tertiary students in Mainland China, and the perceived benefits of this approach on long-term academic achievement. This research project had a high participation rate and is considered a success. The findings described herein reveal several meaningful details that have significant implications into the practice of content-based instruction courses in higher education, and to the community of scholars examining the longitudinal benefits of this method on student performance. The selected methodology, research location, participant base, and seminal literature all contribute to the current inquiry into this phenomenon called content-based instruction.

As reported in this study's literature review, the immediate need within the ESL community is to address the lack of research focusing on the long-term influence that CBI has on student performance in the higher education setting. This analysis reports on the transferability of content-linked courses in the mainstream tertiary community and informs scholars on the topic of sustained performance outcomes—resulting from these methods and interventions. This dissertation may also support future research design and methodology, while providing leaders in education with a broader understanding of the current relationships associated with content-linked curriculum. As universities strategize to meet the influx of ESL students that make up a significant portion of their overall student enrollment, administrators will develop content-linked courses with objectives involving a collaborative effort to enhance L2 proficiency, improve academic discourse, and enhance student performance outcomes.

The practice of implementing and maintaining a content-linked program in tertiary institutions relies on teacher training and well communicated program expectations regarding

student outcomes. Additionally, this study identified a positive relationship between CBI methods and students' academic achievement scores; however, the survey and semi-structured interviews demonstrated that people's perception of content-linked courses also contribute to their expected outcomes. Specifically, 75% of the students surveyed at this study site agreed that teachers instructing CBI courses are well trained in this pedagogical approach. This perception is critically disputed by Cammarata's (2010) research, which identifies a lack of in-service training and CBI resources as a cause of teachers failing to connect with the core principles of CBI, which impedes the basic objectives of content-based learning. This conflict in the data analysis underlines some concerns among tertiary institutions regarding the practice of content-linked programs; the implications for educators is that proper training and resources are necessary to achieve the full potential of CBI methods.

Near the end of the twentieth century many higher education institutions adopted CBI curriculum to help ESL students meet the demands of internationalized degree programs. The majority of literature and experimentation into the efficacy of CBI methods revolves around the K-12 environment; thus, many scholars (e.g., Doiz, Lasagabaster, & Sierra, 2011; Song, 2006) cite a lack of substantive research on the efficacy of CBI methods in the realm of post-secondary education. In relation to this knowledge gap, Xi, Xiao, & Yang (2013) suggest most studies focus narrowly on immediate effects of content-linked instruction, but few researchers have investigated the longitudinal effects on this approach to advance student performance. More recently, formative work by Snow and Brinton (1997) and later reports by Brinton et al. (2003) have begun to demonstrate that content-linked curriculum positively affects student academic performance on a sustained linear track. Projects like these earlier inquires have formed the

foundation of this study, which examined the sustained benefits of CBI methods in higher education.

This particular investigation was rooted in previous literature, and the findings confirm existing evidence that supports CBI's effectiveness within the framework of ESL education in post-secondary classrooms. To fully explore this approach to L2 acquisition and core content knowledge, this research isolated variables thought to form a relationship between student achievement scores and CBI interventions. The results were consistent with the synthesis of effective practice and policies governed by the literature; this indicates a close association among variables, objectives, and the perspectives of students, faculty members, administrators, and lawmakers. The methodology described in Chapter 3 of this dissertation was influenced by previous scholarly work, and this approach has implications on future research as the results can be interpreted for use by education professionals in post-secondary institutions.

In comparison to the extant literature, this current study utilizes a mixed-methods design similar to that employed by many recent scholars (e.g., Lo, 2013; Strotmann et al. 2014; Tan, 2011; Tollefson & Tsui, 2004), and each of these inquires parallel my study's objective and presentation of results. However, the specific outline for many of these formal pieces of research fails to address the persistent lack of longitudinal evidence required to support the growing consensus regarding CBI's efficacy in higher education. Song's (2006) research was mentioned several times in this dissertation, as this investigation leads to a stronger awareness of content-linked curriculum inside the arena of ESL tertiary education. Specifically, this issue is critical to the continued success of ESL programs in China, and to a larger extent, the entire tertiary community. Scholars such as Baik and Greig (2009) also including Kasper (1997) have established a baseline for professional practitioners in education, allowing for informed decisions

based on evidence and exposing this approach to the rigors of academia to advance the understanding of CBI methods in higher education. The findings discussed in this body of research contribute to the immediate need within the contemporary field of ESL in post-secondary education, by conveying a rich contextualized description of doctoral work, further advocating program enhancements in applied content-linked courses to boost student academic achievement.

Recommendations for Further Research

The statistics from around the world continue to demonstrate a spike in ESL enrollment at credit-bearing higher education institutions (Birrell, 2006; Song, 2006; Watty, 2007). This presents a specific and immeasurable challenge for educators, where the goal is to quickly and effectively transition ESL students in to the mainstream curriculum. The future development of content-linked programs require evidence based research to understand critical issues and advocate best practices for implementation so policy makers, government agencies, and students can fully realize the benefits of this approach to bilingual education.

The general scope of this study covered three academic years in a Mainland China university, and is considered a longitudinal investigation; however, the original intervention only occurred over one academic semester. This methodological design could be improved by extending the intervention cycles beyond the first year observed by the study. Additionally, the use of a *t-test* which is a parametric equation is consistent with the extant literature on CBI methods, though other inferential statistics could provide a unique analysis on the relationship between the variables. The common theme across the literature reviewed on content-linked courses indicates many scholars select ex-post-facto student data to compare quantitative statistics. This presents some challenges (*viz.*, numerous extraneous variables, no active

manipulation of the intervention, and difficulty performing pre and post tests), for these reasons, future inquiries should consider these limitations in causal comparative designs.

The majority of experiments reviewed in the seminal literature incorporate a relatively small sample size, this also includes the current research. Nonetheless, the findings of this study provide evidence-based statistics that replicate previous results using contemporary practices. Increasing sample size would greatly impact the validity and reliability of further research on CBI methods; more specifically, by widening the target population to include several universities, both locally and abroad, this would allow for easier transferability and expand the ability to make broader generalizations beyond the Mainland Chinese ESL tertiary community.

As a result of the homogeneous nature of the student population in this investigation, minimal effort was given to analyze the outcomes based on demographic subgroups. Further research in more diverse locations may encounter varying outliers and realize significant variances to the findings reported in this research project. Conducting a similar analysis with variable subsets such as isolating sex, religion, income, and ethnicity will inevitably provide even more value to the ESL tertiary community by replicating this study with a higher level of diversity, which again strengthens the ability to generalize the results to a broader audience.

This study used a participant survey and semi-structured interview process to attain the individual perspectives of students and faculty members involved with the intervention. Perhaps, a similar study could also replicate this design; however, these perceptions can then be compared to student achievement results to determine any relationship between the expectations and actual outcomes. Further research should be conducted that integrates this approach, using student motivation and perceptual data to drive the investigation, which may impact the quantitative data, or conceivably provide supplementary elucidation that contrasts this report.

Coincidentally, this study was conducted by only one researcher. My involvement with faculty, administrative staff, and non-participating students was short in duration and limited to remedial tasks during the entire inquiry. Considering additional layers of exploratory techniques (e.g., retaining a team of investigators, using research assistants, paid staff, etc.) may provide more support and impact available labor hours, also allowing the study to expand the scope or reach of the inquiry.

With respect to this study's findings, the data analysis indicates a positive relationship between ESL students and their long-term academic scores, as compared to their non-intervention peer group. The secondary results also suggest the majority of both student and faculty members have a strong bias towards CBI methods, denoting their belief this approach will enhance academic achievement scores. More specifically, to fully explore this concept additional studies are warranted where perceived benefits are measured against quantified tangible data on a larger scale to improve credibility. Although this study provided meaningful insight into the efficacy of CBI methods in higher educational, it is recommended that further mixed-method investigations be conducted with active manipulation, and to isolate variables from their root-cause allowing for a deeper understanding of the cause and effect relationship between content-linked curriculum and long-term student achievement.

Conclusion

The purpose of this doctoral research study at a public university in Mainland China was to establish a relationship between CBI methods, and the perceived benefits of this approach on academic achievement as reported by GPA scores among ESL tertiary students. The study was successful; it recruited a suitable sample size, reported a high response rate on the survey, recorded deep perceptual data, and uncovered empirical evidence to affirm the second (H₂)

alternative hypothesis. The findings described herein suggest a positive relationship between content-linked curriculum and enhanced or sustained improvement on overall student academic achievement scores. Finally, this inquiry demonstrated the perceived benefits that students and faculty have towards CBI methods, which indicated the majority of participants feel confident that content-linked curriculum leads to enhanced long-term improvement on academic performance, as compared to traditional ESL pedagogy.

Implementation of effective ESL programs in higher education are crucial to the success of students and institutions on a global scale. Meeting the demands of a shifting educational landscape is paramount to helping L2 learners develop linguistically, so they can compete in a multicultural, multilingual, and multiethnic society. Contextualized learning platforms such as CBI methods, inspire students to develop their critical thinking skills through a blended approach of acquiring academic terminology in the target language. The push for bilingual education is expanding at an exponential pace, and programs offering content-linked courses meet this demand, by establishing a meaning-based curriculum which has been linked to higher student achievement in the ESL post-secondary environment.

The content-linked interventions applied in this experiment corroborate with results that have been replicated in other contemporary literature; however, many studies fail to address the long-term impact of student's future academic performance after receiving CBI interventions. This investigation was unique, because it was conducted in a tertiary institution in Mainland China, where the approved CBI program has demonstrated consistent success. Although this study was based on a small scale inquiry, it was significant, and the findings herein have implications on institutions, practitioners, policy makers, and individual students considering ways to support their L2 cognition, and positively influence academic performance.

This study provides further evidence that CBI's efficacy reaches beyond just interim benefits; more specifically, the longitudinal impact has only recently been discovered. I then argue, more comprehensive research be conducted on CBI's efficacy to promote sustained improvement in ESL students' academic success in higher education. This model of language learning warrants additional funding and administrative support to continue refining and advancing the field of ESL.

In summation, I was humbled to be accepted into the Chinese culture and felt honored to work with student and faculty participants. In coordination with this effort, I also learned from this experience, and was pleasantly surprised by the dedication and honesty each member contributed, and encountered unbiased support from the host institution throughout the entire process. Predictably, the internationalization of higher education continues to be a driving force in the tertiary community; thus, the awareness of bilingual education and the role these pedagogical programs play on creating future global citizens must be understood meticulously—to realize each student's full potential.

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Appendix A: Facility Authorization Form–University President

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM



Research Study Title: The relationship between Content-Based Instruction (CBI) methods and student academic achievement scores in higher education.

Principal Investigator: [Researcher's name redacted]

Research Institution: Concordia University

Faculty Advisors: [Advisors' names and emails redacted]

Request for Authorization of Doctoral Research

Dear [University President's name redacted]

As you may already know, I am a doctoral candidate at Concordia University in the Department of Education. This process requires I conduct research as a required component of the doctoral degree program. The purpose of my research is the investigation of a causal relationship between content-based instruction (CBI) methods, and students' academic achievement scores. This form serves as my formal request, asking for authorization to conduct research at [Institution name redacted]

The objective of this proposed quasi-experimental study is to establish and analyze if a causal relationship exists between content-based instruction methods (CBI), and the perceived benefits of this approach on student academic achievement scores in higher education. Additionally, this research focuses on CBI methods, and the efficacy of this approach on L2 learners, as a viable practice in promoting success on a student's overall scholastic achievement, defined by longitudinal data analysis. In a secondary capacity, this research endeavors to explore various student and faculty perspectives toward CBI methods, and the capacity of these programs to influence and enhance academic achievement scores.

If you agree, and authorize this academic study, the researcher will collect student's final grades, also known as grade point averages (GPA's), from six experimental student groups, totaling approximately 300 student participants, that attended courses within the School of Economics and Management at [Institution name redacted]. Additionally, the researcher will conduct an online survey of 100 randomly selected students from these experimental groups, and schedule a semi-structured interview with four foreign faculty members, that were directly involved in the course instruction of the intervention groups.

There are no risks to participants in this study; also, we will protect all personal information, and keep it confidential by coding and masking data so it remains anonymous indefinitely. Any name or identifying information will be kept secure via electronic encryption. The information collected in this study will not be distributed to any other agency and will be kept private and confidential.

Appendix A: Facility Authorization Form–University President Cont.

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM

Contact Information:

You will receive a copy of this authorization form. If you have questions you can write the principal investigator [Researcher's name, email, and phone number redacted] If you want to speak with the researcher's faculty advisors, you can write or call [Advisors' emails, names, and phone numbers redacted]

Your Statement of Consent:

I have read the information above, and I have no further questions. I hereby authorize the doctoral student [Researcher's contact information and institution name redacted] for the purposes mentioned above, for a time period lasting no more than six months from the date of this authorization.

_____	_____
University President	Date
_____	_____
University President Signature	Date
_____	_____
Investigator Name	Date
_____	_____
Investigator Signature	Date



[Researcher's contact information and institution address redacted]

Appendix B: Facility Authorization Form–President (Mandarin Chinese)

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM



研究题目: 内容教学法与高等教育学生成绩之间的关系

首席研究员: [Researcher's name redacted]

研究机构: Concordia University

教师顾问: [Advisors' names and emails redacted]

博士生研究授权请求

[University President's name redacted]

如您所知，我是一名惠州学院的外籍教师我的名字叫 [Researcher's name redacted] 同时我也是自康科迪亚大学教育系的在修博士生。学术研究作为完成博士学位的必要组成部分，起着至关重要的作用。在这里我正式向您提出关于在惠州学院进行学术研究的申请。而此项研究意在表明的是内容教学法与学生学业成绩之间的因果关系。

进行此项准研究实验的目的在于分析和落实基于内容教学法教学是否会对高等教育学生的学业成绩产生影响。此外，本研究重点将放在内容教学法，以及这种方法对 L2 学习者的功效上，并且作为通过纵向数据分析定义促进学生整体学术成就的可行实践。其次本研究将努力探索各种学生以及教师对次内容学习法的看法，以及这些课程影响和提高学生学业成绩的能力。

如果您能够批准同意这项研究，那么我和我的研究人员将需要收集六个曾经参与过惠州学院经济管理学院课程班级学生（大学总计 300 名）的学业最终成绩以及他们的平均学业成绩（即绩点）。此外研究人员将对这六个班级中随机的 100 名学生进行在线调查，并对直接参与实验小组课程安排执导的四名外教老师进行半结构式的采访，本研究实验的参与者将不用承担任何风险；并且，我们将会对参与者的姓名身份以及各项个人信息完全保密并通过编码和数据加密技术永久保护他们的资料不被泄露。本研究收集的各种信息将只用于本次研究并且不会以任何形式出现在任何机构以及个人手中。

Appendix B: Facility Authorization Form–President (Mandarin Chinese) Cont.

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM

联系方式:

您将会受到一份本协议的副本。如果您存在任何问题可以发送邮件至首席研究员

[Researcher's contact information and Advisors' names, emails, and phone numbers redacted]

同意申明:

我已经阅读了上述信息，并没有其他问题。我在此授权在修博士生（ [Researcher's name redacted] 在惠州学院以上
上述目的进行学术研究，自授权之日起六个月内有效。

University President

Date

University President Signature

Date

Investigator Name

Date

Investigator Signature

Date



[Researcher's contact information and institution address redacted]

Appendix C: Facility Authorization Form–Dean

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM



Research Study Title: The relationship between Content-Based Instruction (CBI) methods and student academic achievement scores in higher education.

Principal Investigator: [Researcher's name redacted]

Research Institution: Concordia University

Faculty Advisors: [Advisors' names and emails redacted]

Request for Authorization of Doctoral Research

Dean [Dean's name redacted]

As you may already know, I am a doctoral candidate at Concordia University in the Department of Education. This process requires I conduct research as a required component of the doctoral degree program. The purpose of my research is the investigation of a causal relationship between content-based instruction (CBI) methods, and students' academic achievement scores. This form serves as my formal request, asking for authorization to conduct research at [Institution's name redacted]

The objective of this proposed quasi-experimental study is to establish and analyze if a causal relationship exists between content-based instruction methods (CBI), and the perceived benefits of this approach on student academic achievement scores in higher education. Additionally, this research focuses on CBI methods, and the efficacy of this approach on L2 learners, as a viable practice in promoting success on a student's overall scholastic achievement, defined by longitudinal data analysis. In a secondary capacity, this research endeavors to explore various student and faculty perspectives toward CBI methods, and the capacity of these programs to influence and enhance academic achievement scores.

If you agree, and authorize this academic study, the researcher will collect student's final grades, also known as grade point averages (GPA's), from six experimental student groups, totaling approximately 300 student participants, that attended courses within the School of Economics and Management at [Institution's name redacted]. Additionally, the researcher will conduct an online survey of 100 randomly selected students from these experimental groups, and schedule a semi-structured interview with four foreign faculty members, that were directly involved in the course instruction of the intervention groups.

There are no risks to participants in this study; also, we will protect all personal information, and keep it confidential by coding and masking data so it remains anonymous indefinitely. Any name or identifying information will be kept secure via electronic encryption. The information collected in this study will not be distributed to any other agency and will be kept private and confidential.

Appendix C: Facility Authorization Form–Dean (Cont.)

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM

Contact Information:

You will receive a copy of this authorization form. If you have questions you can write the principal investigator [Researcher's name, email, and phone number redacted] If you want to speak with the researcher's faculty advisors, you can write or call Advisors' names, emails, and phone numbers redacted]

Your Statement of Consent:

I have read the information above, and I have no further questions. I hereby authorize the doctoral student [Researcher's contact information and institution name redacted] for the purposes mentioned above, for a time period lasting no more than six months from the date of this authorization.

_____ Dean School of Economics & Management	_____ Date
_____ Dean Signature	_____ Date
_____ Investigator Name	_____ Date
_____ Investigator Signature	_____ Date



[Researcher's contact information and institution address redacted]

Appendix D: Facility Authorization Form–Dean (Mandarin Chinese)

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM



研究题目: 内容教学法与高等教育学生成绩之间的关系

首席研究员: [Researcher's name redacted]

研究机构: Concordia University

教师顾问: [Advisors' names and emails redacted]

博士生研究授权请求

[Dean's name redacted]

如您所知，我是一名惠州学院的外籍教师我的名字叫 [Researcher's name redacted]。同时我也是自康科迪亚大学教育系的在修博士生。学术研究作为完成博士学位的必要组成部分，起着至关重要的作用。在这里我正式向您提出关于在惠州学院进行学术研究的申请。而此项研究意在表明的是内容教学法与学生学业成绩之间的因果关系。

进行此项准研究实验的目的在于分析和落实基于内容教学法教学是否会对高等教育学生的学业成绩产生影响。此外，本研究重点将放在内容教学法，以及这种方法对L2学习者的功效上，并且作为通过纵向数据分析定义促进学生整体学术成就的可行实践。其次本研究将努力探索各种学生以及教师对内容学习法的看法，以及这些课程影响和提高学生学业成绩的能力。

如果您能够批准同意这项研究，那么我和我的研究人员将需要收集六个曾经参与过惠州学院经济管理学院课程班级学生（大学总计300名）的学业最终成绩以及他们的平均学业成绩（即绩点）。此外研究人员将对这六个班级中随机的100名学生进行在线调查，并对直接参与实验小组课程安排执导的四名外教老师进行半结构式的采访，本研究实验的参与者将不用承担任何风险；并且，我们将会对参与者的姓名身份以及各项个人信息完全保密并通过编码和数据加密技术永久保护他们的资料不被泄露。本研究收集的各种信息将只用于本次研究并且不会以任何形式出现在任何机构以及个人手中。

Appendix D: Facility Authorization Form–Dean (Mandarin Chinese) Cont.

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM

联系方式:

您将会受到一份本协议的副本。如果您存在任何问题可以发送邮件至首席研究员

[Researcher's contact information and Advisors' names, emails, and phone numbers redacted]

同意申明:

我已经阅读了上述信息，并没有其他问题。我在此授权在修博士生（ [Researcher's name redacted] 在惠州学院以上
述目的进行学术研究，自授权之日起六个月内有效。

Dean
School of Economics & Management

Date

Dean Signature

Date

Investigator Name

Date

Investigator Signature

Date



[Researcher's contact information and institution address redacted]

Appendix E: Faculty Authorization Form–Vice Dean

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM



Research Study Title: The relationship between Content-Based Instruction (CBI) methods and student academic achievement scores in higher education.

Principal Investigator: [Researcher's name redacted]

Research Institution: Concordia University

Faculty Advisors: [Advisors' names and emails redacted]

Request for Authorization of Doctoral Research

Vice Dean · [Vice Dean's name redacted]

As you may already know, I am a doctoral candidate at Concordia University in the Department of Education. This process requires I conduct research as a required component of the doctoral degree program. The purpose of my research is the investigation of a causal relationship between content-based instruction (CBI) methods, and students' academic achievement scores. This form serves as my formal request, asking for authorization to conduct research at [Institution's name redacted]

The objective of this proposed quasi-experimental study is to establish and analyze if a causal relationship exists between content-based instruction methods (CBI), and the perceived benefits of this approach on student academic achievement scores in higher education. Additionally, this research focuses on CBI methods, and the efficacy of this approach on L2 learners, as a viable practice in promoting success on a student's overall scholastic achievement, defined by longitudinal data analysis. In a secondary capacity, this research endeavors to explore various student and faculty perspectives toward CBI methods, and the capacity of these programs to influence and enhance academic achievement scores.

If you agree, and authorize this academic study, the researcher will collect student's final grades, also known as grade point averages (GPA's), from six experimental student groups, totaling approximately 300 student participants, that attended courses within the School of Economics and Management at [Institution's name redacted]. Additionally, the researcher will conduct an online survey of 100 randomly selected students from these experimental groups, and schedule a semi-structured interview with four foreign faculty members, that were directly involved in the course instruction of the intervention groups.

There are no risks to participants in this study; also, we will protect all personal information, and keep it confidential by coding and masking data so it remains anonymous indefinitely. Any name or identifying information will be kept secure via electronic encryption. The information collected in this study will not be distributed to any other agency and will be kept private and confidential.

Appendix E: Facility Authorization Form–Vice Dean (Cont.)

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM

Contact Information:

You will receive a copy of this authorization form. If you have questions you can write the principal investigator [Researcher's name, email, and phone number redacted] If you want to speak with the researcher's faculty advisors, you can write or call [Advisors' names, emails, and phone numbers redacted]

Your Statement of Consent:

I have read the information above, and I have no further questions. I hereby authorize the doctoral student [Researcher's contact information and institution name redacted] for the purposes mentioned above, for a time period lasting no more than six months from the date of this authorization.

_____ Vice Dean School of Economics & Management	_____ Date
_____ Vice Dean Signature	_____ Date
_____ Investigator Name	_____ Date
_____ Investigator Signature	_____ Date



[Researcher's contact information and institution address redacted]

Appendix F: Facility Authorization Form–Vice Dean (Mandarin Chinese)

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM



研究题目: 内容教学法与高等教育学生成绩之间的关系

首席研究员: [Researcher's name redacted]

研究机构: Concordia University

教师顾问: [Advisors' names and emails redacted]

博士生研究授权请求

[Vice Dean's name redacted]

如您所知，我是一名惠州学院的外籍教师我的名字叫 [Researcher's name redacted] 同时我也是自康科迪亚大学教育系的在修博士生。学术研究作为完成博士学位的必要组成部分，起着至关重要的作用。在这里我正式向您提出关于在惠州学院进行学术研究的申请。而 此项研究意在表明的是内容教学法与学生学业成绩之间的因果关系。

进行此项准研究实验的目的在于分析和落实基于内容教学法教学是否会对高等教育学生的学业成绩产生影响。此外，本研究重点将放在内容教学法，以及这种方法对L2学习者的功效上，并且作为通过纵向数据分析定义促进学生整体学术成就的可行实践。其次本研究将努力探索各种学生以及教师对次内容学习法的看法，以及这些课程影响和提高学生学业成绩的能力。

如果您能够批准同意这项研究，那么我和我的研究人员将需要收集六个曾经参与过惠州学院经济管理学院课程班级学生（大学总计300名）的学业最终成绩以及他们的平均学业成绩（即绩点）。此外研究人员将对这六个班级中随机的100名学生进行在线调查，并对直接参与实验小组课程安排执导的四名外教老师进行半结构式的采访，本研究实验的参与者将不用承担任何风险；并且，我们将会对参与者的姓名身份以及各项个人信息完全保密并通过编码和数据加密技术永久保护他们的资料不被泄露。本研究收集的各种信息将只用于本次研究并且不会以任何形式出现在任何机构以及个人手中。

Appendix F: Facility Authorization Form–Vice Dean (Mandarin Chinese) Cont.

ACADEMIC RESEARCH FACILITY AUTHORIZATION FORM

联系方式:

您将会受到一份本协议的副本。 如果您存在任何问题可以发送邮件至首席研究员

[Researcher's contact information and Advisors' names, emails, and phone numbers redacted]

同意申明:

我已经阅读了上述信息，并没有其他问题。 我在此授权在修博士生（ [Researcher's name redacted] 在惠州学院以上
述目的进行学术研究，自授权之日内六个月有效。

Vice Dean
School of Economics & Management

Date

Vice Dean Signature

Date

Investigator Name

Date

Investigator Signature

Date



[Researcher's contact information and institution address redacted]

Appendix G: Interview Questionnaire Guide



1

Faculty/Instructor Interview Questionnaire Guide

ATTENTION: Pursuant to the signed participant consent forms, the interviewee is subject to audio recording.


Introduction: *The researcher will introduce the semi-structured interview, and reiterate the purpose of the interaction, explain the definition of content-based instruction (CBI), and reaffirm that participation is voluntary.*

Instructions: Randomly select four teachers from the CBI intervention groups, and interview each professor by asking the questions below, during a scheduled focus group session.

Interview Questions: [Open-ended]

1. Do you feel content-based instruction teaching methods promote improved L2 cognition, and retention in the content or topic area?
2. In your opinion, is there any relationship between using CBI methods, versus traditional pedagogy, and student academic achievement scores in higher education.
3. Within the tertiary community, do you feel there is enough training or resources regarding the development and efficacy of CBI methods in the classroom?
4. Do you believe there is a positive relationship between a student's overall academic scores, and the use of CBI methods in higher education courses?
5. In your opinion, do you believe CBI programs/courses in higher education, effectively promote content knowledge and language ability in L2 learners?
6. In your opinion, do CBI programs/courses in higher education, enhance a student's academic achievement scores, in the near-term and impact their long-term performance scores?

Appendix H: Research Study Survey



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Concordia University Research Study

Survey on Content-Based Instruction Methods (Bilingual Teaching) in Higher Education

1. In your opinion, do courses utilizing content-based instruction methods (bilingual instruction), improve second language proficiency, better than traditional teaching methods?

Strongly Disagree Disagree Uncertain Agree Strongly Agree

2. Do you agree, that content-based instruction methods (bilingual instruction), focuses more on learning content, than on learning language proficiency?

Strongly Disagree Disagree Uncertain Agree Strongly Agree

3. Do you think colleges and universities should make content-based instruction methods (bilingual instruction) programs, available to all second language learners, regardless of their major?

Strongly Disagree Disagree Uncertain Agree Strongly Agree

4. In your opinion, do content-based instruction (bilingual instruction) courses in higher education, improve second language proficiency?

Strongly Disagree Disagree Uncertain Agree Strongly Agree

5. In your opinion, are content-based instruction (bilingual instruction) programs in higher education, effective at improving both content knowledge and second language proficiency?

Strongly Disagree Disagree Uncertain Agree Strongly Agree

Appendix H: Research Study Survey Cont.

6. In higher education, do content-based instruction (bilingual instruction) programs, motivate students to achieve better grades?

Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Do content-based instruction (bilingual instruction) courses, give students more confidence in their second language, compared to traditional instruction methods?

Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. In your opinion, are teachers in higher education well trained on content-based instruction methods?

Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Do you think students are more likely to achieve higher scores and better grades, as a result of taking content-based instruction (bilingual instruction) courses in higher education?

Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Do you think content-based instruction (bilingual instruction) courses, positively encourage a student's long-term academic achievement scores?

Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix I: Research Study Survey (Mandarin Chinese Version)



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Concordia University Research Study (Mandarin Chinese Version)

双语教学环境下内容教学法基于高等教育的调查问卷

1. 基于内容教学法下的双语授课能够提高学习第二语言的能力并且效果优于传统教学。你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. 基于内容教学法的双语教学重点在于学习内容而不是学习语言。你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. 对于高等院校应不分专业针对所有第二语言学习者制定基于内容教学法下的双语授课方案你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. 对于在高等教育阶段实行基于内容教学法下的双语授课将会提高第二语言的能力。你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. 高等教育中基于内容教学法下的双语授课方案能有效提升内容知识的获取以及第二语言的能力。您的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix I: Research Study Survey (Mandarin Chinese Version) Cont.

6. 在高等教育中实行基于内容教学法下的双语教学方案将激励学生取得更好的成绩。你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. 与传统方法相比，基于内容教学法下的双语教学将会使学生对自己的第二语言能力更有信心。你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. 对于高等教育的从业教师接受过关于内容教学法的专业培训。你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. 对于高等教育阶段的学生采用基于内容教学法下的双语教学将会使学生更有可能获得更高的分数和更好的成绩。你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. 对于基于内容教学法下的双语教学将会对学生的长期学业成绩产生积极鼓励。你的看法是？

完全不认同	不认同	不确定	认同	非常认同
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix J: Participant Consent Form

RESEARCH PARTICIPANT CONSENT FORM



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Research Study Title: The relationship between Content-Based Instruction (CBI) methods and student academic achievement scores in higher education.

Principal Investigator: [Researcher's name redacted]

Research Institution: Concordia University

Faculty Advisors: [Advisors' names and emails redacted]

Request for Participant Consent

Dear Student/Faculty Member,

You are hereby formally invited to be part of a research study. The information in this form is provided to help you decide if you want to participate. I am a doctoral candidate at Concordia University in the Department of Education, and this form describes what you can expect during the study. If you have any questions, or do not understand something in this form, you should ask the researcher. For your convenience, I have also created a Mandarin Chinese version of this form, which I will provide to you upon request. Only sign this form if the researcher has answered your questions and you decide to be part of the study. This form describes your responsibilities as a participant during the study, and the risks and benefits of the study.

WHAT IS THIS STUDY ABOUT?

The objective of this proposed quasi-experimental study, is to establish and analyze if a causal relationship exists between content-based instruction methods (CBI), and the perceived benefits of this approach on student academic achievement scores in higher education. Additionally, this research focuses on CBI methods, and the efficacy of this approach on L2 learners, as a viable practice in promoting success on a student's overall scholastic achievement, defined by longitudinal data analysis. In a secondary capacity, this research endeavors to explore various student and faculty perspectives toward CBI methods, and the capacity of these programs to influence and enhance academic achievement scores.

WHY AM I BEING ASKED TO BE IN THE STUDY?

You are invited to be in the study, because you meet one or more of these criteria:

- ✓ You have previously taken a course offered by the School of Economics & Management, where content-based instruction methods had been used.
- ✓ You have previously taken a course offered by the School of Economics & Management between the 2014 – 2017 academic school year.
- ✓ You were at least 18 years old, at the beginning of the 2014 academic school year.

If you do not meet one or more descriptions above, you are not eligible to participate in this study.

Appendix J: Participant Consent Form (Cont.)

RESEARCH PARTICIPANT CONSENT FORM

HOW MANY PEOPLE WILL BE IN THIS STUDY?

Approximately 250 - 300 participants will be in this study.

WHO IS PAYING FOR THIS STUDY?

Any costs associated with this study are the responsibility of the researcher. Additionally, no agreements or promise of compensation has been made for conducting this study.

WILL IT COST ANYTHING TO BE IN THIS STUDY?

You do not have to pay anything to be in the study.

HOW LONG WILL I BE IN THE STUDY?

If you decide to take part in this study, your participation will last approximately 1 to 4 weeks.

WHAT WILL HAPPEN DURING THIS STUDY?

If you decide to participate in this study, you will be expected to do some, or all of the following:

- ✓ Provide personal information about yourself, such as your age, gender, education level etc.
- ✓ Authorize the release of your final grades from previously completed courses.
- ✓ Potentially, you may be asked to complete an online survey.
- ✓ Some or all participants may be asked follow-up questions regarding the research

This section only applies to Faculty members that participate in the study:

- You may be scheduled for a one-on-one interview with the researcher.
- At some point during the investigation, you may be scheduled for a focus group session.

WILL I BE RECORDED?

The researcher will only record audio, during the interviews with faculty members involved in the courses using content-based instruction methods. The researcher will use the audio recordings to transcribe and code responses, and keep them as a reference. The recordings will be kept encrypted for security and confidentiality; additionally, the audio will be stored for a period not to exceed three years, and deleted at the end of this cycle.

WILL BEING IN THIS STUDY HELP ME?

There are no immediate benefits for participating in this study; however, the Information resulting from this investigation could promote better awareness, and deliver improvements to international content-based instruction programs in higher education.

ARE THERE RISKS TO ME IF I AM IN THIS STUDY?

There are no immediate risks associated with this research. If for any reason during the study, a participant becomes uncomfortable, you have the right to withdraw from the research.

WILL I GET PAID?

There is no payment for participating in this study.

Appendix J: Participant Consent Form (Cont.)

RESEARCH PARTICIPANT CONSENT FORM

DO I HAVE TO BE IN THIS STUDY?

Your participation in this study is voluntary.

Additionally, the researcher can remove you from the study at any time, if:

- ✓ The researcher believes it will negatively impact the study
- ✓ Or, you no longer meet the inclusion criteria to participate.

WILL INFORMATION ABOUT MY PARTICIPATION BE EXCHANGED OR SHARED?

Any identifying information collected about you during this study will be kept confidential. In any written reports or publications, no one will be able to identify you. All personally identifying information will be kept confidential by coding and masking data, so it remains anonymous. To further protect this data, any name or identifying information will be kept secure via electronic encryption. The information collected in this study will not be distributed to any other agency, and will be kept private and confidential.

The researcher will keep the information you provide on a password protected computer and on encrypted files. Only the researcher and the research supervisor will have access to review this information.

WHO CAN I TALK TO ABOUT THIS STUDY?

If you have any questions or concerns, please contact the researcher directly, by using the phone number or email address listed on the last page of this document.

ACKNOWLEDGMENT & RIGHT OF WITHDRAWAL

I have read this form, and had the opportunity to ask questions about this study. The researcher has briefed me about the study and all procedures. The researcher has answered all my questions, and I voluntarily agree to be in this study. I agree to allow the use and sharing of my academic records and personal data as described above, for the purposes of this investigative research study.

By signing this form, I agree to participate in this study, and understand I have the right to withdraw at any time during the research. I further acknowledge, that upon my request, I will receive a signed copy of this consent form for my records.

Appendix J: Participant Consent Form (Cont.)

RESEARCH PARTICIPANT CONSENT FORM

Contact Information:

You will receive a copy of this authorization form. If you have questions you can write the principal investigator [Researcher's name, email, and phone number redacted] If you want to speak with the researcher's faculty advisors, you can write or call [Advisors' names, emails, and phone numbers redacted]

Your Statement of Consent:

I have read the information above, and I have no further questions. I hereby consent to participation in this research study, for a period time lasting no more than four weeks from the date of this signed authorization.

Participant Name Printed

Date

Participant Name Signature

Date

Investigator Name

Date

Investigator Signature

Date



[Researcher's contact information and institution address redacted]

Appendix K: Participant Consent Form (Mandarin Chinese)

RESEARCH PARTICIPANT CONSENT FORM



研究题目: 内容教学法与高等教育学生成绩之间的关系

首席研究员: [Researcher's name redacted]

研究机构: Concordia University

教师顾问: [Advisors' names and emails redacted]

研究参与要求

尊敬的学生/教职人员,

我是来自大学的一名博士学位在修生, 现正式邀请你参与此项调查研究。此文件的各项信息将会帮助你决定是否参与此项研究。以及说明你在此项研究中将要完成的事宜。如果对此项研究存在任何疑问或者任何问题随时可向研究员提出。同时我也准备了此文件的中文版本如果需要可向研究人员提出。只有在研究人员解答了你的各项问题并且你对参与此项研究无异议时方可签署此文件。这份文件也将说明你在参与研究期间作为参与者需要履行的责任以及研究所带来的风险和收益。

研究解读

此项准实验研究的目的在于分析内容教学法是否与高等教育的学生学业成绩存在因果关系。此外此项研究的重点在于内容学习法 (CBI) 以及这种方法对 L2 学习者的影响, 并且作为通过纵向数据分析定义促进学生整体学术成就的可行实践。其次, 此项研究也将致力于探索各种教师, 学生对于内容教学法的看法, 以及次方法对学生学习能力和学业成绩的影响。

我为何被邀请参与此项研究?

你被邀请参与此项研究因为满足下一项或多项条件:

- ✓ 曾经参加过使用内容教学法的经济管理学院课程。
- ✓ 在 2014-2017 学年之间参加过经济管理学院课程。
- ✓ 在 2014 学年开始之前已年满 18 岁。

如果不能满足以上一项或多项条件, 将无法参与此项研究。

将会有多少人参与此项调查研究?

大约有 250-300 人将参与到此项研究中。

Appendix K: Participant Consent Form (Mandarin Chinese) Cont.

RESEARCH PARTICIPANT CONSENT FORM

此项研究的花费如何计算？

与本研究相关的任何费用将有研究教师承担
另附，没有就进行此项研究达成任何协议或承诺赔偿。

参与此项研究是否需要支付费用？

参与此项研究不需要支付任何费用。

此项研究将持续多久？

自同意参与研究开始之日起，研究持续 1-4 周。

参与此项研究具体的内容要求？

自研究之日起，研究人员将希望你做到一下一些活着全部内容：

- ✓ 提供诸如你的个人信息，如您的年龄，性别，教育水平等
- ✓ 授权研究人员获取并有权公布你曾经的学业成绩。
- ✓ 可能存在要求你完成在线调查问卷。
- ✓ 部分或者所有参与者将有可能被要求参加研究后续问题的调研。

以下部分将适用于参与研究的教师：

- 将有可能被安排与研究人员进行一对一的面试。
- 在研究进行过程中，将可能需要进行小组会议。

研究是否会被以任何方式记录？

在与接受内容教学法的研究参与者访谈时将只会被记录音频资料。 研究员将会全程录音作为参考。
安全起见，录音将会被加密保存；此外，录音将被保存不超过三年时间，并在此周期内被删除。

参与此项研究对我有何帮助？

尽管，参与此项研究无法带来直接收益与好处；但是，参与这项研究所获得的信息知识将有助于提升自我认识，并参与改善高等教育运用内容教学法在国际上的完善程度。

参与此项研究是否需要承担任何风险？

参与此项研究并不会存在任何直接风险。 在研究进行过程中如果有任何参与者感到不适都可以随时推出研究。

参与此项研究是否可以获得报酬？

没有。

Appendix K: Participant Consent Form (Mandarin Chinese) Cont.

RESEARCH PARTICIPANT CONSENT FORM

此项研究的花费如何计算？

与本研究相关的任何费用将有研究教师承担
另附，没有就进行此项研究达成任何协议或承诺赔偿。

参与此项研究是否需要支付费用？

参与此项研究不需要支付任何费用。

此项研究将持续多久？

自同意参与研究开始之日起，研究持续 1-4 周。

参与此项研究具体的内容要求？

自研究之日起，研究人员将希望你做到一下一些活着全部内容：

- ✓ 提供诸如你的个人信息，如您的年龄，性别，教育水平等
- ✓ 授权研究人员获取并有权公布你曾经的学业成绩。
- ✓ 可能存在要求你完成在线调查问卷。
- ✓ 部分或者所有参与者将有可能被要求参加研究后续问题的调研。

以下部分将适用于参与研究的教师：

- 将有可能被安排与研究人员进行一对一的面试。
- 在研究进行过程中，将可能需要进行小组会议。

研究是否会被以任何方式记录？

在与接受内容教学法的研究参与者访谈时将只会被记录音频资料。 研究员将会全程录音作为参考。
安全起见，录音将会被加密保存；此外，录音将被保存不超过三年时间，并在此周期内被删除。

参与此项研究对我有何帮助？

尽管，参与此项研究无法带来直接收益与好处；但是，参与这项研究所获得的信息知识将有助于提升自我认识，并参与改善高等教育运用内容教学法在国际上的完善程度。

参与此项研究是否需要承担任何风险？

参与此项研究并不会存在任何直接风险。 在研究进行过程中如果有任何参与者感到不适都可以随时推出研究。

参与此项研究是否可以获得报酬？

没有。

Appendix K: Participant Consent Form (Mandarin Chinese) Cont.

RESEARCH PARTICIPANT CONSENT FORM

我是否自愿参与本项研究？

是否参与此研究完全取决于个人意愿。

此外，如违反以下条例研究人员有权将你从参与者中随时移除并终止你继续参与：

- ✓ 当研究人员判定会对研究产生负面影响时。
- ✓ 你不再符合参加研究的标准。

有关我参与的信息内容？

在本研究期间收集的关于你个人的任何信息将会被加密保护，同时不会出现在任何书面报告和刊物中。所有个人信息将会被编码加密和保护，并只会显示匿名状态。为了进一步保护此数据，任何名称或识别信息将通过电子加密保持安全。本研究收集的信息除保密外，不会分发给任何其他机构，。

研究人员将您提供的信息保存在受密码保护的计算机和加密文件中。只有研究人员和研究主管才能查阅这些信息。

有关疑问的咨询？

如果您有任何问题或疑虑，请直接与研究人员联系，联系方式参照本文档最后一页列出的电话号码或电子邮件地址。

申明与撤销权

我已阅读以上材料，研究人员提供了提问的机会并向我介绍了研究的信息以及相关程序。研究人员回答了我所有的问题，我自愿同意参加这项研究。并且我同意出于本调查研究目的的情况下使用和分享我上述的学术记录和个人资料。

通过签署这份表格，我同意参加这项研究，并清楚的知道我有权在研究期间随时退出并撤回授权。根据我的要求，我将收到一份签署的本同意书副本，供我保存记录。

Appendix K: Participant Consent Form (Mandarin Chinese) Cont.

RESEARCH PARTICIPANT CONSENT FORM

联系方式:

您将会受到一份本协议的副本。如果您存在任何问题可以发送邮件至首席研究员

[Researcher's contact information and Advisors' names, emails, and phone numbers redacted]

同意申明:

我已经阅读了上述信息，并没有其他问题。我在此授权在修博士生（ [Researcher's name redacted] 在惠州学院以上
上述目的进行学术研究，自授权之日起六个月内有效。

Participant Name Printed

Date

Participant Name Signature

Date

Investigator Name

Date

Investigator Signature

Date



[Researcher's contact information and institution address redacted]

Appendix L: Statement of Original Work

The Concordia University Doctorate of Education Program is a collaborative community of scholar-practitioners, who seek to transform society by pursuing ethically-informed, rigorously-researched, inquiry-based projects that benefit professional, institutional, and local educational contexts. Each member of the community affirms throughout their program of study, adherence to the principles and standards outlined in the Concordia University Academic Integrity Policy. This policy states the following:

Statement of academic integrity.

As a member of the Concordia University community, I will neither engage in fraudulent or unauthorized behaviors in the presentation and completion of my work, nor will I provide unauthorized assistance to others.

Explanations:

What does “fraudulent” mean?

“Fraudulent” work is any material submitted for evaluation that is falsely or improperly presented as one’s own. This includes, but is not limited to texts, graphics and other multi-media files appropriated from any source, including another individual, that are intentionally presented as all or part of a candidate’s final work without full and complete documentation.

What is “unauthorized” assistance?

“Unauthorized assistance” refers to any support candidates solicit in the completion of their work, that has not been either explicitly specified as appropriate by the instructor, or any assistance that is understood in the class context as inappropriate. This can include, but is not limited to:

- Use of unauthorized notes or another’s work during an online test
- Use of unauthorized notes or personal assistance in an online exam setting
- Inappropriate collaboration in preparation and/or completion of a project
- Unauthorized solicitation of professional resources for the completion of the work.

Appendix L: Statement of Original Work Cont.

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University-Portland Academic Integrity Policy during the development and writing of this dissertation.
2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association*



Digital Signature:

Jason J. Sibulkin

Name: *(Typed)*

February 21, 2018

Date: