GENERAL EDUCATION IN THE 21ST CENTURY: ASPIRATIONAL GOALS AND INSTITUTIONAL PRACTICE

by

AMBER GARRISON DUNCAN

A DISSERTATION

Presented to the Department of Educational Methodology,
Policy, and Leadership
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

September 2014

DISSERTATION APPROVAL PAGE

Student: Amber Garrison Duncan

Title: General Education in the 21st Century: Aspirational Goals and Institutional Practice

This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Educational Methodology, Policy, and Leadership by:

Dr. David T. Conley	Chairperson
Dr. Gina Biancarosa	Core Member
Dr. Deborah Olson	Core Member
Dr. Kenneth Doxsee	Institutional Representative

and

J. Andrew Berglund	Dean of the Graduate School

Original approval signatures are on file with the University of Oregon Graduate School.

Degree awarded September 2014.

DISSERTATION ABSTRACT

Amber Garrison Duncan

Doctor of Philosophy

Department of Educational Methodology, Policy, and Leadership

September 2014

Title: General Education in the 21st Century: Aspirational Goals and Institutional Practice

The goal of general education is to provide students with an education that is broad and holistic, teaching transferable intellectual skills such as critical thinking, written and oral communication, problem solving and teamwork. General education courses are typically offered through the academic subjects of mathematics, science, English, and social science. Recent studies document concern that college graduates are not capable of demonstrating the intellectual skills expected. Through the use of content analysis, this study examined institutional practice to determine if the goals of general education are being met. A nationally representative sample of general education course syllabi and work products were analyzed for evidence of the intellectual skills expected of students and if those expectations were communicated. Findings indicate that learning expectations were not consistently provided and the goals of general education to deliver complex cognitive skills were not met. Implications provide insight for those responsible for general education reform.

CURRICULUM VITAE

NAME OF AUTHOR: Amber Garrison Duncan

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene
Texas A&M University, College Station
Texas Woman's University, Denton

DEGREES AWARDED:

Doctor of Philosophy, Educational Methodology, Policy, and Leadership, 2014, University of Oregon
Master of Science, Student Affairs Administration and Higher Education, 2000, Texas A&M University
Bachelor of Science, Psychology, 1998, Texas Woman's University

AREAS OF SPECIAL INTEREST:

Post-Secondary Education Policy
Higher Education Leadership and Management
Learning Design and Assessment
Latina Experiences in Post-Secondary Education

PROFESSIONAL EXPERIENCE:

Evaluation and Planning Officer, Lumina Foundation, 2013-Present
Director of Student Affairs Assessment and Research, University of Oregon, 2010-2012
Director of Family Programs and Commencement, University of Oregon, 2006-2010
Intake and Investigations Coordinator, University of Michigan, 2003-2005
Assistant Director of Housing and Greek Life, Hope College, 2000-2003

GRANTS, AWARDS, AND HONORS:

National Association of Student Personnel Administrators, Latino/a Knowledge Community, Amigo/a Award, 2014
Beth Rietveld Service to Oregon Women in Higher Education Award, 2011

Lending a Helping Hand Award, Fraternity & Sorority Life, University of Oregon, 2010

Commitment to Community Award, Lesbian, Gay, Bisexual, and Transgender Services, University of Oregon, 2009

Appreciation Award, Office of Multicultural Academic Support, University of Oregon, 2008

College Student Educators International, Outstanding Service Towards the Development of Women, 2006

PUBLICATIONS:

Fuller, M. & Garrison Duncan, A. (2011). Toward A Philosophy of Student Affairs Assessment. NASPA NetResults, July 2011. Retrieved from http://naspa.org/membership/mem/pubs/nr/default.cfm?id=1798

Garrison, A., Hernandez, P., Dunlap, D., & Clott, A. (2008). Convivencia: Imagining possibilities in the nuestra historia. [Review of the book *Chicana/Latina Education in Everyday Life: Feminista Perspectives on Pedagogy and Epistemology]. Harvard Journal of Hispanic Policy, 20,* 77-81.

ACKNOWLEDGEMENTS

This dissertation is the result of the collective efforts of many individuals, and at this time I would like to honor those who have made an impact on my doctoral journey.

I wish to sincerely thank my dissertation chair, Dr. David T. Conley, for his expertise, guidance, and support throughout the dissertation process. The opportunity to learn from you during this experience has been a gift. I am also grateful that you offered the use of an extant data set in this study, as I would not have been able to collect such a quality set on my own. I extend a special thank you to Dr. Gina Biancarosa for taking me on as a student and sharing her expertise during the creation of the methodology and during data analysis. Dr. Deborah Olson, thank you for not only providing insights essential to this study but for your constant support over the years. Dr. Kenneth Doxsee, I thank you for joining in this journey and for your collegiality and leadership for student learning assessment. Thank you all for your investment in me.

I also give thanks to the faculty scorers and content experts who helped shape this study and provided enthusiastic support for purpose of the study, confirming the need within the field for the research questions to be answered. I would be remiss if I did not acknowledge Angela Pellerin for her attention to all the details for policies and procedures with great care for student welfare.

While I had to walk this path on my own, the journey would not have been as rich and full of learning in all aspects of my life were it not for the friends and family who provided unwavering emotional support over the last eight years.

Starting with my first year of coursework at Florida State University, the faculty and fellow doctoral students modeled what a community can do to foster development in both academic and personal ways; especially, Justin, Jennifer, Grahaeme, David, Angela and Michael. I also thank the women who engaged me in authentic and critical research "from the kitchen table" to publication. Aimee Clott, Pamela Hernandez, and Diane Dunlap, I will never forget the lessons we shared. I am also indebted to colleagues at both the Lumina Foundation and University of Oregon who helped me develop as a professional and prioritized the completion of the dissertation.

To all my friends who have listened, motivated, and believed in me throughout the years- AGD Oldcrew, #WLSalt sisters, Bill Stackman, Carla Harcleroad, Annie Carlson, Abbie Schneider, Stephannie Bailey and Kodee Gartner- I offer you my heartfelt thanks for the cheers, tears, and laughs.

For my family - all my grandparents, aunts, uncles, and cousins - you deserve to be acknowledged for the many ways you have loved me through this process. Mom, Earl, Angie, Roz, Zack, and Tay- thank you for understanding the absence of time and sometimes absence of mind to accomplish this goal. Aunt Holly, thank you for consistently cheering me on and sharing a special connection because of your own doctoral journey. To my Earl, you have always had my back from the moment you stepped into my life and it has made all the difference.

To my greatest supporter, my husband John, the depths of your love know no bounds. Not only have you been my anchor throughout this process, you also made this dream of mine into one of your own. The sacrifices you have made with me and for me to earn this degree are a testament to the unconditional love you offer to me each and every day. When I did not think I could sing anymore, you freed me to sing my own song.

For my mother, Carolyn Myres. You have always taught me to be a woman of integrity and courage. I remember playing teacher in your classroom and constantly observing you fight for all students to succeed. You firmly planted the roots for what has bloomed into my life's work in education and equity.

For my maternal grandmother, Fran Swayze. From being one of the first women to ever work in a lumbar yard in the United States to raising three strong daughters, the resilience and determination I know stems from you.

This work is for both of you; I stand on your shoulders and build on your legacies.

TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

Postsecondary education at colleges and universities in the United States is uniquely characterized by a curriculum that emphasizes both general and specialized education. All undergraduate students seeking a bachelor's degree are required to select a discipline or subject to specialize in. This is commonly referred to as the academic major. In addition to the specialized curriculum, students are required to take a certain number of courses from multiple subjects, typically within the first and second year of college. This collection of courses is referred to as the general education curriculum and is "the part of the curriculum that is shared by all students" (Association of American Colleges and Universities, 2002, p. 2). General education curriculum is in place at approximately 95% of United States colleges and universities, making it one of the most consistent aspects of curriculum across all institutions of higher education (Aloi, Gardner, & Lusher, 2003).

The goal of general education is to provide students with an education that is broad and holistic through courses in some of the foundational subjects of human knowledge such as mathematics, science, English language and literature, and social science. In addition, "It is also a major vehicle for cultivating capacities such as communication, critical thinking, quantitative reasoning, and integration of knowledge" (Ratcliff, Johnson, La Nasa, & Gaff, 2001, p. 6). The aforementioned are the practical and intellectual skills that are intended to prepare students for democratic citizenship (Association of American Colleges and Universities, 2002).

The concept of "general education" has been a topic of discussion at colleges and universities in the United States since the early 1800's. Early colleges had a very specific role of preparing students as religious clergymen. As both society and colleges evolved, the curriculum followed. Over the centuries, faculties have engaged in debate about the types of courses offered, the way in which they are offered, and the timing for students to take the courses.

This same debate continues in the 21st century as a topic of speculation by state legislatures, the United States Department of Education, United States Presidents, business leaders, and mainstream media (Gaff & Wasescha, 2001). However, the public is not interested in debating the types of classes or the way in which they are taught; public concerns and demands center on the quality of education needed to meet the complex and demanding challenges of the modern world.

The type of learning needed to meet the challenges of the 21st century has been attributed to the practical and intellectual skills identified in the goals of general education curriculum. Employers have indicated that college graduates need to be prepared with the following transferable skills: critical thinking, complex problem solving, communication, and applied knowledge (Hart, 2009; Hart, 2013). The emphasis on these transferrable skills should not be surprising given the evolving knowledge economy, globalization, and environmental challenges. Society has seen a shift from the Industrial Age of producing specific goods and materials when the role of education was to prepare students for specific tasks associated with production.

Now, in the new knowledge economy, graduates need to be prepared to produce ideas and creative solutions for a fast paced and ever changing world. This shift in economy can be seen in the types of jobs students will be able to attain after college. A college education will soon be the essential credential for access to jobs that afford a middle-class lifestyle (Carnevale & Rose, 2011). Furthermore, 30 percent of students today will be placed in jobs that do not currently exist, and it is estimated that a career spent with one employer or line of work will be the exception (Carnevale & Rose, 2011; Taylor Huber & Hutchings, 2004). In a 2013 survey of employers, 93% agreed, "a candidate's demonstrated capacity to think critically, communicate clearly and solve complex problems is more important than their undergraduate major" (Hart, 2013, p. 1). Given these statistics, preparing students for a specific vocation or with specific skills used today in a field will not prepare them for a future where change is certain, hence the emphasis on transferrable skills.

In addition to the importance of the skills taught in general education for job security and economy, there is also pressure from government officials, accreditation agencies, potential students, and their parents to provide evidence that students learn these skills as a result of attending college. State and federal governments make major investments in higher education, as do students and their families. States funding models and accreditation agencies for higher education have made student success a measure by which state dollars are allocated and authority to award degrees is given.

Public demands and concerns about the ability of postsecondary education to develop these general skills are not unfounded. There is limited scientific evidence to support that defined learning outcomes in higher education are supported across the curriculum and across institutions. Efforts to measure intellectual skills across colleges and universities has been limited to standardized measures such as the National Survey of Student Engagement (NSSE), which is a self-report measure of student engagement in college, or the College Learning Assessment (CLA) that is an assessment of critical thinking, analytic reasoning, problem solving, and writing (Arum & Roksa, 2011). There are limited opportunities for direct assessment of student learning using standard outcomes. The American Association of Colleges and Universities (AAC&U) has attempted to move assessment of learning away from standardized tests and introduced rubrics that are designed for direct assessment of individual assignments within courses.

Even with these tools, questions remain about the depth of learning that would enable students to apply the skills gained. Complex, or deeper levels of cognitive skill development contribute to a student's ability to apply skills in multiple settings and use the skills to solve more complex problems (Anderson & Krathwohl, 2001).

As more and more accountability measures are put into place, institutions must be able to demonstrate effectiveness in meeting the goals of general education. If not, public trust and investment in higher education will continue to decline. Given the challenges previously discussed, the importance of preparing students for an economy fueled by a person's ability to use intellectual and practical skills at a higher level of complexity is clear (Carnevale & Rose, 2011; Hart, 2013).

Purpose of the Study

This study will examine the goals of general education in the context of institutional practice to determine if the curriculum provides opportunities to learn intellectual and practical skills at complex levels. The specific research questions for the study are:

1) Are learning goals or statements in general education curriculum communicated to students in course syllabi?
2) Across the general education curriculum, what evidence of intellectual and practical skills is found in course syllabi and work products?
3) What is the cognitive complexity of the intellectual and practical skills found in course syllabi and work products across the general education curriculum?
4) What evidence of intellectual and practical skills is found in course syllabi and work products by subject areas in general education curriculum?
5) What is the cognitive complexity of the intellectual and practical skills found in course syllabi and work products by subject areas in general education curriculum?

Findings provide insights for those responsible for shaping and delivering general education curriculum and provide support for advancing quality teaching and learning at both associates and bachelor's degree-granting institutions. In addition, the implications of the findings can inform general education reforms that are intended to improve institutional practice.

CHAPTER II

LITERATURE REVIEW

The history and development of undergraduate curriculum in the United States to the present day will explain the context that led to the development of general education as a distinct track in undergraduate curriculum and institutional practices that emerged. General education evolved over time, influenced by the expansion of human knowledge, shifts in economy, open access for all citizens to higher education, and an expanded mission for universities to engage in knowledge creation. The current aspirations of general education curriculum and studies highlighting institutional practice will set the stage for exploration of the research questions in this study.

Founding Principles of Undergraduate Curriculum

Colleges are one of the oldest social institutions in the United States, with over 375 years of existence. Many were established prior to local governments, states, and some even prior to the founding of the country. Despite a well-established tradition in education, the most fundamental question that has been documented consistently in meeting minutes and college Presidential speeches since the inception of postsecondary education is, "What should every student know?" Great debates about undergraduate curriculum in higher education have ebbed and flowed between general consensus and tumultuous disagreement leading academic reform researcher Hefferlin to state, "The curriculum is the battlefield at the heart of the institution" (as cited in Rudolph, 1977, p. 5). It is important to understand the path these debates have taken and the evolution of undergraduate curriculum in higher education in order to comprehend the goals of general education and the complex issues facing it in the 21st century.

Uniform curriculum. Founded in the mid-1600s in the English tradition and following the models of Oxford and Cambridge, the main purpose of early colonial colleges in the United States was to prepare men for clergy and a gentlemen's life by emphasizing character, piety, and civic virtue. It is important to note that women and people of color were not allowed to attend colonial colleges and tuition was so expensive it was only accessible to those in the upper socioeconomic class. Proficiency in Latin and Greek were required for admission, which also confirmed that only students with access to elite preparatory schools where those languages could be learned would be eligible for entry.

The curriculum reflected the purpose of colonial colleges, as it was uniform for every male student and intended for knowledge to be absorbed and committed to memory in order for the student to be able to perform the duties required by the church, or to maintain social status. Subjects of study included logic, rhetoric, mathematics, Greek and Latin, and philosophy (Boyer & Levine, 1981; Lucas, 1994) and were taught over a four-year period. The state and scope of knowledge during this period allowed for both the breadth and depth of human understandings to be covered (Levine, 1978).

Elective courses. The uniform method of education continued until the 1700's when new subjects were added in order to teach the expanding knowledge in the natural sciences at the time. Sciences such as botany, chemistry, and zoology were added to the growing lists of scientific and technological arts (Rudolph, 1977). The curriculum would change again in the 1800's as the birth of a new republic and the ideals of democracy would influence curricular requirements. Antebellum colleges grew rapidly in number, with the focus on preparing men to serve a developing nation. During this time, an increase in scientific knowledge would shape and expand undergraduate curriculum.

Colleges began to experiment with allowing for the substitution of classical courses with scientific courses. The most radical experiment of the time occurred in 1824 when the University of Virginia decided to allow students to choose courses. The university had divided the courses offered into eight different schools and by 1869 the idea had earned credibility. Charles Eliot, the President of Harvard, officially announced in his inaugural address that Harvard students would have freedom in the selection of their courses (Rudolph, 1977). At the time, this bold move flew in the face of conservatives bound to the notion of a set or uniform curriculum and debates among faculty became frequent and often heated.

At Yale College, the debate was rather contentious and in order to resolve the controversy, the college president selected a committee to draw up a position paper about an expanded curriculum. The final report reached beyond its original purpose as an internal document as it was widely read by faculty across the country and published in *The American Journal of Science and Arts*. Often referred to as the last great stand of the classics, *The Yale Report* claimed that the purpose of undergraduate education was to lay a foundation that would provide a liberal and comprehensive view common to the art of living; this view did not include professional education in the definition of art of living and clearly advocated for a uniform curriculum (Lucas, 1994). In addition, President Packard at Bowdoin College defended the core curriculum in 1829 when he pinned an article for the *North American Review* (Levine, 1978).

However, more and more colleges during this time attempted to blend both the classical and expanded courses into the curriculum (Lucas, 1994; Levine, 1978). The free elective system was expanded and students were free to choose courses without any prescribed or recommended course of study (Levine, 1978). This continued through most of the 1800's until the turn of the century.

Emergence of General Education Curriculum

The next century ushered in the Industrial Age and there was a great need for occupational training given new technologies and business models as United States cities expanded into urban population centers. In order to answer the question, "What should every student know?" a new curriculum model emerged that would bring together the various arts and sciences to train young scholars in the practicality of knowledge linked to professional practice. The college curriculum wavered between the liberal arts and vocationalist appeals, as it was no longer feasible to expect everyone to complete the same curriculum (Lucus, 1994). A new model would begin to merge the free elective system and the universal system of curriculum by creating a broadly focused general education curriculum and specialized curriculum, known as the major area of study.

Academic major. By 1905, the requirement for students to select a major area of study could be found widely across the United States (Levine, 1978). The *major* is defined as the compliment to general education by providing a depth of body of knowledge, methods of inquiry, and professional practice in one discipline. The origins of the term *major* are not well known, but The Johns Hopkins University catalog of 1877 used the term to describe the courses students were required to show "marked proficiency" in, typically over the course of two years of study. Indiana University also used *major* in course catalogs as early as 1885 under the leadership of President Jordan, who later served as the first president of Stanford University where he also implemented this curricular framework (Rudolph, 1977).

In summary, a major is tied to a specific academic discipline and characteristically exhibits the following: (a) a defined subject matter for study, (b) widely accepted theories, (c) a preferred methodology for investigating the defined subject matter, (d) and social norms that define success and rewards (Klein, 1990; Salter & Hearn, 1996).

General education. In 1909, President Lowell of Harvard created general education course distribution requirements that gave specific groupings of courses in three subjects outside of the major for students to elect from during their four-years to degree. This gave some prescription of study but still allowed for student choice (Levine, 1978). In the same era, President Meiklejohn of Amherst College created the "survey course" designed to serve as an introduction to particular topics, especially in the arts and sciences and similar type courses were soon implemented at Columbia University. The prescription of study and groupings of courses outside the major and the survey course served as the foundation for modern day general education curriculum.

General education curriculum was widely implemented in the 1920's and 1930's as more colleges and universities created what would be recognized today as general education programs. Several experiments in general education demonstrated the desire of institutions to find the best way to design the curriculum (Levine, 1978). This experimentation continued until after World War II when two seminal reports were issued. In 1945, the oldest university in the United States, Harvard University, issued a report titled *General Education in a Free Society* (commonly referred to as *The Red Book*) that proposed a common core curriculum for general education.

Soon after, President Truman's Commission on Higher Education analyzed the countries system of higher education and outlined specific needs for an educated citizenry and defined role for postsecondary education (Boyer Commission on Educating Undergraduates in the Research University, 1998). The curriculum was characterized as "in crisis" due to the experimental nature and inconsistency of education across institutions. Truman's Commission provided two solutions to the crisis that included an improvement to college teaching and a requirement that all college students are educated through a general education program (Hutcheson, 2007). The reports by Harvard and the Truman Commission refocused colleges on the need for a shared understanding of general education outcomes and curriculum.

Changing Student Demographics

As previously discussed, the industrialization and urbanization of the 20th century relied heavily on new technologies that not only shaped the curriculum, but also the type of student entering higher education. Two federal policies created unprecedented access to colleges and universities and responded to the increasing need for degree attainment among citizens. The Morrill Act of 1862 provided crucial funding that led to the establishment of agricultural and mechanical colleges. The Servicemen's Readjustment Act financially supported military personal returning from duty in World War II to attend college.

The Morrill Act of 1862 was in response to the industrial movement as agricultural and mechanical professions flourished. The federal Morrill Act of 1862 established state institutions of higher education to support these growing professions with citizens educated in the agricultural and mechanical arts (Lucas, 1994). Shortly after, a second Morrill Act was passed that further opened the doors of opportunity by providing additional support for those institutions and demonstrating the commitment to providing education in these areas to support a bustling industrial economy (Lee, 1963). The result was the establishment of 76 institutions, commonly referred to as “land-grant” colleges, and included the founding of Historically Black Colleges and Universities (HBCU). The land grant colleges provided access to working class citizens to learn in the new curriculum that was focused on both broad areas of study and practical knowledge in a professional field.

By the 1940’s, at the time of President Truman’s report, significant change was occurring in the type of student who could now afford to attend college. As a direct result of the Servicemen's Readjustment Act of 1944, commonly referred to as the G.I. Bill, enrollment and access to higher education grew tremendously. In addition to major increases in the size of the student enrollment, the type of student also changed. Higher education was no longer only a place for white men in their early twenties who had received an elite early education. The demographics of the student body saw an influx of diverse students representing different races and ethnicities, genders, religions, socioeconomic statuses, ages, and academic preparedness.

The oldest social institution in the United States now had an entirely different audience than the previous 308 years, moving from a homogenous student body to a diverse and dynamic student body. Students now entered with a range of interests, preparation, and ability to engage in the curriculum (Weissman & Boning, 2003) and the academy would be faced with the challenge of responding to shortages in faculty, courses, and infrastructure to support the influx in number and diversity of students over a short period of time.

Expanding University Mission

As more and more undergraduate students entered postsecondary education and the curriculum began to encompass both the core and elective system, the United States became highly interested in research and inquiry. During the 1950's and 1960's, the height of the Cold War had its effect on curriculum as an increase in federal funding and national desire to surpass the Soviet Union, particularly after the launch of the Sputnik satellite, built further momentum behind the promotion of the sciences in research and as a discipline for undergraduate students.

The federal government turned to universities to engage in research at a time when university leaders and faculty were implementing aspects of the German model of higher education that promoted an emphasis on graduate education, production of knowledge, and elective courses (Levine, 1978; Rudolph, 1977). United States Congress established several national entities (i.e. National Science Foundation, National Institutes of Health, National Aeronautics and Space Administration) specifically focused on awarding federal dollars to support research in the universities, thus solidifying the role of the modern university. The university was no longer focused on simply disseminating knowledge, but now played a major role in the creation of knowledge to benefit society.

Over a 60-year period, the undergraduate curriculum evolved drastically and many institutional practices used today were established during this time. Namely, the establishment of general education as a distinct set of courses separate from the academic major and the growth of the number of academic subjects to reflect the expansion of knowledge resulting in elective courses for both general education and academic major curriculums. These curricular changes were established and influenced by a commitment for broader access to higher education for all citizens and a shift in the mission of universities to be involved in the generation of knowledge through research. The university now had multiple purposes to fulfill and had undergone significant changes. The purpose of higher education had evolved from preparing young men for clergy to playing a major role in helping a young country educate citizens for economic and democratic purposes, as well lead research that would advance the United States in the Industrial Age.

Current State of General Education

As previously discussed, mass access to higher education, changing student demographics, and emphasis on the research mission would culminate to influence a burgeoning general education curriculum. Ernest Boyer, in his 1990 landmark document *Scholarship Reconsidered*, summarized the impact this shift had on general education curriculum, teaching in the university setting, and faculty loyalty. Boyer stated, "The focus had moved from the student to the professoriate, from general to specialized education, from loyalty to the campus to loyalty to the profession" (p. 13).

To further explain Boyer's statement, the new emphasis on the research mission required faculty to be engaged in an academic culture that was highly specialized, leading to specialized inquiry and analysis (Pennsylvania State University, 2002). Furthermore, faculty success was defined by contributions to the profession in the form of knowledge creation in the field. Each of these factors left general education curricula in direct competition with the research mission and professional obligations of faculty (Rudolph, 1977).

Szostak (2003) described how a highly specialized research culture then reinforced the specialization of undergraduate courses and the resulting impact on students selecting a finely defined academic major. The undergraduate experience now has a more specialized focus on learning, and students see the degree as vocational training rather than as an opportunity to learn transferrable skills. Students engage in the undergraduate experience, treating general education courses as mandatory checkboxes instead of broadening knowledge. This approach is also exacerbated by the fact that in order to meet the various needs and abilities of the large classes of students entering the university, many students often find the first of year general education course work to be a replication of courses they took in high school or remediation (Boyer Commission on Educating Undergraduates in the Research University, 1998).

Institutional practice. Weissman & Boning (2003) characterized current courses in general education programs as large lecture sessions taught by adjunct faculty and frequently supplemented by a study or discussion section often led by a graduate student. The syllabus communicates the content of the courses to be a survey or introduction to the specific topic within the academic discipline.

In a study to learn more about courses offered in general education, Gaff & Wasescha (2001) conducted a survey using a national sample of chief academic officers at 305 colleges and universities. As a result of the survey, researchers constructed a profile of the typical courses offered in general education curriculum. The standard general education program requires about 50 hours of curriculum with two courses in writing, one in mathematics, four in humanities, one in fine arts, two in natural science (including labs), and three in social science. About half of the colleges surveyed also required students to take courses in a second language.

Current Reform in General Education

The current level of interest in general education reform initiatives began in the late 1970's. As seen throughout the history of general education, reports from both inside and outside the academy have influenced change. In the late 1970's, the Carnegie Foundation for the Advancement of Teaching set the stage for this round of reform by calling general education a "disaster area" (as cited in Marinara, Vajravelu, & Young, 2004). The argument was that without a clear or common general education curriculum for college students, change would be difficult to implement and provide evidence of success.

This was not the only call for change; the claim that general education was not accomplishing its stated goals was further supported by the United States Commissioner of Education who called for more common curricular experiences, and a Harvard College report that proposed an entirely new common core program (as cited in Marinara, Vajravelu, & Young, 2004).

However, there was still dissent against a common core curriculum and the distributive model was held up as a way to meet the needs of the diverse interests and abilities of students (Jones & Radcliff, 1991). To explore if one method of offering general education curriculum was more effective in reaching the goals for student learning, Jones and Radcliff conducted a study using student transcripts and test scores. The use of grade point averages on transcripts and pre-entry test scores allowed students to be grouped into high and low categories for pre-college entry preparation and college level performance. The findings in the study did not support a core curriculum, as students did not show similar outcomes as a result of taking the same courses. In the end, neither curriculum structures provided evidence that the goals of the general education curriculum had been reached.

In 2006, there was resurgence in the national conversation about student learning as The United States Secretary of Education established a Commission on the Future of Higher Education. In the final report, a section was dedicated to student learning and cited that, "…the quality of student learning at U.S. colleges and universities is inadequate and, in some cases, declining" (United States Department of Education, 2006, p. 3). The commission recommended that in order to meet the challenges of the 21st century, a focus on performance and student learning would be necessary. This report further fueled conversations about the role of general education in the 21st century and that clarity was needed, for both institutions and students, about the outcomes that should be expected (Ewell, 2013).

Current Studies

Nelson Laird, Niskode-Dossett, & Kuh (2009) confirmed in similar reviews of the literature that no studies could be found to demonstrate that general education courses placed importance on a common set of defined learning outcomes. The researchers also concluded there was a lack of studies documenting how faculty facilitates learning outcomes in general education courses. To begin to address this gap in the literature, they conducted an analysis of faculty responses to the 2005 Faculty Survey of Student Engagement (FSSE) at four-year colleges and universities to understand how faculty members structure learning activities towards the goals of general education. Faculty responses to the survey lead the researchers to conclude that faculty used learning activities to emphasize intellectual skills such as critical thinking and written and oral communication.

Many may see evaluating student grades as an obvious answer to understanding what students gained from the college experience. However, grades are an unreliable measure across institutions due to the fluid nature of grading scales and criteria (Arum & Roksa, 2011). Bers, Davis, and Taylor (2000) described the use of content analysis as an unobtrusive measure of student learning. Studies on social science courses and chemistry courses using content analysis could be found (Bers, Davis, & Taylor, 1996; Domin, 1999); however these studies were limited to a subject area or a specific set of courses. Another study where course syllabi were studied can be found in secondary education. Conley (2007) used content analysis to review Advanced Placement course syllabi to determine if courses were aligned with the curricular requirements of Advanced Placement.

Few large-scale studies exist to measure student learning; however, it is important to note that efforts are underway. One such effort can be seen at the Center of Inquiry in the Liberal Arts at Wabash College where researchers are trying to learn more about the gains college students make as a result of higher education (Arum & Roksa, 2011). While the center studies mainly small, private liberal arts colleges and universities, the findings on best practices to improve student gains can inform institutional practices regardless of size or mission.

Another study, called the College Educational Quality project is currently in pilot phase and involves a team of researchers observing courses and analyzing syllabi to examine the cognitive complexity of the course, the quantity of work assigned, and the level of expectations for student participation in class (Berrett, 2014). While these studies have or will provide important information about institutional practices, there have not been any studies that review the actual course documents across all subject areas, across a sample of all types of higher education institutions to determine the degree to which these practices align with the goals of general education.

Trends and Emerging Practices in General Education

Reform efforts in the 21st century reflect the emphasis of the national conversations and studies previously discussed. A common thread in the history of general education curriculum development has been the concern that clear and consistent learning outcomes across institutions do not exist. However, there is a distinctive shift in the conversation and instead of asking, "What should students know?" the question focused on today is, "What should students know and be able to do?" (Weissman & Boning, 2003).

To gain an understanding of current trends and practices in general education, chief academic officers at member institutions of the American Association of Colleges and Universities (AAC&U) were asked to respond with information about current general education practices and emerging practices at their institutions. Hart (2009) reported that 78% of the chief academic officers indicated the institution had a common set of learning outcomes for all undergraduate students.

Of those with a common set of learning outcomes, the skills most widely addressed were writing, critical thinking, quantitative reasoning, and oral communication skills. The emphasis on general education outcomes has also had an impact on the perception of general education as a priority for undergraduate education with 56% of academic leaders reporting that an increase as a priority for their institution. It is clear that institutions are still in a state of reform for general education as 89% indicated the institution is in some stage of assessing or modifying their general education program (Hart, 2009).

Defining Common Outcomes

Since the 1980's, the AAC&U has led general education reform in higher education. In 2006, the AAC&U commissioned Peter D. Hart Research Associates to conduct research about the question, "How should colleges prepare students to succeed in today's global economy?" which resulted in a document with that exact question as the title. In the study, employers and recent graduates were asked questions about what were the most important skills for college students to possess.

Both business executives and graduates recognized the need for broad and transferrable skills such as teamwork, critical thinking, and communication. College graduates did not expect to work in the same field as they currently did; emphasizing the fact that preparation for a specialized vocation was not realistic. Lastly, both groups confirmed previous notions that more advanced cognitive development was needed as business leaders and graduates felt more emphasis should be placed on the ability to use the broad skills in multiple settings (Hart, 2009).

Informed by the Hart (2009) study, the AAC&U launched the Liberal Education and America's Promise (LEAP) initiative that defined Essential Learning Outcomes as national benchmarks for college learning. The development of the Essential Learning Outcomes was based on research into the purpose and goals of general education. The specific AAC&U Essential Learning Outcomes for intellectual and practical skills are: inquiry and analysis, critical and creative thinking, written and oral communication, quantitative literacy, information literacy, teamwork, and problem solving (American Association of Colleges and Universities, n.d. -a).

The 2007 AAC&U report, *College Learning for the New Global Century,* served as a call to action for all institutions of higher education to give priority to the essential outcomes that set general education on a path towards achieving the aspiration goals it desires to provide for students and society.

The next major attempt to define a common set of learning outcomes for college students was launched in 2011 by the Lumina Foundation. The Degree Qualifications Profile (DQP) is the first attempt to describe student performance for each degree level in the United States (Lumina Foundation, 2011). The DQP was intended to provide a common language and reference points for student learning for associates degrees, bachelor's degrees and masters degrees in the United States. To accomplish this goal, outcome statements are defined for specialized and broad/integrative knowledge, intellectual skills, applied learning, and civic learning.

The intellectual skills defined in the DQP are: analytic inquiry, use of information resources, engaging diverse perspectives, quantitative fluency, and communication fluency (Lumina Foundation, 2011). The implementation of the DQP has the ability to drive conversations about institutional practices that provide students the opportunity to learn the defined outcomes. In particular, the DQP provides the foundation for institutions to determine what degree outcomes should be associated with general education curriculum versus the outcomes associated with the student's major curriculum, and how those should best complement each other to achieve the degree outcomes (Ewell, 2013).

To respond to the potential of the DQP to lead to more intentionality in designing and assessing undergraduate curriculum, in the fall of 2013, the AAC&U announced a major initiative called General Education Maps and Markers (GEMs). This project is intended to provide "design principles" for 21st century learning and "…develop a portable and proficiency-based framework for general education…" (AAC&U, n.d. -b). The project will use the DQP as a degree framework to map the markers for general education outcomes across the general education curriculum.

Several efforts are underway to more clearly define a common set of outcomes for general education within the broader curriculum, it is important to note that current efforts are attempting to better align outcomes with 21st century needs. The incorporation of intellectual skills, or cognitive strategies as defined in this study, within these frameworks demonstrates this effort. The impact on institutional practices has not fully been explored.

Cognitive Complexity

In order to answer the question, "What should students be able to do?" attention must also be given to the depth of learning. The more developed cognitive processes lead to greater depths of knowledge and an ability to apply knowledge in multiple settings. In other words, the greater a student's degree of cognitive development, the greater ability they have to use the knowledge in a variety of settings and with more complex problems (Anderson & Krathwohl, 2001; Cohen, 2010). A students' ability to transfer the knowledge and skills learned today towards tasks in an uncertain future is essential in the emerging knowledge economy.

The concept of cognitive complexity has epistemological roots in constructivist learning (Marzano & Kendall, 2007) and the assumptions of this theoretical frame are that learners make use of prior knowledge and experiences to construct or "make sense" of information (Anderson & Krathwohl, 2001). This method of learning focuses on students as they engage in the cognitive processes needed in order to draw upon previous knowledge, organize knowledge into coherent concepts, and integrate new knowledge in order to construct their own understanding and meaning.

As educational goals have shifted from rote memorization or remembering, to an ability to make use of or transfer knowledge and skills in the future, constructivist learning theory has provided the foundation for the further development of cognitive development models.

Bloom's Taxonomy. One of the most widely known frameworks in post-secondary education for understanding cognitive development is Bloom's Taxonomy, which is a model for classifying cognitive processes into levels of cognitive complexity (Anderson & Krathwohl, 2001). The cognitive levels are often broken down into lower levels (knowledge, comprehension, application) and higher levels (analysis, synthesis, evaluation). The taxonomy was developed under the leadership of Bloom, but the contributors to the model came from a group of college and university examiners who desired a framework for classifying student learning outcomes that would facilitate an easier process to share assessment and test items (Bloom, 1956).

The taxonomy stressed educational objectives, or "explicit formulations of the ways in which students are expected to be changed by the educative process" (Bloom, 1956, p. 26). The Taxonomy provides a continuum for cognitive development in order for educational objectives to be classified. The manner in which this occurs is that each educational objective statement has both a noun and a verb. The noun identifies the knowledge or skill a student is expected to learn and the verb describes the cognitive process (Anderson & Krathwohl, 2001).

Revised taxonomy. While the original Taxonomy has been widely implemented, research in the fields of psychology and education since 1956 have refined understandings of cognitive processes as they relate to educational practice. As a result, the Taxonomy was revised in 2001 in an effort to incorporate current research, update language, and provide realistic examples of how to use the framework in curriculum development, instruction, and assessment. Specific to cognitive complexity, the Taxonomy categories were expanded to promote students ability to transfer, or make use of, what they learned (Anderson & Krathwohl, 2001). The result of this effort led to a renaming and organizing of the levels and the addition of a level; the revisions classify lower levels with (remember, understand, apply) and higher levels (analyze, evaluate, create).

New taxonomy. There are a variety of other frameworks that attempt to help educators understand how to define and measure cognitive complexity. Marzano and Kendall (2007) published a book titled, *The New Taxonomy of Educational Objectives,* and took a different approach than Bloom's Taxonomy. Rather than providing a framework like Bloom's, this work provided a predictive model of cognitive processing. This model is not hierarchical by difficultly, but rather by the way in the order of which the processes are controlled. Marzano and Kendall (2007) proposed that all mental processes can be learned and that thinking (or intellectual skills) should be taught throughout the curriculum. Another distinction from Bloom's is that knowledge is the object of action by mental processes.

The model has three steps of mental processing to gain knowledge: the self-system, the meta-cognitive system, and the cognitive system. The complexity of thinking is tied to the demand placed on consciousness; meaning as demand goes up so does complexity. All tasks start in the self-system where individuals make judgments about engaging in new tasks. This is where motivation, emotional response, and efficacy of the individual influences learning. As the individual decides to take on the task, the meta-cognitive system manages the conscious operations necessary. This includes cognitive strategies to accomplish the task and monitor progress and accuracy.

The cognitive system is then responsible for processing the analytic operations needed to accomplish the task including processing of information, comprehension, making inferences, comparing and classifying knowledge, and knowledge utilization. These are listed in order of demand, hence order of complexity. The use of knowledge is classified into three categories: informative or declarative knowledge, procedural knowledge, and psychomotor or physical (Marzano & Kendall, 2007).

Summary

In summary, the goals of general education in the undergraduate curriculum have been shaped by the expansion of human knowledge, changes in economy, broader access to higher education, and major role in the mission of universities to engage in knowledge creation. By gaining an understanding of the evolution of the curriculum, it becomes clear why there is an elevated role that general education must play in delivering intellectual skills at the deeper level of complexity needed for students to be prepared in the 21st century.

Recent efforts to reform general education by gaining better consensus about the specific outcomes in a common language will assist institutional leaders in planning for and delivering the intended outcomes. Students will also be better informed about the need for general education courses and increase their ability to manage their own learning.

The ability to translate emerging findings about cognition and cognitive development to reform institutional practices will be critical to accomplish the goals of general education. While the most widely used framework is Bloom's Revised Taxonomy, our collective understanding of cognitive processes, and the role of motivation in learning has grown immensely. New frameworks for implementation will need to emerge if higher education is to be successful in providing student learning experiences and assessing deeper levels of complexity.

CHAPTER III

THEORETICAL FRAMEWORKS

The distinction between the subject of knowledge and cognitive process has become essential to identifying way for practices to promote student learning in higher education. Understanding the process of cognitive development is helpful to educators as it allows for the course materials to be structured towards specific outcomes that include intellectual skill development at a defined level of cognitive complexity. Webb (1997) stated, “Ideally cognitive studies would be conducted to delineate in some detail what depth of knowledge is required by an expectation and what mental operations students actually used on the corresponding assessments” (p. 16).

As discussed in the literature review, there is room for better defining what intellectual or cognitive strategies are used to reach commonly defined outcomes and incorporating advances in knowledge about cognitive processes for complexity. This study sought to advance both agendas by using two theoretical models that are closely tied to cognition and cognitive complexity. In this study, the frameworks used were Key Cognitive Strategies (Conley, 2010) to represent intellectual skills and the Novice-Expert Continuum (Baxter & Glaser, 1997; Bransford, Brown & Cocking, 2000; Marzano & Kendall, 2007) to represent cognitive complexity. Each model will be discussed individually with a brief summary of how the two together created the theoretical framework for this study.

Key Cognitive Strategies

The Key Cognitive Strategies (Conley, 2010) were developed over time and as a result of numerous studies on college and career readiness. These five cognitive strategies are employed by college students to monitor, control, and regulate thinking and learning in order to achieve a learning goal. They include problem formulation, research, interpretation, communication, and accuracy. The strategies were developed and validated over time by studying entry-level college courses (Conley, 2003; 2005; 2007; 2010).

The cognitive strategies were developed from three theoretical frames: 1) dispositional-based theory of intelligence; 2) cognitive learning theory and; 3) competency theory (Lombardi, Seburn, Conley & Snow, 2010). The theoretical frames complement each other and are theoretically consistent with the underlying assumptions of constructivist learning (Marzano & Kendall, 2007). The dispositional-based theory of intelligence supports the belief that thinking is not an attribute, but rather a disposition that through increased effort can grow. In partnership with this belief is cognitive learning theory that confirms that thinking, or cognition, is necessary to construct new knowledge (Lombardi, Seburn, Conley, & Snow, 2010).

Cognitive learning theory also includes discussion about the role prior knowledge plays in the construction of new knowledge, and emphasizes that meaningful learning experiences can be created by encouraging and building on what students already know. An important distinction is that prior knowledge is also socially connected as student's previous learning experiences are heavily shaped by social roles such race, gender, and class (Bransford et al., 2000).

Lastly, the strategies are rounded out by competency theory, which also provides a direct connection to the Novice-Expert Continuum that was used in this study. Competency theory suggests that learners can progress from a novice to competent to expert and benefit from instruction in that progression (Baxter & Glaser, 1997). In sum, cognitive strategies are thinking strategies that any person can develop and increase competency for along a continuum.

The five Key Cognitive Strategies are broken down into more specificity by providing two components of each strategy (See Table 1). This format provides an overview of the strategy that might be the focus of a course or a collection of courses while also recognizing there are intricate cognitive skills that must be developed in order to accomplish the strategy.

Table 1
The Key Cognitive Strategies and Component Descriptions

Key Cognitive Strategy	Component	Component Description
Problem Formulation The student demonstrates clarity about the nature of the problem and identifies potential outcomes. The student develops strategies for exploring all components of the problem. The student may	Hypothesize	Formulates a problem statement that demonstrates understanding of the problem and includes one or more plausible hypotheses. Considers purpose and audience when speculating about the problem and potential outcomes.
revisit and revise the problem statement as a result of thinking about potential methods to	Strategize	Considers one or more plausible approaches that could lead to a solution; generates a feasible plan

solve the problem.		of action to implement the approach.
Research The student explores a full range of available resources and collection techniques or generates original data. The student makes judgments about the sources of information or quality of the data, and determines the usefulness of the information or data collected. The student may revisit and revise information collection methods as greater understanding of the problem is achieved throughout this process.	Identify	Considers a full range of appropriate resources and determines how and where to locate available informational material and source data.
	Collect	Makes judgments about available informational material and data sources, considering validity, credibility, and relevance, and collects information and data necessary to solve the problem as formulated.
Interpretation The student identifies and considers the most relevant information or findings and	Analyze	Deconstructs information and data, selects evidence, and uses analytic tools to structure findings or insights. Looks for patterns and

develops insights. To make connections and draw conclusions, the student uses structures and strategies, which contribute to the framework for communicating a solution. The student reflects on the quality of the conclusions drawn and may revisit and revise previous steps in the process.	Analyze	relationships as the basis for developing ideas and insights relevant to the problem and its solution.
	Evaluate	Groups information into useable pieces, connects ideas and supporting evidence, draws conclusions, and reflects on the quality of conclusions.
Communication The student organizes information and insights into a structured line of reasoning and constructs a coherent and complete final version through a process that includes drafting, incorporating feedback, reflecting, and revising.	Organize	Incorporates ideas and supporting evidence purposefully using structures that demonstrate the line of reasoning.
	Construct	Creates a draft, incorporates feedback to make appropriate revisions, and presents a final product that is appropriate for the purpose and audience.
Precision and Accuracy The student is appropriately precise and accurate at all	Monitor	Determines and applies standards for precision and accuracy appropriate to the subject area

stages of the process by determining and using language, terms, expressions, rules, terminology, and conventions appropriate to the subject area and problem.	Monitor	throughout the task.
	Confirm	Assures that the final product meets all discipline-specific standards for precision and accuracy in language, terms, expressions, rules, terminology, and conventions.

Note. Retrieved from Conley, 2010

The literature on expected general education outcomes calls for students to be able to "solve complex problems" and "think critically" but fails to break down the intellectual or cognitive skills needed to achieve these outcomes (Hart, 2009; Hart, 2013). Therefore, the Key Cognitive Strategies provide a meaningful contribution to defining the specific cognitive strategies that must be employed to demonstrate an ability to think critically or solve problems.

Novice-Expert

Bransford, Brown, and Cocking (2000) have written about how people learn and the characteristics of how experts use knowledge and execute cognitive strategies. Additionally, Gagné, Yekovich, and Yekovich (1993) provided a framework for the types of knowledge use. In summary, there are three categories that provide a framework for understanding what experts are able to know and do with knowledge. As a reminder, knowledge is acted upon through the use of cognitive strategies and as more expertise in the strategy is developed, students are able to perform more complex cognitive tasks with less demand on consciousness to make use of knowledge (Marzano & Kendall, 2007).

The type of knowledge use will imply a certain level of complexity. Declarative knowledge is defined by knowing specific details but not necessarily within a context and is likened to recall or memorization, while procedural knowledge is defined by knowing how to perform a specific protocol or process. As learning continues to move forward in complexity, conditional knowledge is understanding when to use knowledge or protocols, and conceptual knowledge is the ability to recognize when to use knowledge and justify why that was the best decision (Gagné, Yekovich, & Yekovich, 1993).

Knowledge organization, integration, and concept formation describes the ability to notice and recognize meaningful patterns of information and organize that information by concepts. For novice students, they may have disparate facts of information and not recognize the patterns that exist or how to place them into conceptual understandings. While more expert students will be able to place new facts and knowledge into subject area concepts, know when to apply them, and be able to contribute novel contributions to build on the subject (Bransford, Brown, & Cocking, 2000).

Flexibility of retrieval and use in new situations with little attentional effort is also the mark of an expert as little consciousness is required for the person to retrieve and access knowledge. For a novice, knowledge is very context specific and as complexity grows the student is able to connect information to multiple settings conceptually until this becomes intuitive (Bransford, Brown, & Cocking, 2000).

The Key Cognitive Strategies and Novice-Expert Continuum in Practice

The theoretical underpinnings of the Key Cognitive Strategies and Novice-Expert Continuum research demonstrate a comprehensive way to measure intellectual skills and cognitive complexity since both frameworks are based on the latest understandings of how people think and learn. A relevant example using these frameworks further illustrates their application for the purposes of this study. The Key Cognitive Strategies of Analyze and Evaluate may be needed to complete one aspect of problem solving; this could simply mean solving an equation put in front of them absent of any context. For instance, this is commonly seen on a math exam where students are instructed to solve for "x." Using Analyze and Evaluate KCS's to procedurally solve an equation in this way would be considered a lower level of complexity. The student is not given the opportunity to develop the KCS's for use at more complex or expert level.

The type of complex problem solving that the world demands today requires students not only know how to procedurally solve the equation, but also be able to define a problem, devise a strategy to solve the problem using the equation, gather any information or materials needed, and construct a solution; all while maintaining awareness of how precise and accurate they are in the process. One can quickly see how a collection of strategies at a high level of complexity would be needed to meet the outcome of being able to solve complex problems. By using the Key Cognitive Strategies and Novice-Expert Continuum in tandem, the specific intellectual skills and level of complexity can be better defined, measured, and assessed in general education curriculum.

Institutional Practice

To study outcomes and opportunities to learn in the curriculum, it was important to explore teaching practices that would match with the different levels of novice and expert learning experiences. Novices are more likely to search for formulas and recall facts. Experts will begin their exploration of knowledge by developing an understanding of the problem and thinking in terms of core concepts or big ideas. Providing learning experiences that engage students from novice as they learn new facts and information in the subject area to a more expert level requires attention to work product expectations, directions, and demand on cognitive activity or consciousness.

Bransford, Brown, and Cocking (2000) explained,

> In open situations, explicit directions are minimized; students are expected to generate and carry out appropriate process skills for problem solution. In process-constrained situations, directions can be of two types: step-by-step, subject-specific procedures given as part of the task, or directions to explain the process skills that are necessary for task completion. (p. 144)

An example of an expert level learning opportunity from math would include asking students to not only solve problems with standardized equations and proofs, but also to build arguments, frame solutions, and provide justification for why the procedures apply.

The most identifiable evidence of institutional practices to provide learning opportunities for students can be found by examining course syllabi. These documents have served as the major communication tool for outlining institutional practices in designing course content, learning activities, assessment, and outcomes. The word syllabus comes from the Greek word *sittyba* and use in the academic setting began in the 18th century to describe the topics for a series of lectures (Snyder, n.d. -b).

The modern conception of course syllabi emerged in the 20th century and often includes: course title and number, required texts and reading assignments, outline of class meeting topics, policies, graded assignments and due dates, and professor contact information (Davis, 1993). Several books and articles have demonstrated the importance of course syllabi to communicate course outcomes and assignments. Syllabi serve as the "contract" between faculty and students (Altman & Cashin, 1992; Davis, 1993; Lowther, Stark, & Martens, 1989; Rubin, 1985). In addition, course assignments or work products are often described in the course syllabus or in written form to the student.

As it would be difficult and costly to individually assess each student's cognitive ability at the thousands of colleges and universities in the United States, Webb (1997) suggested, "A more realistic analysis would be to seek some expert help and conduct a content analysis using verbs and their objects to judge the match between expectations and assessments" (p. 16).

CHAPTER IV

METHODOLOGY

The purpose of this study was to examine the goals of general education in the context of institutional practice to determine if the goals of general education are being met and if they are being met, determine the level of cognitive complexity. The specific research questions for the study were:

1. Are learning goals or statements in general education curriculum communicated to students in course syllabi?
2. Across the general education curriculum, what evidence of intellectual and practical skills is found in course syllabi and work products?
3. What is the cognitive complexity of the intellectual and practical skills found in course syllabi and work products across the general education curriculum?
4. What evidence of intellectual and practical skills is found in course syllabi and work products by subject areas in general education curriculum?
5. What is the cognitive complexity of the intellectual and practical skills found in course syllabi and work products by subject areas in general education curriculum?

Data Source

The source of data for use in this study was an extant data set from a study conducted by the Educational Policy Improvement Center (EPIC). The data are from a study called *Reaching the Goal: The Applicability and Importance of the Common Core*

State Standards to College and Career Readiness and the purpose was to "define the knowledge and skills students should achieve in order to graduate from high school ready to succeed in entry-level, credit-bearing academic college courses…" (Conley, Drubbmond, Gonzalez, Rooseboom, & Stout, 2011, p. 3)

The original sampling technique used in the study was maximum variation sampling (Maxwell, 2005). This technique identifies "the dimensions of variation in the population that are most relevant to your study and systematically selecting individuals or settings that represent the most important possible variations on these dimensions." In *Reaching the Goal*, the identified dimensions of variation were academic subject areas and type of higher education institution. These two factors are most relevant to understanding entry-level courses in colleges and universities. This sampling method resembles stratified random sampling by using the subject area and type of institution as the stratifications, except the final selection of participants is purposeful rather than random. The specific sampling procedures are explained below.

The *Reaching the Goal* study required the identification of academic subject areas before entry-level courses could be identified. In order to do so, the National Center for Educational Statistics (2009) report, *The Condition of Education 2009 in Brief,* section titled "Undergraduate Fields of Study" was reviewed to determine the subject areas (i.e. science, English) most common in attaining a bachelor's degree. Once the subject areas were defined, the most common entry-level, credit-bearing courses were identified within each area. Table 4 provides description of the content areas and courses.

Table 2
Common Content and Entry-Level, Credit-Bearing Courses

Content Area	Common Courses
Science	Biology
	Chemistry
	Physics
	Anatomy and Physiology
Mathematics	College Algebra
	Calculus
	Statistics
Social science	Introduction to Economics
	Introduction to Psychology
	Introduction to Sociology
	U.S. History
	U.S. Government
English language arts	Composition I
	Composition II
	English literature

Next, college level instructors were identified for participation due to teaching a course in the categories listed. To ensure the sample was representative of United States higher education institutions, The Carnegie Classification of Institutions of Higher Education listing of 3,468 institutions that offered associate and undergraduate degrees in Spring 2009 was used. From that list, the names of institutions were placed on lists for each subject area and randomly sorted. Then, in the order now listed under each content area, academic leaders such as deans, provosts, and department chairs were contacted via email and telephone and asked to participate. If they agreed to participate, the academic leader was then asked to provide the name, course, and contact information, (via a secure web-based form) for instructors having recently taught a course or courses in that content area. For example, in the science category the department head for the biology department was contacted and asked to provide the name of a biology instructor.

As academic leaders responded affirmatively, the Carnegie classification of the institution was noted and adjustments made down the contact list to ensure that institution size, public or private, and two-year or four-year designations were represented as fully in the sample as they occur on the original Carnegie list. This resulted in institutions being moved up on the contact list to ensure that the sample was representative of the various types of institutions at the same percentages as they occur.

The third phase produced the data that will be used in this study. Nominated instructors were contacted and asked to participate in a survey about the entry-level, credit-bearing course taught. As part of the survey, instructors were required to submit at least one syllabus and encouraged to upload additional documents for the course such as assignments, tests, and quizzes. Documents could be uploaded in various Microsoft Word, Rich Text, and Portable Document Format (.doc, .docx, .rtf or .pdf). Prior to upload, instructors were encouraged to remove any identifying information from the document.

Study sample. A total of 1,485 course documents were scored in the study. This number was reached after the documents used in the independent scoring rounds were removed, as well as 23 documents that were either duplicate, blank, or password protected. The number and percentage of documents by type (syllabus or work product), by subject area, and by geographic region and campus size can be found in Tables 5 and 6 below.

Table 3
Study Sample Course Documents by Type and Subject Area

		Subject				
		English	Math	Science	Social Science	Total
	Syllabus	185	172	225	260	842
	Work Product	164	162	128	189	643
Total		349	334	353	449	1485

Table 4
Study Sample Types of Institutions by Carnegie Size and Geographic Region Classification

		Carnegie Campus Size Classification						
		Very Small	Small	Medium	Large	Special Focus	Very Large	Total
Carnegie	East	4	5	18	5	2	0	34
Geographic	Midwest	2	7	22	18	1	0	50
Regions	South	0	12	20	21	0	1	54
	Southwest	1	2	12	7	0	0	22
	West	3	6	6	17	0	0	32

	Total		10	32	78	68	3	1	192
Private	Carnegie	East	6	40	17	3	8	0	74
	Geographic	Midwest	19	49	12	1	9	0	90
	Regions	South	23	36	10	3	12	0	84
		Southwest	9	14	3	1	2	0	29
		West	8	13	9	1	7	0	38
	Total		65	152	51	9	38	0	315
Total	Carnegie	East	10	45	35	8	10	0	108
	Geographic	Midwest	21	56	34	19	10	0	140
	Regions	South	23	48	30	24	12	1	138
		Southwest	10	16	15	8	2	0	51
		West	11	19	15	18	7	0	70
	Total		75	184	129	77	41	1	507

The final sample documents represented the diversity of institutions across the United States with 507 campuses total. In the year the course documents were collected (2009), there were 2,292, four-year institutions of higher education that offered undergraduate education. A 10% margin of error at 99% confidence would require a sample size of 155 institutions. A 5% margin of error at 99% confidence would require a sample size of 516 institutions.

Research Design

Content analysis is a technique that allows the researcher to study the phenomena in an unobtrusive manner through the analysis of communications (Fraenkel & Wallen, 2006). Communications can include text data such as meeting minutes, publications, website materials, email, and letters.

Content analysis was selected as the most appropriate technique to analyze institutional practices as outlined in course documents for cognitive strategies and cognitive complexity. This study utilized directed content analysis, which is guided by theoretical understandings and existing research. The purpose is to extend or support existing theories and data analysis with coding categories defined based on theoretical concepts (Hsieh & Shannon, 2005). The theoretical concepts for this study are the Key Cognitive Strategies and Novice-Expert Continuum.

Scoring Guide. In content analysis, the ability to develop a coding scheme is critical to the validity and reliability of the study. The scoring guide was developed based on the theoretical frameworks Key Cognitive Strategies (KCS) and the Novice-Expert Continuum. The researcher began by examining the theoretical frameworks and constructing specific definitions for each KCS and for each level of the Novice-Expert Continuum (Miles & Huberman, 1994).

Then, a random set of syllabi was pulled from university websites and examined within the context of the frameworks. Bogdan and Biklen (2007) supported the use of building the guide based on data so that abstractions were built as the particulars emerged. The use of random syllabi informed the researcher as to what type of evidence might be found in course documents and how that evidence would correspond with the theoretical definitions. First, evidence of the Key Cognitive Strategies was selected, and then matched with a level of the Novice-Expert Continuum. This process informed the first iterations of the scoring guide.

Once the scoring guide was well formed, the researcher conducted a developmental pilot with 49 course syllabi representing English, math, social science and science sampled from a random collection of university websites. This allowed the researcher to better define the scoring guide and expand it by providing examples of evidence for each Key Cognitive Strategy and Novice-Expert Continuum level, as well as create important decision rules to guide the coders. The scoring guide was developed with both manifest and latent evidence in mind. The manifest content was information that was directly accessible to the researcher without inference, and latent content required an assessment of the underlying meaning the purpose or statement in the course syllabi (Fraenkel & Wallen, 2006).

An example of a decision rule that was created during this phase was to determine how to handle supplemental courses (i.e., labs, discussion groups) and extra credit. Since these items are outside the activities of the specific course, the researcher decided to score extra credit and supplemental courses separately.

While the complete scoring guide can be found in the Appendix, a summary of the criteria defined for Key Cognitive Strategies and Novice-Expert Continuum levels is provided below.

Key cognitive strategies. Building on the five Key Cognitive Strategies (Conley, 2010) and based on the developmental pilot, some language was altered to provide the scorers more direction regarding the type of evidence and activities found in course documents that would support the strategy. The following are the definitions of each KCS as used in this study:

- Hypothesize- Identify and clarify the nature of the problem or topic of significance and create a meaningful representation. Form a problem statement or hypothesis.
- Strategize- Determine strategies and next steps to investigate the problem, proposed hypothesis, or topic of significance.
- Identify - Determine how and where to locate valid and reliable references and data not already identified. Creating systematic search methods.
- Collect- Collect references and data not already identified and determine what is necessary, valid, and reliable in order to solve a problem or answer a question. Resources must be listed and relevant to the problem and subject area.
- Analyze- Analyze information and data by deconstructing the problem into parts, recognizing patterns, connecting relationships.
- Evaluate- After analysis, prioritize findings in support of a conclusion or solution.
- Organize- Create an organizational structure to provide justification and coherent explanation of conclusions. This includes using findings, providing supporting evidence, and demonstrating a line of reasoning for conclusions.
- Construct- Prepare a work product to demonstrate learning. This can include providing drafts of work for feedback revisions until a final product is ready.
- Monitor- Monitor utility of strategies and attention to subject area details. Use defined standards, conventions, and rules from a subject area to complete tasks

(such as the American Psychological Association, Modern Language Association, and Analytical Chemistry Standards).

- Confirm- Self-confirm for technical accuracy, grammar, work product directions, and requirements. Adjust, recalibrate, or edit drafts as needed.

Novice-expert continuum. The Key Cognitive Strategies can be placed on a continuum depending on the level of thinking the student is asked to demonstrate when using the strategy. The Novice-Expert Continuum provides a model for the progression of student thinking from novice to expert, and allows for the determination of the level of complexity for which the student is being asked to use the key cognitive strategy (Baxter & Glaser, 1997; Bransford, Brown & Cocking, 2000). The specific definitions developed for each Novice-Expert level and the number given to score complexity is provided below.

1) Novice- Use of knowledge is declarative as students know subject-specific facts and information (separate facts, not arranged by concepts, principles). Knowledge is context specific. No evidence of ability to recognize patterns, integrate, or connect information.
2) Accomplished Novice- Procedural use of knowledge is focused on how to use subject-specific facts, information, and procedures. Follow directions and place facts into predetermined concepts and equations. Able to use equations and processes. Knowledge is context specific and as encounter new facts, searches for subject-specific formula or process to fit the new situation. Notices patterns of meaningful information/data in a specific setting.

3) Strategic Thinker- Uses knowledge conditionally by knowing when to use the facts, information, process. Incorporate subject area core concepts, laws and principles to know when to use equations and processes. Can easily connect information within the subject area and describe when to use. Notices similarities between multiple patterns of information/data.
4) Emerging Expert- Beginning to use conceptual knowledge including why to use the facts, information, processes. Uses principles and concepts to organize and explain evidence, problem solving, and solutions. Begins to use information and knowledge in multiple settings and explain why it can be used in a different setting or subject area. Notices similarities and differences between multiple patterns of information/data from different settings.
5) Expert- Use knowledge conceptually as the student knows why and the conditions to use the facts, information or process. Ability to contemplate and organize new evidence within subject related theories, principles, or laws to contribute novel ideas to subject-area knowledge. Uses knowledge in multiple settings and subjects and explains why. Intuitively starts problem solving at a higher level, across subjects, with ease. Keen and sensitive recognition of multiple patterns of meaningful information/data from different settings.

Content Expert Review. Content experts were consulted in the development of the scoring guide to address interpretive validity, descriptive validity, and generalizability. Content experts are defined for the purpose of this study as academic leaders responsible for general education curriculum and student learning assessment.

Four content experts reviewed the scoring guide and provided feedback. Their backgrounds were: 1) a current higher education faculty member who was a former Director of Institutional Research and was responsible for learning outcomes assessment, 2) a dean of undergraduate studies responsible for overseeing general education curriculum, 3) an associate provost of undergraduate studies responsible for overseeing general education curriculum and assessment, and 4) a researcher at a policy center with experience conducting content analysis on course syllabi.

The researcher explained the content expert role to each expert and provided prompts about the content validity of the scoring guide, meaning the extent to which the measure reflects the full domain of the concepts being measured in the setting that they occur. Content experts were provided with the scoring guide, questions about each of the theoretical models (Key Cognitive Strategies and Novice Expert Continuum), and specific questions about the validity of applying the models to general education curriculum.

The content experts all agreed that the Novice Expert Continuum was a valid way to determine the complexity of Key Cognitive Strategies, and that the strategies were a part of the goal of general education curriculum. Additional feedback from the experts was incorporated into the scoring guide. One of the most influential aspects of the review on the scoring guide was the incorporation of evidence that may not be as influenced by traditionally positivist disciplines. It was important to acknowledge the ways in which various disciplines interact with the world and how those interactions could produce different types of judgments. This included clarifying the language in the Key Cognitive

Strategies to include evidence that may not appear in the traditional written form such as videos, posters, and various forms of art.

Expert Scorers. Procedures were put in place to ensure the scoring procedures were reliable, yielding the same results time after time and that more than one individual could use the scoring guide to produce similar results. Two faculty scorers and the researcher conducted independent scoring of a subsample of the course documents, followed by convergent consensus meeting before the research conducted analysis for the study. The process of selecting and training the faculty scorers is described below.

Selection of Expert Scorers. The purpose of the two scorers in the study was to test the inter-coder reliability in the pilots of the scoring guide and during study scoring. The researcher selected scorers who are considered experts and work directly with general education curriculum. During the first pilot, both scorers were faculty members with one responsible for teaching history and math general education courses. Unfortunately, due to campus time constraints, both faculty had to step down from the study. Two new coders were selected for their expertise in overseeing general education curriculum and assessment. One was a professor of history and Associate Dean for Academic Affairs while the other is the Associate Vice President for Academic Policy and Assessment with degrees in mathematics and education.

Scorer training. Training of the faculty scorers involved two, in-person meetings totaling six hours. Topics covered during training included the theoretical concepts underpinning the scoring criteria, review of the scoring guide and scoring logistics, and practiced as a group scoring 15 documents. Training also reviewed the protocol to control for scoring fatigue as coders were instructed to score in 30-minute increments with at least a five-minute break between. The faculty scorers were compensated monetarily for their scoring by estimating the number of hours they would spend scoring the documents.

Convergent Consensus Process. Consensus is a useful way to review pilot findings and create additional consensus to be documented in the scoring guide to enable the scorers to reach the same level of reliability (Neuendorf, 2002). The Delphi Technique, developed by the Rand Corporation in the 1950's, is a widely accepted method for consensus building with experts to correlate informed judgments on a topic and to seek out information which may generate consensus (Hsu & Sandford, 2007).

The technique is a controlled feedback process that is conducted in rounds where each participant shares their position on a topic. A summation of the opinions is provided back to the group and a statement of position is formed which gives each participant an opportunity to generate additional insights and clarify the statement (Hsu & Sandford, 2007). A key feature of the technique is that each participant should feel free to confirm to another participant's opinions and all are given an opportunity to reach consensus or disagree.

Informed by the novice-expert model in this study, a hallmark of expert thinking is the ability to analyze artifacts at a sophisticated level and make judgments. The reason experts are utilized in scoring is that they are able to make evidenced based decisions on areas of disagreement. As experts engage in the scoring process and review scoring using the consensus process, the researcher can have stronger confidence that the agreements reached by the experts are reflective of the evidence found in the documents. This process has been applied to curriculum studies conducted by the Educational Policy

Improvement Center (2013) in the National Assessment of Educational Progress Grade 12 Preparedness Research Project.

Traditional analysis methodology is focused on increasing inter-rater reliability and gaining consistent scores. This emphasis on reaching the highest levels of inter-rater reliability can also become a limitation, as the desire to reach higher levels of reliability can lead to an overly prescriptive scoring guide. This requires less interpretation by the scorer and does not capitalize on the value of experts to interpret. In an effort to achieve higher reliability, the validity of the models may be jeopardized or evidence may not be scored. This would also defeat the purpose of providing experts from three distinct disciplines to judge evidences and come to consensus, strengthening the judgment.

Within the constraints of the resources available for this study, the scoring methodology reflects the convergent consensus process. However, the use of inter-rater reliability is also calculated to honor traditional means of understanding agreement.

Independent scoring. To create a subsample of the course documents, the researcher determined the number of documents needed to represent the percentage of course documents by subject area for each pilot. In the first pilot, two percent was needed while in the second pilot five percent was needed. All course documents were assigned random numbers and sorted, with the required number of documents in each subject area selected. The documents were then combined and grouped by subject and by course to ensure that scoring was conducted by subject and then by all documents for one course. Scorers were given the same documents to score.

The principle researcher and two faculty scorers performed the first round of independent scoring with a random selection of two percent (n = 33) of the documents.

As previously mentioned, these two faculty coders had to step down from the study due to time commitment. Therefore, the first round of independent scoring was duplicated with the new scorers with a random sample of two percent (n = 33) of the course documents. Following the first round of scoring, additional conversations were held on the areas where scorers showed the least agreement. Additionally, the researcher had follow up conversations with the scorers on the areas where there was significant disagreement. In the second round of independent scoring, a total of five percent (n = 80) of the course documents were scored to allow the scorers to gain more experience scoring course documents using the scoring guide.

The implications of the second round of independent scoring were that the Novice-Expert Continuum score between level 1 Novice and level 2 Accomplished Novice was almost always adjacent to each other, meaning the scorers found it difficult to discern evidence between the two levels consistently. The decision was made to collapse these levels in analysis as one level called Novice.

Consensus meeting. A three-hour, in person consensus meeting was held. To facilitate this technique with the faculty coders and the principle researcher, an outside facilitator was hired to lead the meeting to ensure all scorers could participate fully. The facilitator created meeting iterations by reviewing each key cognitive strategy, highlighting areas of disagreement, asking each coder to share expert judgments, summarizing feedback, and recording the decisions of the group. While the goal is to reach consensus, the facilitator’s role was not to force the group to reach consensus; rather it was to ensure the collective expertise of the scorers was used to strengthen the results.

During this process, the scorers reached consensus as a group on each scoring decision. The facilitator documented the summary of feedback and decisions for the principle researcher. As a result, further clarity was gained and then added to the scoring guide for use in study scoring and back scoring by the faculty scorers.

Inter-coder reliability coefficient. Common reliability test statistics were reviewed to consider the most appropriate reliability coefficient for the study. Since the data were ordinal and multiple scorers used, the most appropriate statistic was Krippendorf's *alpha* (Neuendorf, 2002), which was used to test inter-coder reliability and provide a reliability coefficient for the pilots and study. Krippendorf's *alpha* takes into account agreement, chance agreement, and the magnitude of disagreements between coders. A kAlpha coefficient was prepared for each variable using SPSS.

During round one of independent scoring two percent (n = 33) of the documents were coded, and during round two, five percent (n = 80) of the documents were coded. During the study, the two faculty scored five percent (n = 80) of the course documents. The results of these statistical tests for the pilot and the study back scoring are in Table 2 below. Krippendorff (2004) applied a .800 standard for reliability, with .667 being recommended as sufficient.

Table 5
Inter-coder Reliability Coefficient Results Learning Goals

	Independent Scoring 1	Independent Scoring 2	Study
	kAlpha	kAlpha	kAlpha
Learning Goals	n/a	.91	.95

Table 6

Inter-coder Reliability Coefficient Results KCS Evidence Only

KCS	Independent Scoring 1	Independent Scoring 2	Study
	kAlpha	kAlpha	kAlpha
Hypothesis	.09	.35	.39
Strategize	.10	.44	.46
Identify	-.10	-.08	.34
Collect	-.16	.38	.31
Analyze	.13	.23	.24
Evaluate	-.02	.27	.32
Organization	-.04	.61	.53
Construct	-.10	.04	.48
Monitor	-.04	.78	.23
Confirm	-.05	.65	.44

Table 7

Inter-coder Reliability Coefficient Results KCS Novice-Expert Score

KCS	Independent Scoring 1	Independent Scoring 2	Study
	kAlpha	kAlpha	kAlpha
Hypothesis	.04	.33	.32
Strategize	.05	.42	.38
Identify	-.06	.48	.33
Collect	-.03	.37	.33
Analyze	.003	.21	.43
Evaluate	-.05	.24	.34
Organization	.02	.59	.40
Construct	-.08	.07	.37
Monitor	-.03	.78	.28
Confirm	-.06	.61	.52

Focusing on the kAlpha for the study documents scored by all three coders, the only variable where agreement was reached at a significant level was if the course syllabus had learning goals or statements.

To understand if the low levels of agreement were isolated to one or more scorers, kAlpha was calculated in pairs of scorers for the study. The result are below in Table 3 and show that significant levels of reliability were reached with scorers 2 and 3, while scorer 1 showed consistent disagreement with the other two scorers. This would traditionally mean that scorer 1 should be retrained or removed from the study (Neuendorf, 2002).

Table 8
Inter-coder Reliability Coefficient Results Between Coders

	Scorer 1 and Scorer 2	Scorer 2 and Scorer 3	Scorer 1 and Scorer 3
Learning Goals or Statements	.96	.96	.92
Hypothesis	.30	.56	.01
Strategize	.41	.54	.12
Identify	.27	.63	.08
Collect	.30	.58	.13
Analyze	.47	.47	.21
Evaluate	.50	.34	.16
Organization	.40	.52	.25
Construct	.24	.72	.14
Monitor	.49	.37	-.06
Confirm	.66	.55	.29

The test of reliability was more favorable; however, not at the desired level of reliability. Given time constraints of the study timeline, additional training, securing additional scorers, or holding another consensus meeting was not possible. In looking back, it would have been better to hold consensus meetings after each round of independent scoring. Due to busy schedules and limited funds to pay scorers, training and consensus meetings were not as lengthy as they could have been. In the future, more time in training for the scorers and additional consensus meetings might have improved the inter-rater reliability. The results of the inter-rater reliability will be a limitation to the generalizablility of the results for all the variables except "learning goals and outcomes."

Data Analysis

The researcher conducted the scoring of course documents for the study by scoring subject-by-subject and course-by-course; meaning all the documents for one subject and one course were scored before moving to the next. Each course document had an assigned document number. Using the scoring guide, the researcher analyzed the document for evidence of a Key Cognitive Strategy. If evidence of a KCS was found, then a score on the Novice-Expert Continuum was given. If evidence of a KCS was found one or more times, the KCS was given a score for the highest level expected.

As each course document was scored, information was entered into an online survey for ease of data collection and analysis. Once all documents were scored, the scoring data was downloaded in excel and combined with identification variables such as geographic region and campus size. The document was then loaded into the Statistical Package for Social Sciences (SPSS) software program in preparation for analysis.

The first analysis of the data was focused on evidence of learning goals or outcome statements. A cross tabulation of and Chi-square test of independence was conducted to determine if the evidence of learning goals or outcomes was significant by subject area. The second analysis was conducted to provide a broad view of the Key Cognitive Strategies and Novice-Expert Continuum levels covered by general education curriculum. Descriptive analysis provided the frequency of KCS evidence found across the curriculum. A Chi-square test for goodness of fit was then conducted to determine if the frequency of the evidence found was related to the strategies.

The third round of analysis was conducted by subject area with the frequency of the Key Cognitive Strategies and Novice-Expert Continuum score required by subject area (i.e. mathematics, biology) was examined. A Chi-square test for independence was conducted to determine if the distribution of KCS and complexity were the same across the subject areas.

Summary

The methodology of this study utilized content analysis methodology to create a scoring guide by which course documents could be examined for evidence of Key Cognitive Strategies along the Novice-Expert Continuum. Content experts examined the scoring guide for content validity while two faculty scorers were employed to test the reliability of the scoring guide. The inter-rater reliability coefficient was significant for learning goals or statements, but not significant for each of the Key Cognitive Strategies, Novice-Expert Continuum score.

Due to time constraints, the researcher had to continue with the study and employed the two faculty to conduct back scoring during the study to test reliability. The sample consisted of 1,485 course documents that were scored by the principle researcher according to the scoring guide. The inter-rater reliability coefficient results for the back scoring were still significant for learning goals or statements, but not for the Key Cognitive Strategies, Novice-Expert Continuum score. Descriptive analyses were conducted with the study data to determine findings.

CHAPTER V

RESULTS

This chapter provides results generated from the analysis of the scoring of the course documents. The results will be reported by corresponding research questions and provide better insight into the current institutional practices in general education.

Learning Goals and Statements

Course syllabi are created to establish course expectations and learning priorities. Therefore, the first question in this study is to understand if course syllabi provide students with learning goals or statements. During scoring, the researcher looked for evidence and scored each syllabus with a yes or no. A learning outcome statement was defined in the scoring guide as a, "Sentence that describes the knowledge, skills, attitudes and habits of the mind that students should gain as a result of the learning experience." In addition, the scoring guide defined learning goal statements as, "Goals that broadly describe what students will learn as a result of the class [and] are often contained in a section of the syllabus titled learning goal statement. These are typically in paragraph form and do not give as specific of information as an outcome statement, but often contain an action verb and broad observable behavior."

The results were that many (n = 602) of the course syllabi did communicate learning goals or statements to students. However, there were still a large number (n = 240) that did not provide any learning goals or statements.

Table 9

Learning Goals by Subject Area

		Does the syllabus have learning goals or statements?		Total
		Yes	No	
Subject	English	142 (77%)	43 (23%)	185
	Math	117 (68%)	55 (32%)	172
	Science	140 (62%)	85 (38%)	225
	Social Science	203 (78%)	57 (22%)	260
Total		602 (72%)	240 (28%)	842

To determine if the frequency of the evidence of learning goals found was related to the subject area, a Chi-squared test for independence was performed. The results indicate that the frequency of learning goals or statements was related to subject area, χ^2 (3, N = 842) = 18.551, $p < .001$. While learning outcomes and goals could be better communicated across general education curriculum, this finding is especially particular for the subject areas where a large percentage of syllabi did not include learning goals or statements (Science = 38%, Math = 32%).

Cognitive Skills and Complexity in General Education Curriculum

The second and third research questions in the study were designed to understand the Key Cognitive Strategies in context of the entire general education curriculum. This broad view of the curriculum demonstrates what evidence of Key Cognitive Strategies and the level of complexity for those strategies are fostered across the curriculum. Below you will see that evidence of all Key Cognitive Strategies was found in the curriculum (See Table 8). The amount of evidence found varied by strategy with analyze (84%) and evaluate (86%) found the most frequently. The strategies with the highest percentages where no evidence of the strategy was found were identify (83%), collect (82%), hypothesize (81%), and strategize (79%).

While there were four levels of complexity (Novice, Strategic Thinker, Emerging Expert, and Expert), there was no evidence in the course documents of strategies at the Emerging Expert or Expert levels. There were a small number of strategies used at the Strategic Thinker level, with only six percent of the scores for analyze and evaluate, and no more than two percent for all the other strategies. From the course documents analyzed, there was not enough evidence in the course documents analyzed to support a conclusion that general education curriculum fosters the development of intellectual skills beyond a Novice level.

Table 10
Frequency of Key Cognitive Strategy and Novice-Expert Score

Key Cognitive Strategy	Complexity	Total	Percent	Chi-Square Results
Hypothesize	Novice	265	18%	χ^2 (2, *N*= 1485) = 1557.248, p < .001
	Strategic Thinker	22	1%	
	Emerging Expert	0	0%	
	Expert	0	0%	
	No Evidence	1198	81%	

Strategize	Novice	293	20%	χ^2 (2, *N*= 1485) = 1459.507, p < .001
	Strategic Thinker	21	1%	
	Emerging Expert	0	0%	
	Expert	0	0%	
	No Evidence	1171	79%	
Identify	Novice	232	16%	χ^2 (2, *N*= 1485) = 1666.574, p < .001
	Strategic Thinker	26	2%	
	Emerging Expert	0	0%	
	Expert	0	0%	
	No Evidence	1227	83%	
Collect	Novice	236	16%	χ^2 (2, *N*= 1485) = 1650.558, p < .001
	Strategic Thinker	26	2%	
	Emerging Expert	0	0%	
	Expert	0	0%	
	No Evidence	1223	82%	
Analyze	Novice	1160	78%	χ^2 (2, *N*= 1485) = 1361.903, p < .001
	Strategic Thinker	89	6%	
	Emerging Expert	0	0%	
	Expert	0	0%	
	No Evidence	236	16%	
Evaluate	Novice	1158	78%	χ^2 (2, *N*= 1485) =
	Strategic Thinker	89	6%	

	Emerging Expert	0	0%	1354.453, p < .001
	Expert	0	0%	
	No Evidence	238	16%	
Organize	Novice	965	65%	χ^2 (2, *N*= 1485) = 896.339, p < .001
	Strategic Thinker	23	2%	
	Emerging Expert	0	0%	
	Expert	0	0%	
	No Evidence	497	34%	
Construct	Novice	969	65%	χ^2 (2, *N*= 1485) = 903.968, p < .001
	Strategic Thinker	23	2%	
	Emerging Expert	0	0%	
	Expert	0	0%	
	No Evidence	493	33%	
Monitor	Novice	619	42%	χ^2 (2, *N*= 1485) = 790.194, p < .001
	Strategic Thinker	4	0%	
	Emerging Expert	0	0%	
	Expert	0	0%	
	No Evidence	862	58%	
Confirm	Novice	825	56%	χ^2 (2, *N*= 1485) = 751.531, p < .001
	Strategic Thinker	7	1%	
	Emerging Expert	0	0%	
	Expert	0	0%	

No Evidence	653	44%

To determine if the differences in the frequency of evidence found between strategies was statistically significant, a Chi-square goodness of fit test was conducted. The results of the test can be found in Table 8 and the difference in scores between the strategies was statistically significant.

Cognitive Skills and Complexity in Subject Areas

While an overview of the entire curriculum provided valuable insights, given that the results of the Chi-square test to determine if the learning goals and statements were related to subject area was significant, the ability to analyze key cognitive strategy results by subject area would deepen the understanding of how the strategies were fostered within each subject area. Table 9 provides the frequency of evidence and Chi-square test results for each Key Cognitive Strategy.

Table 11
Key Cognitive Strategies by Subject Area

Subject	Novice	Strategic Thinker	Percent Evidence	No Evidence	Percent No Evidence	Chi-Square Results
Hypothesize						
English	156	4	46%	189	54%	χ^2 (6, N= 1485) =
Math	9	0	3%	325	97%	277.533, p < .001
Science	21	3	7%	329	93%	
Social Science	79	15	21%	355	79%	

Hypothesize Total		287	19%	1198	81%	
Strategize						
English	170	4	50%	175	50%	χ^2 (6, N= 1485) =
Math	11	0	3%	323	97%	291.197, $p < .001$
Science	28	3	9%	322	91%	
Social Science	84	14	22%	351	78%	
Strategize Total		314	21%	1171	79%	
Identify						
English	110	5	33%	234	67%	χ^2 (6, N= 1485) =
Math	8	1	3%	325	97%	136.166, $p < .001$
Science	39	3	12%	311	88%	
Social Science	75	17	21%	357	79%	
Identify Total		258	17%	1227	83%	
Collect						
English	110	5	33%	234	67%	χ^2 (6, N= 1485) =
Math	12	1	4%	321	96%	126.751, $p < .001$
Science	39	3	12%	311	88%	

Social Science	75	17	21%	357	79%	
Collect Total		262	18%	1223	82%	
Analyze						
English	283	17	86%	49	14%	χ^2 (6, *N*= 1485) = 45.537, p < .001
Math	260	23	85%	51	15%	
Science	259	7	75%	87	25%	
Social Science	358	42	89%	49	11%	
Analyze Total		1249	84%	236	16%	
Evaluate						
English	283	17	86%	49	14%	χ^2 (6, *N*= 1485) = 45.259, p < .001
Math	258	23	84%	53	16%	
Science	259	7	75%	87	25%	
Social Science	358	42	89%	49	11%	
Evaluate Total		1247	84%	238	16%	
Organize						
English	305	8	90%	36	10%	

Math	155	5	48%	174	52%	χ^2 (6, *N*= 1485) = 149.831, p < .001
Science	200	5	58%	148	42%	
Social Science	305	5	69%	139	31%	
Organize Total		988	67%	497	33%	
Construct						
English	308	8	91%	33	9%	χ^2 (6, *N*= 1485) = 155.992, p < .001
Math	155	5	48%	174	52%	
Science	201	5	58%	147	42%	
Social Science	305	5	69%	139	31%	
Construct Total		992	67%	493	33%	
Monitor						
English	162	0	46%	187	54%	χ^2 (6, *N*= 1485) = 376.307, p < .001
Math	258	0	77%	76	23%	
Science	158	2	45%	193	55%	
Social Science	41	2	10%	406	90%	
Monitor Total		623	42%	862	58%	

Confirm						
English	231	2	67%	116	33%	χ^2 (6, *N*= 1485) =
Math	263	1	79%	70	21%	180.145, p < .001
Science	180	2	52%	171	48%	
Social Science	151	2	34%	296	66%	
Confirm Total		832	56%	653	44%	

The Chi-squared test for independence indicated that the frequency of evidence for each Key Cognitive Strategy and Novice-Expert Continuum complexity score was related to subject area. The variation in evidence found by subject area reflects differences in student learning expectations for Key Cognitive Strategies across the curriculum. In particular, English was the only subject that covered all the Key Cognitive Strategies in a substantial way while Math, Science, and Social Science mostly expected Interpretation (Analyze and Evaluate), Communicate (Organize and Construct) and Precision/Accuracy (Monitor and Confirm) strategies.

CHAPTER VI

DISCUSSION

This chapter will provide a complete discussion of the study findings within the context of the related theories and prior research. The implications of the research are explored through the limitations and the implications for the theoretical frameworks and institutional practice. In closing, a discussion of future studies is included.

Overview

The goal of general education is to compliment the academic major by providing a broad and holistic view of human knowledge through key subjects and to teach transferrable intellectual skills. As the 21st century continues to unfold, research indicates that the type of learning needed to meet the challenges of this century can mostly be found in general education curriculum (Hart, 2009; Hart, 2013). General education curriculum is one of the most consistent aspects of college curriculum across all institutions in the United States (Aloi, Gardner, & Lusher, 2003). By examining this aspect of the curriculum, it provides a critical lens into student learning across the country, which also underscores the importance of knowing if the curriculum is delivering on the goals set forth.

As the literature indicates, general education has been in a constant state of question and reform since its place in undergraduate curriculum was solidified in the early 1900's. Fast forward to the 21st century, where individual and national economic stability in an emerging knowledge economy will depend on the intellectual and practical skills earned through a post-secondary credential (Carnevale & Rose, 2011; Hart, 2013). The ability to meet these demands places a great expectation on general education curriculum to live up to its goals of teaching students the complex, intellectual skills required today.

First, it was important to define what intellectual skills were and what it meant to develop those skills to a level that would meet the goals of general education. There are current reform efforts underway to provide a common definition of learning outcomes (i.e., Degree Qualifications Profile and General Education Maps and Markers); however, there is room for further definition of intellectual skills and cognitive complexity within this work. The frameworks of Key Cognitive Strategies (Conley, 2010) and the Novice-Expert Continuum (Bransford, Brown, & Cocking, 2000; Marzano & Kendall, 2007) were used.

Current research into institutional practices to deliver intellectual skills is limited and there is a lack of research documenting how learning is facilitated in general education courses. There has been one study conducted where faculty self-reported their efforts to structure learning activities and faculty responses did lead the researchers to conclude that faculty did use activities to emphasize critical thinking and written and oral communication (Nelson Laird, Niskode-Dossett, & Kuh, 2009).

To understand institutional practices to create opportunities for students to learn intellectual skills and the complexity of those opportunities within general education, this study examined course syllabi and work products. These documents served as the communication tool for course content and expectations. What follows is a discussion of the findings in order of the research questions for the study. The review of these results and implications is timely given the amount of reform measures under way (i.e., Degree Qualifications Profile and General Education Maps and Marker) and this study can help define the landscape of what general education looks like now so reforms can focus on shaping institutional practices for the future.

Interpretation of Findings

The discussion below provides an interpretation of findings within three major areas: 1) evidence of learning goals and statements; 2) Key Cognitive Strategies and Novice-Expert Continuum scores within general education curriculum and 3) Key Cognitive Strategies and Novice-Expert Continuum scores within subject areas. However, before an interpretation of findings is offered, it is important to recognize the limitations of the study and the ability to apply some of the findings broadly.

Limitations

While a significant level of agreement for evidence of student learning goals and statements was reached by testing with the reliability coefficient, significant levels of agreement for the analysis of Key Cognitive Strategies and Novice-Expert Continuum scores were not reached. This limits the generalizability of the findings in this study, as it cannot be guaranteed that the scoring guide and scoring would produce the same results if this study were conducted again. In addition, the scoring guide and scoring process was conducted with little inference, meaning most evidence had to be manifest and scorers were instructed not to infer as much as possible due to the variability of the syllabi. While this may have produced better data and increased reliability, the scorers may have inadvertently discarded evidence. Lastly, institutional practice was defined as evidence directly taken from course documents. While course documents are the most readily available form of communication, we also know that everything that happens in the classroom may not have been included. These results cannot be confused with a direct measure of individual student learning.

Learning goals and statements. The most reliable finding based on the inter-rater reliability coefficient (kAlpha = .95) and statistically significant finding was if learning goals and statements were communicated in general education curriculum. While many of the course syllabi did have learning goals or statements (*n* = 602) there were still a large number of documents that did not provide learning goals. When subject areas were examined for the practice of including learning goals and statements, the results were not consistent across subjects and this inconsistency was statistically significant. The results of this study suggest that the subjects of mathematics and science are the furthest behind in making this a common practice in course syllabi.

This finding may mean that institutional expectations for course syllabi are not consistent across subject areas. It would appear that course syllabi are constructed by subject area expectations without a comprehensive view of the role of the subject area in contributing to general education goals. Curriculum maps are emerging as a way to intentionally set up the curriculum, including general education, to cover all desired learning outcomes and track the role of each course in contributing to learning (Ewell, 2013). Without specific course outcomes and goals being communicated in the course syllabi, institutions may find it difficult to construct a curriculum map for general education. The impact is that intellectual skills may be taught, but this would be due to chance and there would not be a guarantee that all intellectual skills are covered in the curriculum to the level of complexity expected.

Current institutional practice could also contribute to unclear learning expectations for students. If we examine the literature on learning, multiple studies have demonstrated that a motivation to learn stems from a clear understanding of expectations (Marzano & Kendall, 2007). As students attempt to monitor and control their own learning across general education courses, course syllabi may limit their ability to do so if they are not provided clear expectations.

Student learning of Key Cognitive Strategies to monitor and confirm may be limited in this environment. Additionally, the strategic thinker level on the Novice-Expert Continuum aligns with the goals of general education for students to know when to apply a KCS across subject areas. This also limits a students' ability to recognize the interconnectedness of the curriculum and start to know when intellectual skills should be applied across course subjects.

Cognitive skills and complexity in general education curriculum. The goals of general education are to teach students the intellectual and practical skills necessary to be successful in the 21st century. By taking courses across subjects, students should be given opportunities to learn the Key Cognitive Strategies at a level of complexity that would allow utilization of the strategy as they develop more specialized knowledge. To accomplish this goal, the Key Cognitive Strategies should be reinforced across the curriculum, with subject areas complimenting each other by providing either unique contributions by thoroughly covering a smaller number of strategies or covering all the strategies.

The results in this study yield insights into what explicit expectations are conveyed via syllabi and assignments, as evidence of each of the Key Cognitive

Strategies were not equally present. The most frequently found KCS was Interpretation, which required the student to Analyze and Evaluate. Based on this evidence, institutions expect students to use these strategies about 84% (Analyze) and 86% (Evaluate) of the time. In contrast to those figures, there was a significant lack of evidence in the expectations that students would use Problem Formulation (Hypothesize and Strategize) and Research (Identify and Collect) strategies. These findings suggest that the Key Cognitive Strategies are not comprehensively expected in general education curriculum.

There is a major disparity between institutional practices that facilitate the ability to interpret, as students are only asked to do so when they have been given the problem and do not have to take it upon themselves to identify and collect the information needed to solve the problem. This finding suggests that students may enter a major without the ability to perform these strategies. Given the expressed goals of general education to teach intellectual skills that can be applied to more specialized knowledge in the major, it must be concluded that institutional practices do not meet this goal.

As for complexity, based on the current results, it can be inferred that performance at the strategic thinker level of the Novice-Expert Continuum would be a goal of general education. This is where students are able to know when to use the strategy and begin to think conceptually about subject areas. Again, the current documents analyzed indicate there was not enough evidence to suggest that strategies were expected above a Novice level in the curriculum. This absence may limit students' ability to apply the KCS that are expected when the student moves into courses for the academic major.

For instance, if a student only knows how to apply a KCS it means they must be prompted to apply it in a particular setting. If the student learned the KCS at a Novice level in one subject and that subject does not become the students major, then there is the chance that the KCS will not be further developed or will need to be re-taught in the new subject since the student was not expected to determine when to use the strategy. This is a concern as it would require major level courses to teach strategies that should have already been learned. At that point in the curriculum, the student is mostly spending time within the major learning specialized knowledge and would not be given the opportunity to apply the strategy in a new setting.

The evidence from this study demonstrates that expectations communicated in the course documents are falling short of the goal that general education curriculum provide students the opportunity to learn intellectual and practical skills at a level that can be used across areas of knowledge. While it is important to remember that these findings cannot be generalized broadly, they may inform future studies to confirm or reject these assertions.

Cognitive skills and complexity in subject areas. Now that a view of institutional practices across general education curriculum has been provided, the following findings focus on each of the subject areas in the study (mathematics, science, social science, English). Since the findings from the Chi-square test demonstrated significant differences in evidence of the Key Cognitive Strategies associated to the subject areas, a review of what subject areas covered is described below.

English was the only subject that covered all the Key Cognitive Strategies in a substantial way while Math, Science, and Social Science mostly expected Interpretation

(Analyze and Evaluate), Communicate (Organize and Construct) and Precision/Accuracy (Monitor and Confirm) strategies. The complexity level of novice means these cognitive strategies were performed procedurally and the use of equations required precision. Rarely were expectations communicated to use the strategies, leaving students without an ability to determine when the knowledge could be used in the same subject or another subject.

By understanding what Key Cognitive Strategies each subject area communicates and expects, and the level of complexity, we can better understand what decisions must be made about how each subject area contributes to the overall curriculum and where to focus efforts for improvement. Currently, the subject areas do not provide unique or complimentary contributions to the curriculum to ensure Key Cognitive Strategies are expected at the Expert-Novice level of strategic thinker.

Based on the findings in this study, it would appear that there is not an intentional role for each subject area to fulfill in the curriculum. While English communicated an expectation of all the Key Cognitive Strategies, the other subject areas may already be providing the opportunities without communicating them or they may have the ability to contribute to the development of intellectual skills if prompted.

Summary

In conclusion, an interpretation of the findings provides an understanding of where institutional practices align with the goals of general education curriculum and where improvements can be made. In particular, there is not a clear expectation that institutions will provide students with learning goals and statements in course syllabi. The results were also not consistent across subjects, and this finding may mean that institutional expectations for preparing course syllabi are not consistent across subject areas. This would contribute to unclear learning expectations for students and an inability for the institution to understand how courses collectively contribute to the general education goals.

As for institutional practices to expect Key Cognitive Strategies at complex levels on the Novice-Expert Continuum evidence suggests that each of the Key Cognitive Strategies were not equally present and for those present, there was no evidence to suggest that strategies were expected above a Novice level. To understand these findings by subject areas, the Key Cognitive Strategies were not equally covered in the subject areas and it would appear that there is not an intentional role for each subject area to fulfill in setting expectations for the development of intellectual skills in the curriculum.

Implications

There are theoretical and practical implications as a result of this study that can inform the field as post-secondary reforms continue to influence general education to achieve the aspirational goals for which it is intended. This section will provide a discussion of both the theoretical and practical implications, as well as those related to the further exploration of these ideas through future research.

Theoretical implications. The theoretical framework used in this study to represent intellectual skills through the Key Cognitive Strategies and Novice-Expert Continuum to assess institutional practices towards the goals of general education curriculum was the first of its kind. The theoretical validity of the use of these frameworks in this setting, and for this purpose, was validated through content experts and through the ability to construct a scoring guide using the frameworks. This builds on the work of Conley (2003; 2005; 2007; 2010) who developed the strategies and validated them over time by studying entry-level college courses.

As discussed in the literature review, the representation of cognitive complexity in post-secondary education has heavily relied upon Bloom's Taxonomy and is not necessarily aligned with the latest knowledge of cognition and how to develop a student's ability to use skills at higher complexity levels. By drawing upon the theoretical frameworks developed from studying experts and Competency Theory, a more nuanced understanding of complexity can be developed and used to design and measure institutional practices to teach intellectual skills to these levels.

There is, however, still work to be done to increase the reliability of the scoring guide that currently represents these frameworks for the future. A discussion about the use of these frameworks within post-secondary education and the development of tools to better measure them is provided in the section on future studies found later in this chapter.

Practice implications. Given the way general education curriculum has evolved over the last 100 years, we have seen higher education raise many questions about the role of general education within the undergraduate curriculum and how to best deliver student learning. From the debates about a core common curriculum, to the use of electives, and the development of the academic major, general education has evolved drastically as institutions have experimented with the best ways to design the curriculum (Lucus, 1994; Levine, 1978).

The opportunity that lies ahead in the early stages of the 21st century to define what knowledge and intellectual skills students will need in a knowledge economy, shaped by a vastly expanding knowledge base and changing environment, demonstrates a significant need for intellectual skills at high levels of complexity (Carnevale & Rose, 2011; Hart, 2009; 2013). As attempts are under way to define the specific knowledge and skills (i.e., Degree Qualifications Profile and General Education Maps and Markers), institutional practices will also need to be examined and aligned in order to meet the goals as defined.

Working off of the interpretation of the findings in this study, the next section will discuss implications for institutional practices and provide a discussion of the potential for future studies to continue to advance our understanding of general education curriculum.

Communicate clear expectations for integrated learning. As previously discussed, students who have clear expectations for learning can better monitor and control their learning processes (Marzano & Kendall, 2007). Without clear learning goals and statements communicated across all subjects, students are not able to understand what they should be learning, where they should be learning it, and why they should be learning.

One of the faculty scorers had this to share with the researcher after completing the scoring process:

> Much more generally, it has been very sobering to read syllabi that must be very confusing to students who encounter such different examples in each of their semesters. It might be defensible if the syllabi were reflections of particular courses in particular disciplines with colleagues and educators or those interested in education as their primary audience but it seems that there is no agreement of

> what the syllabus is and how assignments are tied to SLOs that translate into key cognitive strategies, and are designed to be level-specific according to the novice-to-expert continuum. (personal communication, Faculty Scorer, December, 2013)

Furthermore, the researcher observed that all syllabi were formatted differently and rarely provided a broader picture of what learning in the particular course contributed to the student's overall learning experience while at the institution. Since learning goals and statements are not currently communicated across the curriculum, the first implication for practice is for institutions to find new ways to ensure learning expectations are shared with students.

Institutions must find ways to ensure that course syllabi communicate learning goals and statements for students. This could be accomplished through institutional expectations and implemented from the first moment that a course is being developed. As the findings suggest, while all subjects could improve, Math and Science were the subjects that demonstrated this practice the least. Math and Science may benefit from conversations with colleagues in other disciplinary associations and across campus to better understand how this practice can be ingrained during course development.

A more forward thinking approach would be for institutions to put themselves in the place of the student and ask, "How does the collection of course syllabi in a semester communicate to a student what they should learn?" In other words, even if all the course syllabi communicated course specific outcomes there is still a gap for students in understanding the interconnectedness of the curriculum.

To meet this need, institutions may be able to make use of learning management systems or e-portfolios to create learning portals for students where they can log on and see the learning outcomes they need to accomplish for the entire semester as well as the corresponding courses where those outcomes should be learned. To complement the curriculum, co-curricular experiences could also be included. This may enable students to not only monitor their own learning but also use cognitive strategies at more complex levels as they integrate their learning opportunities.

Cognitive skills and complexity in the curriculum. The interpretation of the findings provided an overview of the disparity between what Key Cognitive Strategies are communicated and the goals of general education. The findings suggest that the curriculum may not expect students to perform cognitive strategies at complex levels, which may limit the ability to apply the cognitive strategies in multiple settings as the student moves on through the specialized curriculum of the major. This demonstrates a need for institutional practices to be more intentional in designing a comprehensive general education curriculum that includes intellectual skills and cognitive complexity in addition to subject area knowledge.

In this regard, an implication for practice would be to review institutional goals for general education and ensure those goals align with the emerging national frameworks as provided in the Degree Qualifications Profile (Lumina Foundation, 2011) and Essential Learning Outcomes (American Association of Colleges & Universities, n.d. -a). The findings in this study may suggest that many institutional expectations for general education have not been updated for 21st century and in light of these documents.

Once institution level outcomes have been aligned with broader national frameworks, some campuses are then ensuring that their curriculum is set up to deliver the outcomes through curriculum mapping (Ewell, 2013). This practice may drive critical dialogue about institutional practices and help campuses define where opportunities exist for students to learn intellectual skills across the curriculum and where there may be gaps. Furthermore, curriculum mapping may be used to audit these learning opportunities over the years and as the curriculum changes to ensure that changes made will continue to contribute to the goals of the curriculum.

Another implication for practice lies with the institutional committees that review general education courses and conduct the processes to review new courses for addition to the curriculum. By using the Key Cognitive Strategies and Novice-Expert Continuum, the review process can ensure courses include intellectual skills and complexity. This committee could also be a group that reviews the general education curriculum on a regular basis so that courses already approved have a way to be examined for consistency over the years.

Cognitive skills and complexity in subject areas. When reviewing the findings by subject area, an interpretation was made that the course documents in this study suggest that subject areas do not currently provide unique or complimentary contributions to the curriculum; which ultimately means general education curriculum goals will not be met.

While the institutional practice of curriculum mapping has already been discussed, the mapping process should begin with an understanding that each subject area has a unique way to teach intellectual skills that can deepen a student's ability to make use of them in multiple settings. Often, the disciplines become embattled in conversations about which subject contributes the most or is most important in the curriculum. Unfortunately, this dissolves into heated debates and the focus on student learning is lost. The findings in the study infer that each subject area is needed in order for students to develop intellectual skills at higher levels of complexity. Ideally, intellectual skills and complexity could provide a common meeting ground for disciplines to find ways to complement each other.

Additionally, each of the faculty scorers and the researcher benefited greatly from consensus discussions about the Key Cognitive Strategies and Novice-Expert Continuum. Since the scorers came from different disciplines, each expressed multiple times how beneficial the conversation was to gaining clarity as there were opportunities to question and explain what each KCS may look like in different disciplines and at different levels of complexity. Each scorer commented that they were energized by the conversation and felt better prepared to contribute in their respective settings. This highlighted the need for more opportunities to incorporate training and discussions on intellectual skills and complexity. These conversations may help faculty understand and see their role in shaping the entire general education curriculum, gain an appreciation for the importance of each discipline in developing skills, and provide them inspiration to align their practices in their subject area.

The next recommendation is focused on how disciplinary organizations can effectively lead conversations about the role of the subject in undergraduate curriculum. This is especially important since it has been documented that faculty loyalty is often directed to the disciplinary profession (Boyer, 1990). Discipline organizations can and should lead conversations about how subject areas can contribute to the development of cognitive strategies at increasing levels of complexity. This would allow faculty to contribute to institutional practices in more meaningful ways by having discipline specific expectations and examples. The National Communication Association provides one example of this type of leadership where the association is leading the effort to improve curriculum planning and improvement by defining the learning outcomes within Communications (Learning Outcomes in Communication, n.d.)

Future Studies

While generalizations of the findings in this study are limited by reliability, the findings in this study gave cause for concern and demonstrated a need for continued exploration of the research questions. The results and contributions provided here are first steps in understanding the landscape for where general education expectations for learning are and are not living up to the learning goals. Opportunities for further research are explored below.

Since this is one of the first times a scoring guide was created with the Key Cognitive Strategies and Novice-Expert Continuum to examine general education practices, future studies could continue to test these frameworks in the field. The scoring guide used in this study could be further refined to reach higher levels of inter-rater reliability so that a reliable tool is created for those studying general education curricula or wishing to use the guide within an institution.

Questions not explored in this particular study, but that could provide additional insight, would be to review the findings within the context of institutional characteristics. For instance, a research question may be, “Do certain types of institutions better communicate learning outcomes and goals and cover the Key Cognitive Strategies at higher levels of complexity?" This question could be explored based on accrediting agency, institutional size, Carnegie classification, and/or region.

To that end, while this study was solely focused on bachelor degree granting institutions, general education courses are also offered at associate's degree granting institutions. Students frequently transfer or earn credits from these institutions that contribute to their bachelor's degree. Conducting the same study methodology with course syllabi and work products from associate's degree granting institutions could further this work. Additionally, it would be interesting to see if general education intellectual outcomes could be achieved with an associate's degree.

Other aspects of this study that were not explored are the use of extra credit and supplemental courses. Findings may reveal that particular subjects or types of institutions make use of these practices to compliment course learning opportunities. In addition, consideration could be given to the fact that opportunities to learn on a college campus are not confined to classroom experiences. There is a history of student learning documented through co-curricular experiences including work and student leadership opportunities, in particular because students are often applying knowledge in these settings. This would also include any prior learning that the student has accumulated before enrolling at the institution and can be validated. According to Bransford, Brown, and Cocking (2000), "Work in social psychology, cognitive psychology, and anthropology is making clear that all learning takes place in settings that have particular sets of cultural and social norms and expectations and that these settings influence learning and transfer in powerful ways" (p. 4). Acknowledging the co-curricular and prior learning, as well as curricular influences on learning, would provide a more thorough understanding of the practices that most influence the development of cognitive strategies and complexity.

If any of the above factors (based on institution type, size, region, co-curricular experiences, extra credit/supplementary courses, and/or accrediting agency) result in significant differences in intellectual skill development, then case studies could be the next line of inquiry could be to explore the environmental factors that result in institutional practices that better deliver outcomes. In addition, a study of general education course approval processes and how those processes do or do not make use of the opportunity to align not only subject area knowledge, but also cognitive strategies and complexity to goals could be a way to understand an institutional practice.

In summary, there are many additional research questions to explore about general education and institutional practices. Post-secondary education could benefit greatly from the results of findings in each of these studies.

Conclusion

As the literature has clearly indicated, the role of general education is still relevant to accomplishing the goals of undergraduate education in the 21st century (Association of American Colleges and Universities, 2007; Hart, 2013). Based on the findings in this study, general education practices to develop intellectual skills at the level of complexity defined should be examined. Communicating learning goals and statements to students and understanding the best ways to develop intellectual skills by subject areas show promise for the alignment of practices to goals. As national and campus reforms continue, the institutional practices that best contribute to intellectual skill development and foster the use of those skills in complex ways will be become clearer and the aspirational goals of general education may be within reach.

APPENDIX

SCORING GUIDE

Key Cognitive Strategies and

Cognitive Complexity Scoring Guide

Introduction to the Scoring Guide

The goal of general education curriculum is to provide students with an education that covers broad bodies of knowledge and teaches students how to think and learn. Thinking skills are described as cognitive strategies and students are asked to perform them at varying levels of complexity that range from novice to expert. General education courses include subjects such as English language and literature, general science, social science and mathematics and are often taken in the first and second year of college.

Theoretical Models

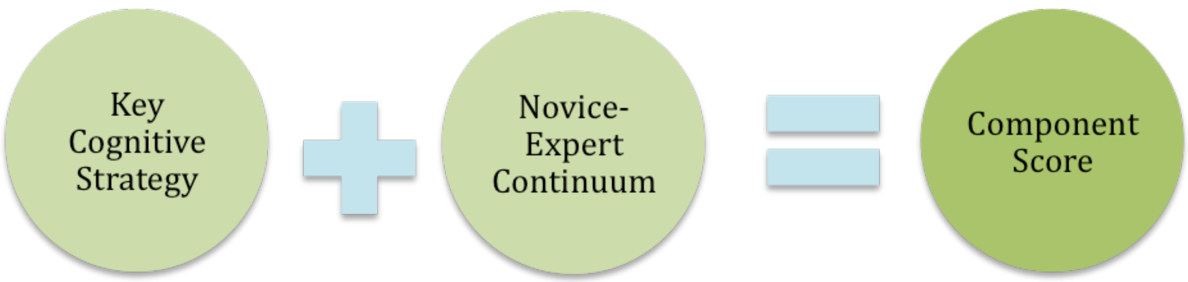
While subject area knowledge is important, this study is focused only on the thinking skills. As a scorer, you will review general education course documents, such as syllabi and assignments, for evidence of key cognitive strategies and the level for which the student is asked to use the strategies. The study makes use of two theoretical models that represent these concepts and are described below.

Key Cognitive Strategies (KCS)- These five cognitive strategies are employed by college students to monitor, control and regulate thinking and learning in order to achieve a learning goal. They include problem formulation, research, interpretation, communication and accuracy (Conley, 2011). The strategies were developed and validated over time by studying entry-level college courses. Students may be asked to use all, several or none of the Key Cognitive Strategies in a course.

Novice-Expert Continuum- The key cognitive strategies can be placed on a continuum depending on the level of thinking the student is asked to demonstrate when using the strategy. The Novice-Expert Continuum provides a model for the progression of student thinking from novice to expert and allows you to determine the level of complexity for which the student is being asked to use the key cognitive strategy (Baxter & Glaser, 1997; Bransford, Brown & Cocking, 2000). You will also find a Novice-Expert Rubric that provides additional characteristics and defines the nuances between each level.

How will I use the models?

The two models will be considered simultaneously during scoring. You will review the course document for evidence that the KCS is expected of the student in the course. Once a component of a Key Cognitive Strategy has been identified, you will then review the Novice-Expert Continuum and Rubric to determine the appropriate score.



Scoring Process

Materials needed for review:
- Scoring Guide
- All Course Documents for one course (syllabus and any work product documents)
- Reviewer ID, Document ID, Course ID
- Access to the Internet and online scoring sheet

Complete the following steps for each separate document:

1. Go to: https://oregon.qualtrics.com/SE/?SID=SV_3FeKZR34tgeZrLv
2. Open the excel document containing the sample of course documents. Each specific document will have a Document ID Number. All documents associated with one course should be listed together. For each course, there will be a course syllabus listed first. If the course number is listed again in the next row, then the course has additional work product documents. Each document will be scored individually, but you will need to score all documents for one course before moving onto the next course.
3. First, complete the section titled Document and Reviewer Information. This section includes:
    - Reviewer ID = select your name
    - Document ID Number = the Document ID number found in column A of the excel document
    - Course Document Type = select syllabus or work product

4. Click the arrow button at the bottom of the page and it will take you to the scoring section.
    - If the document is a work product, you will be taken directly to the scoring section to complete scoring. Proceed to step number 5.
    - If the document is a syllabus, you will be directed to a page with two questions, one to identify learning outcomes and extra credit or supplemental course details.
        - Mark "yes" if learning outcomes or learning goals are written in the syllabus. Course descriptions do not qualify unless there are specific outcome statements written similar to the examples provided in the definition section of this guide.
        - Mark "yes" if there are extra credit activities or supplemental course details.
            - Extra credit is anything that is listed as an opportunity for students to complete a learning activity to increase their grade.
            - Supplemental courses are separate classes that maybe associated with the course such as labs, discussion groups, and sequenced courses. Evidence of these courses may include laboratory instructions, calendar of meetings, discussion expectations and assignments. These will be scored separately.
        - Click the arrow button at the bottom of the page to be taken to the scoring section in step number 5.
5. Next, score the document in the section titled ***Component Score: Syllabus or Work Document*** by selecting the appropriate boxes for evidence found in the course document.
6. When you are finished, click the arrow button at the bottom. If there is extra credit or supplemental course material to score, you will be taken to that page. If not, you will be taken to the end of the survey and should receive a confirmation that you have completed scoring.
7. If you have other course documents to review for the course, click the link provided in the confirmation statement to open a new survey and go back to direction number one to complete the scoring process again.

General Scoring Decision Rules

1) Reviewers may score documents in 30-minute increments, with at least a 5-minute break between scoring sessions.
2) Complete all the documents for a course before moving to the next course.
3) Some course documents may reflect multiple Key Cognitive Strategies. Please score all strategies when scoring the documents.
4) Many of the course documents are in Microsoft Word and a few of them contain pictures of online course content. If you open a document and there is no text, view the document in print preview to ensure all content is visible.
5) Reading assignments and lectures without any other evidence are scored Analyze and Level 1.

6) Supplemental courses need to appear as a course connected to the course you are scoring
7) Assume as little as possible, remembering this is a methodology based on analyzing communication. If it is communicated, then it should be score. Otherwise, mark "no evidence."

Course Documents

As you are aware, faculty prepare syllabi and assignments for the course being taught. There will be two categories of course documents for you to review.

1) Syllabus- Course document that outlines course content, learning activities and course outcomes. Each course you are assigned will have a course syllabus.
2) Work Product- In addition to the syllabus, some courses will also include work product documents for you to review. Examples of documents you may encounter in this category are: course exam, homework assignments, worksheets, project descriptions or other assignment given to students to facilitate or assess learning. These activities may be listed and described in the course syllabus. In addition, some courses have work product documents for you to score.

Evidence of Key Cognitive Strategies: Learning Outcome Statements and Learning Activities

Within the syllabus, you may find evidence of the Key Cognitive Strategies by looking for these types of statements or sections.

1) Learning Outcome Statement- Sentence that describes the knowledge, skills, attitudes and habits of the mind that students should gain as a result of the learning experience.
    - The statement will typically be in the following format: Student should be able to (action verb) + (defined observable terms or behavior).
    - Action Verb- words that express action and something that a person will do.
    - Defined Observable Term or Behavior- words that express the type of knowledge, skill or behavior expected.
2) Learning Goal Statement- Goals that broadly describe what students will learn as a result of the class are often contained in a section of the syllabus titled learning goal statement. These are typically in paragraph form and do not give as specific of information as an outcome statement, but often contain an action verb and broad observable behavior. Below you will find an example where the action verbs are italicized:

    Students will be introduces to the fundamental principles and vocabulary of chemistry. A central focus is on developing the skills needed to *solve* the many types of problems that occur in general chemistry. Although you will encounter a good many “facts” along the way, your primary concern should be to *understand and comprehend* the general principles. Your comprehension should reach a level that will allow you to *demonstrate* your understanding using the facts and concepts learned to clearly explain principles and properties and apply them to new situations.

3) Assignments or Exams- There are sometimes descriptions included about the assignments or exams and faculty expectations for their completion and learning.
4) Faculty Tips- Many times, faculty will include study tips and other ideas about to succeed in the course. These are items that students can commit to their cognitive strategies, typically to monitor precision and accuracy.

Within the work product, you may find evidence of key cognitive strategies by looking through:

1) Assignment Directions- these are often listed at the top of the assignment.
2) Exams and Worksheet Questions- These may be multiple choice, short answer, fill in the blank.
3) Problem Statements- If a prompt for writing is given, is there may be a problem statement given or problem to solve. These may be constrained or unconstrained activities.
4) Project Description- In the more expert activities, faculty may give description of what the project should look like in a way that is still unconstrained to the student and their ability to apply the key cognitive strategies at the emerging expert or expert level.

Key Cognitive Strategies

Key Cognitive Strategy	Component	Component Description	Examples

Problem Formulation The process used to explore, identify and clarify the nature of the problem, form a hypothesis and strategies to investigate hypothesis.	Hypothesize	Identify and clarify the nature of the problem or topic of significance and create a meaningful representation. Form a problem statement or hypothesis.	Student asked to form some type of persuasive argument, definition of significance, or problem statement. Cannot reiterate something that is indisputable; must be something that could be disagreed or agreed upon and student has to put it in context.
	Strategize	Determine strategies and next steps to investigate the problem, proposed hypothesis or topic of significance.	Often paired with hypothesize and if you find evidence of hypothesize, you will likely find strategize. However, a student may just strategize if they are given a problem statement/argument stance/topic.
Research The process of investigating the hypothesis through identified strategies. Student is asked to determine how and where to locate valid and reliable references and data relevant to the problem. Requires judgment of the data and information.	Identify	Student asked to determine how and where to locate valid and reliable references and data not already identified for them. Creating systematic search methods.	If it's not suggested that the student takes additional steps to identify more references and data than is provided, then that is indicative of no evidence.
	Collect	Student asked to collect references and data not already identified for them and determines what is necessary, valid and reliable in order to solve a problem or answer a question. Resources must be listed and relevant to the problem and subject area.	If it's not suggested that the student takes additional steps or collects more references or data than is provided, then that is indicative of no evidence.
Interpretation The process of identifying the most relevant information	Analyze	Student is asked to analyze information and data by deconstructing the problem into parts, recognizing	To count as evidence, information and/or data to be analyzed needs to be specified.

or findings from research to develop insights and draw conclusions.	Analyze	patterns, connecting relationships.	To count as evidence, information and/or data to be analyzed needs to be specified.
	Evaluate	After analysis, student is asked to prioritize findings in support of a conclusion or solution.	
Communication Through oral and written communication, student must organize and construct a work product to effectively demonstrate learning.	Organize	Student is asked to create an organizational structure to provide justification and coherent explanation of conclusions. This includes using findings, providing supporting evidence and demonstrating a line of reasoning for conclusions.	Criteria of the component description are met only when the document is not prescriptive. In courses such as Math, the document would include a “show your work” statement.
	Construct	Student is asked to prepare a work product to demonstrate learning. This can include providing drafts of work for feedback revisions until a final product is ready.	Any assignment where the student is asked to demonstrate learning can be considered a work product, including homework that an instructor sees, tests and exams. If a work product is inclusive of entire course content, that would increase the expert-novice scale score.
Precision and Accuracy During the problem formulation, research, interpretation and communication steps, student demonstrates language, rules, conventions and expressions appropriate to the work product	Monitor	Monitor utility of strategies and attention to subject area details. Student is asked to use defined standards, conventions and rules from a subject area to complete tasks (such as the American Psychological Association, Modern Language Association, Analytical Chemistry Standards).	Students are given specific instructions on a specific writing standard to use.

directions and subject area standards.	Confirm	Student is asked to self confirm for technical accuracy, grammar, work product directions and requirements. Adjust, recalibrate or edit drafts as needed.	Student is given specific directions that define technical accuracy, grammar, work product directions and requirements.

Characteristics of Novice-Expert Levels and Example Evidence

Expert- 5

Type of Knowledge	**Knowledge Organization and Concept Formation**	**Flexibility of Retrieval and Use in New Situations**	**Knowledge Integration**
Conceptual Knowledge (Know **why** and the conditions to use the facts, information, process)	Ability to contemplate and organize new evidence within subject related theories, principles, or laws to contribute novel idea to subject-area knowledge.	Uses knowledge in multiple settings and subjects and explains why. Intuitively starts problem solving at a higher level, across subjects, with ease.	Keen and sensitive recognition of multiple patterns of meaningful information/data from different settings.
Example Learning Activity Directions	**Example Evidence of Learning Activities**	**Example Verbs of Outcome Statements**	
Unconstrained activities where explicit directions are not given and specific tasks to be performed must be inferred. Multiple ways to implement and students asked to select and provide full rationale for best possible solution and justification for discarding other solutions.	Original research papers (thesis), create a novel solution to a problem, incorporate multiple subject area resources or culmination of all information covered (portfolios), reflection on learning over time, judge the value of material or method.	The best way, transfer, predict, invent, judge, research, defend, anticipate, create, use in another setting, provide full justification/rationale.	

Emerging Expert – 4

Type of Knowledge	**Knowledge Organization and Concept Formation**	**Flexibility of Retrieval and Use in New Situations**	**Knowledge Integration**
Beginning Conceptual Knowledge (Know **why** use the facts, information, process)	Uses principles and concepts to organize and explain evidence, problem solving and solutions.	Begins to use information and knowledge in multiple settings and explain why it can be used in a different setting or subject area.	Notices similarities and differences between multiple patterns of information/data from different settings.
Example Learning Activity Directions	**Example Evidence of Learning Activities**	**Example Verbs of Outcome Statements**	
Unconstrained activities where explicit directions are minimal and student is required to make some inference about specific tasks. Student asked to select when to apply knowledge and to briefly describe why it is the best possible solution or why another solution was discarded.	Provide justification for steps taken or not taken towards a solution, problem solve and explain steps, short answer with analysis of why the answer was given over another. Persuasive papers, debates, case study with justification for steps taken.	Provide justification/justify, select the best way to solve, generate, recommend, manipulate, criticize, integrate, modify, specify why, rearrange, develop and know why.	

Strategic Thinker – 3

Type of Knowledge	Knowledge Organization and Concept Formation	Flexibility of Retrieval and Use in New Situations	Knowledge Integration
Conditional Knowledge (Know **when** to use the facts, information, process)	Incorporate subject area core concepts, laws and principles to know when to use equations and processes.	Can easily connect information within the subject area and describe when to use.	Notices similarities between multiple patterns of information/data.
Example Learning Activity Directions	**Example Evidence of Learning Activities**	**Example Verbs of Outcome Statements**	
Unconstrained activities with some direction for student to demonstrate an ability to know when to apply knowledge.	Solve a problem by selecting steps, integrate and connect concepts from the semester, explain when to use methods or procedures.	Solve a problem by selecting steps, relate, infer, translate, select/choose, plan, analyze, assess, classify, order, specify steps, compile, rate, organize, integrate, modify, evaluate, develop.	

Accomplished Novice - 2

Type of Knowledge	**Knowledge Organization and Concept Formation**	**Flexibility of Retrieval and Use in New Situations**	**Knowledge Integration**
Procedural Knowledge (Knowledge of **how** to use subject-specific facts, information, procedures)	Follow directions and place facts into predetermined concepts and equations. Able to use equations and processes.	Knowledge is context specific and as encounter new facts, searches for subject-specific formula or process to fit the new situation.	Notices patterns of meaningful information/data in a specific setting.
Example Learning Activity Directions	**Example Evidence of Learning Activities**	**Example Verbs of Outcome Statements**	
Constrained activities, focused on rote application in defined circumstances. The student is asked to use a learned concept or equation to solve a problem. Directions explain the process skills necessary for task completion.	Apply subject- specific procedures. Solve a given equation, replicate an experiment, role plays, and implement a defined procedure.	Apply, solve, operate, perform, assemble, employ, demonstrate, calculate, reconstruct, add, compute, match, produce, show, subtract, divide, outline, reproduce, role play, use, formulate, develop.	

Novice - 1

Type of Knowledge	**Knowledge Organization and Concept Formation**	**Flexibility of Retrieval and Use in New Situations**	**Knowledge Integration**
Declarative Knowledge (**Know** subject-specific facts and information).	Separate facts, not arranged by concepts, principles	Knowledge is context specific.	No evidence of ability to recognize patterns, integrate or connect information.
Example Learning Activity Directions	**Example Evidence of Learning Activities**	**Example Verbs of Outcome Statements**	
Constrained activities, focused on recall and recognition of facts, information and processes.	Reading, lectures, generate lists, recall and recognition, identifying facts.	Understand, memorize, recall, recognize, remember, summarize, identify, give examples, describe, know, label, list, name, rank, read, select, summarize, describe, explain	

REFERENCES CITED

Aloi, S. L., Gardner, W. S., & Lusher, A. L. (2003). A framework for assessing general education outcomes within the majors. *Journal of General Education, 52,* 237-52.

Altman, H. B., & Cashin, W. E. (1992). Writing a syllabus. *Idea Paper*, no. 27 Manhattan: Center for Faculty Evaluation and Development, Kansas State University.

Anderson, L., & Krathwohl, D. (Eds.). (2001). *A taxonomy for learning, teaching and assessing: A revision of educational objectives.* New York, NY: Longman.

Arum, & Roksa, (2011). *Academically adrift: Limited learning on college campuses.* Chicago, IL: University of Chicago Press.

American Association of Colleges & Universities. (n.d. -a). *Essential learning outcomes.* Retrieved from http://www.aacu.org/leap/vision.cfm

Association of American Colleges and Universities. (n.d. -b). *General education maps and markers.* Retrieved from https://www.aacu.org/gems/index.cfm

Association of American Colleges and Universities. (2002). *Greater Expectations: A new vision for learning as a nation goes to college.* Retrieved from http://www.greaterexpectations.org/

Baxter, G. P., & Glaser, R. (1997). *An approach to analyzing the cognitive complexity of science performance assessments.* (Report No. CSE Technical Report 452). Retrieved from http://www.cse.ucla.edu/products/Reports/TECH452.pdf

Bers, T., Davis, D., & Taylor, W. (1996). Syllabus analysis: What are we teaching and telling our students? *Assessment Update, 8,* 6. doi: 0.1002/au.3650080602

Bers, T., Davis, D., & Taylor, W. (2000). The use of syllabi in assessments: Unobtrusive indicators and tools for faculty development. *Assessment Update*, *12*(3), 4-7.

Berrett, D. (2014, February 7). A new kind of study seeks to quantify educational quality. *The Chronicle of Higher Education.* Retrieved from http://chronicle.com/article/A-New-Kind-of-Study-Seeks-to/144621?cid=megamenu

Bloom, B. (Ed.). (1956). *Taxonomy of educational objectives: The classification of educational goals*. New York, NY: Longmans.

Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theories and methods* (5th ed.). Boston, MA: Pearson Education, Inc.

Boyer, E. (1990). *Scholarship reconsidered: Priorities of the professoriate.* San Francisco, CA: Jossey-Bass.

Boyer, E. L., & Levine, A. (1981). *A quest for common learning: The aims of general education.* Washington, DC: Carnegie Foundation for the Advancement of Teaching.

Boyer Commission on Educating Undergraduates in the Research University. (1998). *Reinventing Undergraduate Education: A Blueprint for America's Research Universities.*
Retrieved from http://www.eric.ed.gov/pdfs/ed424840.pdf

Bransford, J., Brown, A. L., & Cocking, R. R. (2000). *How people learn: Brain, mind, experience and school.* National Academy Press: Washington, DC.

Carnevale, A. P., & Rose, S. J. (2011). *The undereducated American.* Center on Education and the Workforce. Georgetown University. Retrieved from http://cew.georgetown.edu/undereducated/

Cohen, M. (2010). *Critical reflection among school psychologist: An examination of content, cognitive style, and cognitive complexity*. (Doctoral dissertation, University of Southern California). Retrieved from http://digitallibrary.usc.edu/assetserver/controller/item/etd-Cohen-3446.pdf

Conley, D. T. (2003). *Mixed messages: What state high school tests communicate about student readiness for college.* Eugene, OR: Center for Educational Policy Research, University of Oregon,

Conley, D. T. (2005). *College knowledge: What it really takes for students to succeed and what we can do to get them ready.* San Francisco, CA: Jossey-Bass Publishers.

Conley, D. T. (2007). *The AP course audit syllabus review process: Methodological explanation.* Educational Policy Improvement Center. Retrieved from http://files.eric.ed.gov/fulltext/ED537874.pdf

Conley, D. T. (2010). *College and career ready: Helping all students succeed beyond high school.* San Francisco, CA: Jossey-Bass Publishers.

Conley, D. T. (2010). *The Key Cognitive Strategies.* Educational Policy Improvement Center.

Conley, D. T., Drummond, K. V., Gonzalez, A., Rooseboom, J., & Stout, O. (2011). *Reaching the goal: The applicability and importance of the Common Core State Standards to college and career readiness.* Educational Policy Improvement Center. Retrieved from https://www.epiconline.org/files/pdf/ReachingtheGoal-FullReport.pdf

Davis, B. G. (1993). *Tools for teaching*. San Francisco, CA: Jossey-Bass Publishers.

Domin, D. (1999). A content analysis of general chemistry laboratory manuals for evidence of higher-order cognitive tasks. *Journal of Chemical Education, 76,* 109-111.

Ewell, P. (2013). *The Lumina Degree Qualifications Profile (DQP): Implications for assessment.* Public report sponsored by the National Institute for Learning Outcomes Assessment. Retrieved from http://www.learningoutcomesassessment.org/documents/EwellDQPop1.pdf

Fraenkel, J. R., & Wallen, N. E. (2006). *How to design and evaluate research in education* (6^{th} ed.). Boston, MA: McGraw-Hill.

Gaff, J. G., & Wasescha, A. (2001). Assessing the reform of general education. *The Journal of General Education, 50*(4), 235-252. doi: 10.1353/jge.2001.0023

Gagné, E. D., Yekovich, C. W., & Yekovich, F. R. (1993). The cognitive psychology of school learning. New York: HarperCollins College Publishers.

Hart, P. (2009). *Trends and emerging practices in general education*. Public report sponsored by the American Association of Colleges and Universities. Retrieved from http://www.aacu.org/membership/documents/2009MemberSurvey_Part2.pdf

Hart, P. (2013). *It takes more than a major: Employer priorities for college learning and success.* Public report sponsored by the Association of American Colleges and Universities. Retrieved from http://www.aacu.org/leap/documents/2013_EmployerSurvey.pdf

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277-1288.

Hsu, C., & Sandford, B. A. (2007). The Delphi Technique: Making sense of consensus. *Practical Assessment, Research & Evaluation, 12*(10), 1-8.

Huber, M. T., & Hutchings, P. (2004). *Integrative learning: Mapping the terrain.* American Association of Colleges and Universities. Retrieved from http://carnegiefoundation.org/sites/default/files/publications/mapping-terrain.pdf

Huberman, A. M., & Miles, M. B. (2002). *The qualitative researcher's companion*. Thousand Oaks, CA: Sage Publications.

Hutcheson, P. (2007). The Truman commission's vision of the future. *Thought & Action,* 107-115. Retrieved from http://www.nea.org/assets/img/PubThoughtAndAction/TAA_07_11.pdf

Jones, E. A., & Ratcliff, J. L. (1991). Which general education curriculum is better: Core curriculum or the distributional requirement? *The Journal of General Education*, *40,* 69-101.

Klein, J. T. (1990). *Interdisciplinarity.* Detroit, MI: Wayne State University Press.

Krippendorff, K. (2004). Reliability in content analysis: Some common misconceptions and recommendations. *Human Communication Research, 30*(3), 411-433.

Lee, G.C. (1963). The Morrill Act and education. *British Journal of Educational Studies, 12,* 19-40.

Levine, A. (1978). *Handbook on undergraduate curriculum*. San Francisco, CA: Jossey-Bass.

Lombardi, A., Seburn, M., Conley, D. T., & Snow, E. (2010). *A generalizability investigation of cognitive demand and rigor.* Presented at the American Educational Research Association annual conference: Denver, CO.

Lowther, M. A., Stark, J. S., & Martens, G. G. (1989). *Preparing course syllabi for improved Communication*. National Center for Research to Improve Postsecondary Teaching and Learning, University of Michigan. Retrieved from http://www.eric.ed.gov/PDFS/ED314997.pdf

Lucas, C. (1994). *American higher education: A history*. New York, NY: St. Martin's Griffin.

Lumina Foundation. (2011). The Degree Qualifications Profile. Indianapolis, IN: Author.

Marinara, M., Vajravelu, K., & Young, D. L. (2004). Making sense of the "loose baggy monster": Assessing learning in a general education program is a whale of a task. *The Journal of General Education*, *53*(1), 1-19 doi: 10.1353/jge.2004.0021

Marzano, R., & Kendall, J. (2007). *The new taxonomy of educational objectives* (2nd ed.). Thousand Oaks, CA: Corwin Press, A Sage Publications Company.

Maxwell, J. A. (2005). *Qualitative research design: An interactive approach* (2nd ed). Thousand Oaks, CA: Sage Publications.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Thousand Oaks, CA: Sage Publications.

National Center for Educational Statistics. (2009). *The condition of education 2009 in brief.* Retrieved from http://nces.ed.gov/pubs2009/2009082.pdf

National Communication Association. (2014). *Learning outcomes in communication.* Retrieved from http://www.natcom.org/tuningproject/

Nelson Laird, T. F., Niskode-Dossett, A. S., & Kuh, G. D. (2009). What general education courses contribute to essential learning outcomes. *The Journal of General Education, 58*(2), 65-84. doi: 10.1353/jge.0.0037

Neuendorf, K. A. (2002). *The content analysis guidebook.* Thousand Oaks, CA: Sage Publications.

Pennsylvania State University. (2002). *Students in the balance: General education in the research university.* Book presented at the Penn State Symposium on General Education.

Ratcliff, J. L., Johnson, D. K., La Nasa, S. M., & Gaff, J. G. (2001). *The status of general education in the year 2000: Summary of a national survey.* Washington D.C.: American Association of Colleges and Universities.

Rubin, S. (1985, August 7). Professors, students and the syllabus. *The Chronicle of Higher Education,* p. 56.

Rudolph, F. (1977). *Curriculum: A history of the American undergraduate course of study since 1636.* San Francisco, CA: Jossey-Bass.

Salter, L., & Hearn, A. (1996). *Outside the lines: Issues in interdisciplinary research.* Montreal: McGill-Queen's University Press.

Snyder, (n. d.). *Brief history of the syllabus with examples.* Derek Bok Center for Teaching and Learning. Retrieved from http://isites.harvard.edu/icb/icb.do?keyword=k1985&state=popup&topicid=icb.topic58495&view=view.do&viewParam_name=syllabushistory.html&viewParam_popupFromPageContentId=icb.pagecontent79821

Students in the balance: General education in the research university. (2002). *The Penn State Symposium on Higher Education* Retrieved from http://dus.psu.edu/documents/publications/studentsinthebalance.pdf

Szostak, R. (2003). “Comprehensive” curricular reform: Providing students with a map of the scholarly enterprise. *The Journal of General Education*, *52*(1), 27-49. doi: 10.1353/jge.2003.0022

Taylor Huber, & Hutchings (2004). *Integrative learning: Mapping the terrain.* Retrieved from http://www.carnegiefoundation.org/sites/default/files/publications/elibrary_pdf_636.pdf

United States Department of Education. (2006). *A test of leadership: Charting the future of U.S. higher education.* Retrieved from http://www2.ed.gov/about/bdscomm/list/hiedfuture/reports/final-report.pdf

Webb, N. (1997). *Criteria for alignment of expectations and assessments in mathematics and science education. (*Research Monograph No. 8). Washington DC: Council of Chief State School Officers. Retrieved from http://facstaff.wcer.wisc.edu/normw/WEBBMonograph6criteria.pdf

Weissman, J., & Boning, K. (2003). Five features of effective core courses. *The Journal of General Education*, *52*(3), 150-174.