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Impact of a California Community College's General Education Information Literacy Requirement

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COLLEGE OF EDUCATION

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MLS, University of Illinois at Urbana-Champaign, 1999

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Budget cuts at a California community college prompted stakeholders to consider dropping the college's general education information literacy (IL) requirement. Broad institutional outcomes data showed learning gains, but no targeted assessment existed regarding the IL requirement's impact on those gains. This quantitative study used Astin and Antonio's Inputs-Environment-Outcomes (I-E-O) assessment model to address relationships among student characteristics of demographic and prior preparation (Inputs), the IL requirement (Environment), and student reports of information critical analysis behavior and confidence (Outcomes). Study participants were 525 students aged 18 years and older who had completed the IL course with a grade of 2.0 or better and volunteered to complete an anonymous survey. The majority of participants reported the IL requirement had a positive impact upon subsequent coursework, with 87% stating that taking it in the first or second term would be most helpful. Less preparedness for information critical analysis prior to the IL course was significantly correlated ($r = -.35$, $r = -.38$, $p < .001$) with higher reported frequency of 2 measures of information evaluation changes following completion of the course. The 3 hierarchical multiple regression analyses revealed that the predictors of student demographic characteristics, prior student preparation, and IL course format contributed significantly to reported information critical analysis and confidence. The study's outcome was a white paper with recommendations to support completion of the IL course requirement early, continue the IL requirement, and repeat the study's survey in the future. Effective IL education promotes information evaluation behaviors essential to informed members of society.

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List of Acronyms

ACCJC: Accrediting Commission for Community and Junior Colleges

ACRL: Association of College & Research Libraries

ASCCC: Academic Senate for California Community Colleges

CCCCO: California Community Colleges Chancellor's Office

CCSSE: Community College Survey of Student Engagement

CIRP: Cooperative Institutional Research Program

ESL: English as a Second Language

GPA: grade point average

HERI: Higher Education Research Institute at University of California, Los Angeles

I-E-O: Inputs-Environment-Outcomes

IL: information literacy

LIR: library & information resources

OIR: Office of Institutional Research

NSSE: National Survey of Student Engagement

PIL: Project Information Literacy

SRJC: Santa Rosa Junior College

SPSS: Statistical Package for the Social Sciences

WASC: Western Association of Schools and Colleges

Section 1: The Problem

Introduction

The evolution of the Internet created a paradigm shift in information access at community colleges. As students increasingly accessed information directly from the Internet, academic libraries, traditionally the primary source for mediated access to information necessary to support the learning process, had to compete. Throughout the 1990s, colleges raised concerns about students' abilities to find information on the Internet and critically evaluate it to produce successful outcomes (Association of College & Research Libraries [ACRL], 1989, 1998; Kuhlthau, 1991; Reeves, 1996). These concerns, subsequently identified as information literacy (IL) concerns, continue to affect higher education today (Chen, Pedersen, & Murphy, 2012; Gross & Latham, 2012; Gross, Latham, & Armstrong, 2012; Head, 2013; Ritzhaupt, Feng, Dawson, & Barron, 2013; Taylor, 2012; York, 2013).

To address students' information use concerns, the ACRL (2000) developed *IL Competency Standards for Higher Education*. These standards systematized expected IL competencies in education using performance indicators and learning outcomes. regional and discipline-specific accrediting bodies adopted IL as a core competency to ensure institutions were teaching and assessing students' IL abilities (Accrediting Commission for Community and Junior Colleges [ACCJC], 2014; Western Association of Schools and Colleges [WASC] Senior College and University Commission, 2013).

In 2002, the Santa Rosa Junior College (SRJC) initiated its general education IL requirement to address this IL educational need. Since then, the college has not

conducted targeted assessments to determine to what degree this requirement has achieved the desired outcome of instilling students with information evaluation knowledge and skills. The ACRL (2000) defined critical information evaluation skills as the ability to locate, analyze, synthesize, and evaluate information needed to conduct academic research. The college has needed to assess its assumption that a relationship existed between students' IL requirement participation and development of information evaluation behaviors. This quantitative study addressed this need.

In this project study, I assessed students' perceptions of the impact that a general education IL requirement had on their information evaluation abilities as a means to gather data to develop recommendations for program assessment. In Section 1, I introduce background information necessary to this study. This information includes the definition and significance of the problem, related research questions, a comprehensive literature review, and implications for the study results.

Definition of the Local Problem

The local problem prompting this study was the college's lack of targeted assessment of the impact of its general education information literacy (IL) requirement for student development. More than a decade has passed since SRJC (2013c) instituted its 1-unit general education IL requirement for those pursuing a local associate degree. In that time, the college had not tested the IL requirement to determine whether the course produced the desired outcome of equipping students with the information evaluation knowledge and skill set needed for successful involvement in other courses. Although local shared governance committees composed of administrators, faculty, staff, and

students discussed discontinuing the IL requirement, no specific assessment process was implemented. The college needed to assess its assumption that a relationship existed between participation in the IL requirement and developing appropriate student IL behaviors.

To provide an educational context for the study, I defined this problem in terms of issues in the larger education context of the United States and the state of California, as well as the local setting of a community college. Astin's (1985) theory of student involvement provided context for the study. The current study's purpose was to examine relationships among student characteristics, aspects of the general education IL requirement, and subsequent frequency of student use of IL critical information evaluation behaviors and levels of confidence in relation to writing papers and participating in discussions in other courses.

Definition of Terms

Key terms associated with the assessment of the IL requirement problem are defined here to clarify their usage in this study.

Critical analysis: SRJC (2013b) *Institutional Learning Outcomes* define *critical analysis* as the ability to "locate, analyze, evaluate, and synthesize relevant information" (para. 4). In this study, I used the phrase *critical evaluation* interchangeably with the phrases *critical analysis* and *critical thinking*, except when specifically discussing critical analysis from the SRJC *Institutional Learning Outcomes*.

Critical information evaluation behaviors: The ACRL (2000) defined critical information evaluation behaviors using performance outcomes including confidence in

using criteria to evaluate information and its sources, comparing new with prior

knowledge to determine contradictions; understanding information through discourse

with others, and determining if a search query should be revised to improve results.

Critical evaluation: ACRL's (2000) *Information Literacy Standard Three* (see

Appendix I) stated "the information literate student evaluates information and its sources

critically and incorporates selected information into his or her knowledge base and value

system" (p. 11). In this study, I used the phrase *critical evaluation* interchangeably with

the phrases *critical analysis* and *critical thinking*.

Critical thinking: Detmering and Johnson (2011) defined the word *critical*

thinking in the context of information literacy as the practice of analyzing and evaluating

information to direct belief and action. In this study, I used the phrase *critical evaluation*

interchangeably with the phrases *critical analysis* and *critical thinking*.

Effectiveness: Astin and Antonio (2012) defined *effectiveness* in terms of a

practice or program producing the desired outcomes. In this study, I used the word

effectiveness interchangeably with the word impact.

Engagement: Kuh (2008) defined the word *engagement* in relation to high-impact

activities that lead to student involvement in active-learning practices. In this study, I

used the word *engagement* interchangeably with the word *involvement*.

I-E-O model: Astin and Antonio (2012) defined the *Inputs-Environment-*

Outcomes (*I-E-O*) model as a method to assess the student development connections

among the Inputs of student characteristics, the Environment of the educational program

being measured, and the Outcomes as the cognitive or affective measures that students are expected to gain in the program.

Information literacy (*IL*): The ACRL (2000) defined *information literacy* as a set of skills that require "individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (p. 2).

IL requirement: SRJC (2014–15) identified a general education IL requirement, delivered via a 1-unit course, as the best method to ensure students gained core competencies as a component of the local associate degree.

Impact: Astin and Antonio (2012) defined *impact* in terms of measuring how educational practices produced a change in student skill development. In this study, I used the word *impact* interchangeably with the word *effectiveness*.

Involvement: Astin (1999) identified *involvement* as "what the individual does, how he or she behaves" (p. 519). In this study, I defined the word *involvement* as a student's behavior of critically evaluating information needed for writing papers or participating in academic class discussions.

LIR 10: SRJC (2014–15, 2013c) identifies *LIR 10* as a 1-unit course that meets the institution's general education IL requirement.

Outcomes: Astin and Antonio (2012) defined a taxonomy to classify student outcome measures using type of *Outcomes* (cognitive or affective), type of data (behavioral or psychological), and time (short term or long term). They identified affective *Outcomes* as a measure of a student's beliefs, self-concepts, attitudes, etc., such

as a self-report of the amount of time spent doing a task. In this study, I defined the word *Outcomes* as affective behavioral and psychological measures.

Research: The ACRL (2000) defined *research* as a set of skills used to identify information needs, implement search strategies to locate information, critically evaluate information for quality and relevance, and synthesize the information into their existing knowledge for problem solving.

Student development: Astin and Antonio (2012) defined *student development* as "changes in the student's abilities, competence, knowledge, values, aspiration, and self-concept that occur over time" (p. 23).

Student success: The California Community Colleges Chancellor's Office (CCCCO; 2011) defined *student success* in its Student Success Initiative as educational achievement and completion of a degree, certificate, or transfer.

Theory of student involvement: Astin (1985) described the student involvement theory as "the amount of physical and psychological energy that the student devotes to the academic experience" (p. 135).

Larger State and National Educational Context

Three relevant issues surrounded the college's IL requirement assessment gap problem. These issues included increasing numbers of underprepared students who may not possess IL skills and abilities, the IL education delivery methods options available, and the need to regularly assess general education requirements.

Historical Evolution of the Information Literacy Need

Beginning in the late 1980s, the Internet began to offer students alternative data resources that competed with the mediated services offered by the academic libraries (Horner & Thirlwall, 1988). Libraries continued to offer mediated access, but they could no longer claim to be the sole gatekeepers to information resources. The library was no longer the only available resource to support student research. As students increasingly accessed information directly from the Internet, instructors, and others in educational institutions raised concerns about the scope and quality of students' research capabilities and the quality of the information used to support their work (Bodi, 1988; Horner & Thirlwall, 1988; Kemp & Nofsinger, 1988; Lewis, 1987). Lewis' study of searches in emerging online library catalogs showed students were confused and often failed to find the needed information. Kemp and Nofsinger's study established that a significant number of beginning students did not possess the minimal research skills needed for college-level work. Bodi's study noted the growing need for college students to analyze critical information and its sources to achieve successful outcomes in research-intensive courses. As a result, the scope of IL education developed and expanded. The ACRL (1989) began a conversation about the implications of the emerging Internet in a Presidential Committee on Information Literacy report that emphasized the need for improved IL education on a national level.

Continuing into the 1990s, the growing need for IL education paralleled the rise of the Internet as a powerful decentralized information access point to a massive amount of information from an increasing number of available sources resulting in information

overload. In addition, the fact that anyone could contribute information freely to the Internet required that students be able to critically evaluate information sources to determine the value of the information found (Kuhlthau, 1991). Reeves (1996) discussed the need for students to filter ever-increasing amounts of information and use it selectively. The ACRL (1998) published an updated report from the Presidential Committee on Information Literacy that became a requirement within student learning. This report extolled national progress on IL, including the work of regional accrediting bodies. The report also warned of the continued challenges of incorporating teaching IL skills into the educational system.

In the 2000s, the ACRL (2000) published its *Information Literacy Competency Standards for Higher Education*. ACRL's *Information Literacy Standard Three* (see Appendix I) included critical thinking components related to analyzing information that enabled students to use information to increase their knowledge. Multiple authors continued to acknowledge the growing need for IL support in education. This research was based on studies that showed a reduction in the quality of information sources students used for research projects in academic settings (Grimes & Boening, 2001; Head & Eisenberg, 2009; Thompson, 2003; Wieler, 2004). These researchers highlighted the importance of the IL skills and abilities required to write research papers covering a broad range of general education subjects in the community college associate degree program. The need for IL education has persisted into the 2010s. Researchers are still raising concerns that students' IL information evaluation performance has not been

meeting expectations (Chen et al., 2012; Gross & Latham, 2012; Gross et al., 2012; Head, 2013; Ritzhaupt et al., 2013; Taylor, 2012; York, 2013).

The national response to the IL education needs resulted in studies showing students were underprepared for the complexities of navigating an information-dependent world (Grimes & Boening, 2001; Kuhlthau, 1991). Later studies showed similar findings (Head, 2013; Taylor, 2012; Thompson, 2003; Wieler, 2004). Community college students' reduced level of academic preparation included deficiencies in the IL critical evaluation component of information use and offered a rationale for the IL requirement (Conteh-Morgan, 2002; Gross & Latham, 2012; Finley & Waymire, 2012; Head, 2013; Showman, Cat, Cook, Holloway, & Wittman, 2013). This research, in turn, led to this study, designed to determine whether the college's IL requirement is an effective strategy to appropriately develop students' IL information evaluation abilities.

At the statewide level, the California Community Colleges Chancellor's Office (CCCCO, 2011) convened a task force to make recommendations for how the system could meet the challenge of educating increasing numbers of academically underprepared students. The task force recommendations centered on the need to equip students early in the education process with college success skills, thereby increasing their chances of graduating. In response to the task force recommendations, the California legislators passed the Student Success Initiative bill mandating that community colleges implement orientation practices to address statewide student preparedness concerns (CCCCO, 2013).

Researchers responded by documenting this IL need at the state and national levels. The educational community responded nationally, and, more specifically, in

California to meet that educational need. The college's IL requirement evolved from events occurring in this larger educational setting that, beginning in the late 1980s, highlighted how underprepared students struggled with academic IL critical information evaluation expectations.

Underprepared Students Information Literacy Need

The California community college system's open access mission provides opportunities for students who may not otherwise be able to obtain degrees. These students often face a variety of barriers to degree completion. Many arrive with a low level of academic preparation. This barrier requires them to stay longer to attain their degrees and increases the likelihood that they may not meet their educational goals (Astin, 1999; Cabrera, 2014; Heaney & Fisher, 2011; Kim and Bragg, 2008). Kuh (2008) originated the *National Survey of Student Engagement* (NSSE), which examined high-impact practices that addressed student development needs and increased success. Kuh considered IL education to be a high-impact practice with the potential to provide underprepared students with academic research support to increase overall success in writing intensive courses. Head (2013) included SRJC in a study of how freshmen conduct research. Head's work highlighted how underprepared students were not meeting desired academic research outcomes. Students reported that they struggled to complete or did poorly on research-based assignments.

As numerous researchers have noted, one of the most important components of IL education is a need for critical evaluation skills (Detmering & Johnson, 2011; Grimes & Boening, 2001; Hogan and Varnhagen, 2012; Kuhlthau, 1991; Radom & Gammons,

2014; Taylor, 2012; Thompson, 2003; Wieler, 2004). These higher-level IL critical thinking skills require students to analyze a research need, implement search strategies to locate relevant information, evaluate it for quality and appropriateness, and then synthesize it into their existing knowledge base for problem solving. Detmering and Johnson studied the effects of including critical thinking research concepts in an IL education module. They found that students valued critical thinking competencies such as asking a question and using information to determine an answer. Researchers have thus construed the capacity to perform critical evaluation of information as an active indicator of learner behavior.

Students themselves expressed awareness of their need for IL education. The University of Washington's iSchool's (2014) national-scale Project Information Literacy (PIL) studies showed that students consider IL knowledge and abilities to be college success skills. Head's (2013) PIL study of the research habits of freshmen included a sample of SRJC students. In this study's findings, students reported they were "unprepared to deal with the enormous amount of information they were expected to find and process for college research assignments" (Head, 2013, p. 2).

State and National Response to Information Literacy Need

The identified IL education need and ACRL's (2000) development of nationally recognized standards initiated changes in higher education accrediting practices. The IL competencies were defined using performance indicators and learning outcomes (ACRL, 2000). Regional and discipline-specific higher education accrediting bodies integrated

these competencies into their assessment expectations to ensure institutions were teaching and assessing students' IL abilities (WASC, 2013; ACCJC, 2014).

To meet accreditation standards, community colleges institutionalized and implemented IL education using different delivery methods (Artman, Frisicaro-Pawlowski, & Monge, 2010; Bowles-Terry, 2012; Detlor, Julien, Willson, Serenko, & Lavallee, 2011; Dunn, 2002; Fitzpatrick & Meulemans, 2011; Hellenius, 2007; McBride, 2011; Moore, Brewster, Dorroh, & Moreau, 2001; Orme, 2004; Radom & Gammons, 2014; Sherman, Martin, & An, 2012; SRJC, 2014–15; Zachery, 2010). The Academic Senate for California Community Colleges (ASCCC; 1998) resolved that all California community colleges should implement education programs to ensure that graduating students meet IL competencies. Four IL education delivery methods emerged from the system of 113 California community colleges, including using a stand-alone credit course, infusing IL into a core research course, integrating library instruction sessions into courses, and self-paced tutorials (CCCCO, 2014b; Hellenius, 2007).

The literature provided assessment results from studies showing how various IL delivery methods have positively impacted student success (Bowles-Terry, 2012; Detlor et al., 2011; Dunn, 2002; Kuh, 2008; Sherman et al., 2012). Bowles-Terry's correlation study looked at the effect of IL education on students' grade point average (GPA). The study results showed a relationship between participation in an IL course and higher GPA at graduation. Moore et al. (2001) reported on a longitudinal study conducted by the institutional research office at Glendale Community College. This study examined two IL education delivery methods, one a workshop and the other a stand-alone course. The

statistically significant results indicated "up to a 35 percent higher pass rate in English and English as a Second Language (ESL) composition classes for students who took the workshops" (Moore et al., 2001, p. 302). These two studies provide examples of how various IL education delivery methods impacted student development.

Local Educational Context

The local context for this study, the SRJC (2003) IL requirement program, included details of the college's community as well as information about students and their level of preparedness for the evaluation of information. It also included information about how the college institutionalized IL education delivery as a general education requirement and the assessment that was conducted to test institutional outcomes to date.

College Community, Mission, Values, and Programs

SRJC is a large California community college founded in 1918. It is accredited by the Accrediting Commission for Community and Junior Colleges (ACCJC), which functions under the Western Association of Schools and Colleges (WASC). SRJC's district covers approximately 1,600 square miles, and it is in the heart of northern California (SRJC, Office of Institutional Research [OIR], 2013).

SRJC (2013e) identifies its educational purpose in its vision, mission, and values statements. It emphasizes employing innovative educational methods to develop students' skills and knowledge. The CCCCO (2013) Student Success Initiative positively influenced the college's mission toward cultivating learning through student development. The CCCCO's influence extended the college's mission to include defining

the skills and knowledge the college valued and intended to see addressed within its general education requirements.

SRJC (2014) offers a variety of instructional and student service programs to achieve its student development mission within the context of the open-access mission of California community colleges. Institutional values can be an important component of efforts to evoke developmental change (Branson, 2008). The college identifies the value of providing innovation in its instructional and student support services to create a learning- and learner-centered environment. The college's student development mission aligns with this value. The IL requirement is an example of an innovative instructional program designed to support student's critical evaluation development in a general education delivery method that is uncommon within the community college system.

SRJC has offered a strong general education program that graduates more than 1,700 students annually with 2-year degrees, with more than 1,500 student transferring to 4-year colleges and universities each year (SRJC, OIR, 2013). SRJC's (2013b) *Institutional Learning Outcomes* include critical analysis, which indicates students are expected to conduct academic level research across the curriculum in courses including English 1A, Psychology 1A, Microbiology, Business, and Nursing, to name a few.

Students' Information Evaluation Preparedness

SRJC enrolls more than 25,000 students annually in more than 2,500 classes at two campuses, two centers, a farm, and online (SRJC, OIR, 2013). The ethnic demographic is predominately white with a Latino population that has expanded from "15% to 29%" (SRJC, OIR, 2013, pp. SD 6–7) within the last decade and continues to

grow at an accelerating rate. SRJC (2013a) has also experienced an increasing number of students enrolling who are underprepared for college-level work. Students at the college who began at the course levels of remedial English and English as a Second Language (ESL) courses were less successful in completing English 1A within 6 years than other groups (SRJC, 2013a). These students lack many of the skills necessary for academic success. This growing demographic of underprepared students has required remediation in foundational literacies such as reading and writing prior to enrolling in college-level courses. This need has resulted in an internal demand for the IL requirement as increasing numbers of underprepared students, including ESL students, need to learn how to conduct the kind of IL information evaluation required for college-level research.

Information Literacy Education Delivery Method

SRJC (2003) addressed the ASCCC (1998) IL education recommendations in Fall 2002 by adding a general education requirement in the form of a 1-unit course. The college's faculty and administrators made the assumption that a general education requirement would be the IL educational delivery method best suited to developing student research competencies in other courses. In so doing, they signaled their commitment to the development of IL critical evaluation skills and knowledge in students. SRJC was one of only a few California community colleges that implemented a general education IL requirement for graduation (Hellenius, 2007).

SRJC's (2013c) Library & Information Resources (LIR) Department facilitated IL education through its 1-unit course, LIR 10, Introduction to Information Literacy. This course met the general education "Area I: Information Literacy Requirement" (SRJC,

2014–15, p. 1) for the local associate degree. A required general education course has been an uncommon method of delivering IL education within the California community college system. SRJC (2013b) *Institutional Learning Outcomes* reinforced this commitment by including IL knowledge and skills under critical analysis as a component of a graduating student's expected overall level of proficiency.

SRJC's (2003) IL requirement evolved from events occurring in the larger educational setting. These events included students who were assumed to be underprepared to meet academic critical evaluation expectations, the state and national response to the IL education need, and how one community college institutionalized a general education IL requirement as an education delivery method. The college continued to support this program, with thousands of students completing the IL requirement yearly.

Information Literacy Requirement Assessment

SRJC's (2003) general education IL requirement has been in place more than two decades. The college has continued to make a commitment to supporting the IL requirement based on the assumption that participation in the LIR 10 course increased students' IL information evaluation behaviors in academic settings. The college has not gathered targeted data to test this assumption and determine if the IL requirement has, in fact, developed students' abilities to critically evaluate information necessary to conduct research effectively in academic settings.

A broad measurement of institutional learning outcomes generates the assessment data available at the college using a *Student Survey* (2013d) instrument of self-reported affective outcome gains. SRJC's (2013b) *Institutional Learning Outcomes* enumerates

the abilities students are expected to develop as part of their educational program. The critical analysis outcome is defined as students possessing the ability to analyze and evaluate information to solve problems. It is closely aligned with the ACRL's (2000) *Information Literacy Standard Three* (see Appendix I), that states "the information literate student is able to evaluate information and its sources critically and incorporate selected information into his or her knowledge base and value system" (p. 11).

The alignment of SRJC (2013b) *Institutional Learning Outcomes* critical analysis outcome (see Appendix J) with LIR 10's (SRJC, 2013c; see Appendix K) use of the ACRL (2000) IL standards (see Appendix I) as learning outcomes led to the assumption that completing the IL requirement relates to reported critical analysis gains (SRJC, 2010; 2013d). However, the *Student Survey* (2013d) instrument containing measures of institutional learning outcomes did not address whether participation in the IL requirement through LIR 10 is responsible for those gains. It is quite possible that students may have obtained these gains through other means such as participation in English 1A.

SRJC's (2013b) *Institutional Learning Outcomes* measurement of the critical analysis outcome allowed for a broad, standardized assessment of student development. However, it did not assess the impact of the college's choice of the general education requirement for IL education delivery. The lack of literature published regarding similar IL requirements imposed on students at the community college level compounded the college's lack of information to support decisions about IL education delivery. Despite exhaustive research, I found no articles and only a single dissertation specific to IL

assessment linked to an IL general education requirement program. In that qualitative study, Zachery (2010), related student learning and student success in three California community colleges to IL requirements. The delivery methods studied were stand-alone and linked library courses. Zachery reported anecdotal findings that IL education positively influenced student performance on research papers and stressed the need for the development of a quantifiable assessment instrument to determine the extent to which IL affects student development.

<div align="center">**Rationale**</div>

Community college administrators monitor general education requirements to ensure they achieve institutional goals. SRJC's (2014–15) IL requirement has been a local general education requirement for more than a decade but the school has not conducted a targeted assessment of the program's effectiveness. Research shows that students continue to struggle with the evaluation of information needed for writing papers or participating in class discussions in academic courses. The college needed a targeted assessment process to determine if the goals of its IL education delivery method were being met and if they conformed to the changing needs of the institution and its students.

SRJC, like other colleges, struggles to respond to demographic shifts, budget restrictions, accreditation standards, and changing government regulations. These competing pressures make it essential for the college to regularly examine the relevance of its required general education courses to students' programs of study (Sorey & DeMarte, 2013). This study supplemented the college's institutional level assessment, currently in use, with a targeted survey component designed to determine if the

requirement's skill development goals for students were being met. The choice to study the college's lack of program targeted assessment was based on institutional documents, California governing bodies' resolutions and initiatives, and regional accreditation standards as well as research studies in the professional literature.

Evidence of the Problem in the Larger State and National Context

The United States relies on recognized accreditors vested by the Department of Education operating within regions to assess community college educational programs. The ACCJC (2014), the regional accrediting body for California, required institutions to provide evidence of IL education and proof of its assessment in its Standard IIC. The ASCCC (1998) resolved that community colleges provide IL education in some form, and 16 years later, this expectation persists.

However, state legislators did not earmark any funding for community college IL education to implement this resolution. The Student Success Initiative legislation, designed to address the state's increasing numbers of academically underprepared students, significantly influenced how the state funds its community colleges (CCCCO, 2013). The CCCCO reported that the system has experienced 5 years of severe budget cuts beginning in 2007. These cuts resulted in a statewide 25% reduction in the number of course sections individual community colleges could offer (CCCCO, 2014b). The result of this reduced number of course offerings has been a delay for students needing to complete degree requirements.

Evidence of the Problem in the Local Context

As a result of the statewide budget constraints, SRJC's administration decreased the number of course sections offered across the board. This reduction created an internal pressure due to the college's need to fund sufficient sections to support every student coming through, particularly in hard economic times. Large numbers of students were unable to enroll in the IL requirement courses needed to graduate, thereby delaying program completion. The graduation delay caught the attention of the college's administrators as they faced state pressures to move more students to degree completion.

The graduation delay caused by high enrollment demand for the IL requirement LIR 10 course was discussed in several of the college's stakeholder and shared governance committees (SRJC, Academic Senate, 2013; SRJC, Education Planning and Coordination Council [EPCC], 2013). The Counseling Department complained about the insufficient number of available LIR 10 sections with open seats to meet student demand. SRJC's EPCC raised concerns about the efficacy of the general education delivery method for the IL requirement and noted the need to determine if this method should continue in the future. SRJC's Academic Senate acknowledged the EPCC enrollment pressure concerns. Popular feeling was that the institution needed to make a decision about keeping the general education IL requirement. If the college decided to keep the requirement, it must provide support by increasing the number of sections available for students. As funding sources perceive student completion as an indicator of a community college's success, lack of access to the IL degree requirement posed an institutional dilemma. Stakeholders discussed the enrollment pressures, but still they did not consider

whether the IL requirement helped students acquire valuable skills leading to student success throughout their program. They simply stated concerns about the high number of students needing the requirement.

In 2002, SRJC (2014–15) added a general education IL requirement as a component of its local associate degree. Since that time, SRJC's LIR Department received a number of testimonials from students regarding the impact of the IL requirement. Other than these testimonials, no targeted assessment data existed to show whether or not the IL requirement had been a relevant program component that fostered student success in a liberal arts general education. IL critical analysis gains in student learning were self-reported in the 2010 and 2013 versions of an SRJC (2010, 2013d) longitudinal *Student Survey*. The 2013 survey assessed 10% of the credit students and 100% of online students in randomly selected courses resulting in "2,780 responses" (SRJC, 2013d, p.1). The survey analysis used student characteristics such as age, gender, ethnicity, and academic preparation as independent variables to ensure the sample represented the student population as a whole (SRJC, 2013d). In SRJC's *Student Survey* students were asked to provide self-reports of how much their education had increased their "knowledge, skills, and abilities" (SRJC, 2013d, p. 31) on 20 different institutional learning outcomes. SRJC's (2013a) *Institutional Effectiveness Assessment Report* indicated students' highest skills and abilities gains were in writing (81.0%) followed closely by critical analysis "locating, analyzing, evaluating and synthesizing relevant information" (80.8%; p. 7). Whether the IL requirement had an impact on gains made or

the maintenance of higher levels achieved was not directly assessed. Results indicated that the objectives of the requirement were being met somewhere within the curriculum.

Student behaviors are indicators of their skills and abilities that, in turn, are indicators of development. Astin (1999) believed that the concept of involvement related more to how a student behaved rather than what the student thought or felt. A study of the impact of the IL requirement on students' information evaluation behavior could provide insight into the continued need for the program. Research has shown the value of IL education but its delivery as a core component of the general education program requires further study for insight into the impact of such a program on student learning. In making future decisions relating to the program, the college would benefit from a program focused assessment of the impact of its current method of delivering IL education on students' critical information evaluation behaviors. The gap in assessment of the general education IL requirement created the potential for the college to make decisions without evidence. Assessment was needed to ensure that resources were being used to best effect in meeting institutional objectives. This study examined relationships among student characteristics, aspects of the general education IL requirement, and subsequent frequency of student use of IL critical information evaluation behaviors and levels of confidence in relation to writing papers and participating in discussions in other courses.

Significance of the Study

The local, statewide, and national evidence showed a gap in the practice of assessment of the college's general education IL requirement. The lack of assessment of this requirement was relevant in the local context because external funding pressures

made it critical for the college to determine if it should continue to support the IL

requirement program. This study addressed the gap in assessment by quantifying

students' information evaluation behavior changes in academic settings as a result of

participation in the LIR 10 course meeting the IL requirement.

This study provided a targeted way to assess students' IL critical evaluation skills

and knowledge development in academic settings. The college can use these data as the

basis for examining the efficacy of the general education requirement as an IL education

delivery method. Study of SRJC's IL requirement also produced data about the

relationship between successful IL requirement completion and student behavior changes

in other classes. Findings about these student behavior changes can inform institutional

decisions about the impact of the program and can be used as a basis and support for

future decision-making. The lack of targeted assessment of the IL requirement was

significant in the larger educational context because all California community colleges

must deliver IL education. The study added to the professional literature regarding the

impact of a general education delivery method for IL education and its assessment.

Research Questions and Hypotheses

This study had one overarching question and two researchable questions (RQ)

that were aligned with the problem, purpose, and literature. I developed null and

alternative hypotheses for each of the research questions that informed the research

design and approach. I used a survey to collect data for the 10 independent and three

dependent variables in the study. The student identified characteristics referred to broadly

in the research questions specifically included age, gender, ethnicity, primary language,

terms attended, English course level, research preparedness, and number of papers comprised eight of the independent variables. The remaining two independent variables, referred to specifically in the research questions, included the IL requirement course characteristics of format and length. The dependent variables consisted of IL information evaluation behavior changes and levels of confidence. Descriptive and correlation statistical tests will be used to determine if relationships between independent and dependent variables exist.

Overarching Question

Is a 1-unit general education requirement an effective IL education delivery method for students at a community college?

Research Questions and Hypotheses

RQ1: What is the relationship between completion of the general education IL requirement course with different formats and lengths and frequency of information evaluation behavior changes among students with identified characteristics?

H_{01}: There is no statistically significant relationship between identified characteristics of students who completed the general education IL requirement course with different formats and lengths in terms of information evaluation behavior changes.

H_{a1}: There is a statistically significant relationship between identified characteristics of students who completed the general education IL requirement course with different formats and lengths in terms of information evaluation behavior changes.

RQ2: What is the relationship between completion of the general education IL requirement course with different formats and lengths and how skills learned contributed

to information evaluation confidence in other courses among students with identified

characteristics?

H_{02}: There is no statistically significant relationship between identified

characteristics of students who completed the general education IL requirement course

with different formats and lengths in terms of how skills learned contributed to

information evaluation confidence in other courses.

H_{a2}: There is a statistically significant relationship between identified

characteristics of students who completed the general education IL requirement course

with different formats and lengths in terms of how skills learned contributed to

information evaluation confidence in other courses.

Research Question Alignment with Problem, Purpose, and Literature

The overarching question directly aligned with the identified problem of the

college's IL requirement program assessment gap. It also aligned with my purpose to

examine relationships between student characteristics, aspects of the general education IL

requirement, and subsequent frequency of student use of IL critical information

evaluation behaviors and levels of confidence in writing papers and participating in

discussions in other courses. The study results will provide assessment data the college

can use to determine the impact of a general education requirement as a delivery method

for IL education at a community college. The institutional, regulatory, and, professional

literature provided evidence of the increasing number of underprepared students in

colleges and universities and the role of IL critical information evaluation education in

student success. The literature also addressed the importance of assessment of general

education requirements and the value of Astin's (1985) Inputs-Environment-Outcomes (I-E-O) model of assessment. SRJC's limited documentation of IL skill development underlined the IL requirement program assessment gap as a problem. The use of the I-E-O assessment model to provide insight into the impact of SRJC's IL requirement program gave rise to one overarching and two research questions. I used relationship types of quantitative research questions. These types of questions related one or more identified student characteristics variables such as age or level of English course completed and one or more program characteristics variables such as course format and length to how frequently students use IL critical analysis behaviors or noted confidence level changes to discover relationships among the variables.

Review of the Literature

Abundant studies have been published on IL skills and abilities and a large body of literature on various aspects of IL education exists. However, a lack of studies assessing the efficacy of a required general education course as the IL education delivery method existed. The review focused specifically on institutional, regulatory, and professional literature directly related to the student development impact of IL education. I organized the review around the topics of student involvement, students' IL critical evaluation behavior development, and IL education delivery methods within local educational contexts and in the higher education community.

Theoretical Base and Conceptual Framework

Astin (1985) described the theory of involvement as "the amount of physical and psychological energy that the student devotes to the academic experience" (p. 135).

Based on longitudinal studies of student development, Astin concluded that involved students spend more time and effort in educational activities, resulting in increased student performance (Astin, 1999). Based on those findings, Astin concluded that the more frequently students were involved in developmental opportunities, the more likely they were to be engaged and achieve educational goals.

Astin and Antonio (2012) defined student development as "changes in the student's abilities, competence, knowledge, values, aspiration, and self-concept that occur over time" (p. 23). Astin's (1985) theory evolved from the idea that students' knowledge and skill development relate to their level of involvement. Knowledge and skill development, two of Astin's central concepts, also make up the core of SRJC's (2013e) mission. This alignment was fundamental to the association between Astin's model and the IL information evaluation development gap at the college.

IL education develops critical information evaluation competencies in students, allowing them to make connections needed for successful involvement in courses that require research for writing. Detmering and Johnson (2011) noted the fundamental value of critical thinking in academic courses. Kuh (2008) listed IL as one of the high impact practices affecting student engagement in intensive writing courses. As a result of this research, educators have assumed that the general education IL requirement could potentially have an impact on students' success and completion rates through the development of the information evaluation skills needed for research.

Inputs-Environment-Outcomes Model Description

Astin's (1985) I-E-O model of assessment offered a conceptual framework for examining the student development impact of a general education IL requirement. Astin was the first director of HERI at the University of California, Los Angeles. The longitudinal study of college students conducted nationally since 1973 through CIRP brought attention to the student involvement issue (HERI, 2014). CIRP is the largest empirical study of higher education including "1,900 institutions, over 15 million students, and more than 300,000 faculty" (HERI, 2014, para. 2).

Astin (1985) developed the I-E-O model, shown in Figure 1, to facilitate the assessment of student development by using the connection among Inputs, Environment, and Outcomes. The Inputs are the individual characteristics and level of development that students bring to the learning environment. The Environment is the educational program being measured. The Outcomes are cognitive or affective measures of what students are expected to gain in the program (Astin & Antonio, 2012).
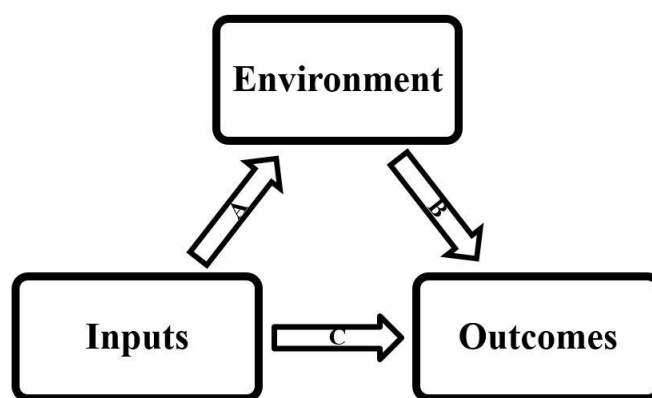
Figure 1. A diagram of Astin's Inputs-Environment-Outcomes model.

Justification of Selection of the Inputs-Environment-Outcomes Model

I chose Astin's (1985) I-E-O model as a diagnostic tool and as a conceptual model for measuring the student development impact of the IL requirement. Astin believed that involved students learn more and are, therefore, more successful. I considered several theoretical frameworks for this study, including the social constructivist theory of education, IL education theory, critical thinking theory, and literacy acquisition theory. Ultimately, I selected Astin's theory of student involvement and I-E-O model as the study's theoretical basis and the conceptual framework that most closely matched the needs of a quantitative study of behavior changes with a learner-centered focus.

A number of educational studies have used Astin's student involvement theory and I-E-O model to evaluate the impact of various educational programs on students' experiences or development. Thurmond and Popkess-Vawter (2003) studied the intersection of the theoretical and empirical uses of the I-O-E model for evaluating the effectiveness of online courses. These researchers concluded that Environment characteristics were the most predictive of student satisfaction in a Web-based course and that the model's inclusion of Inputs and Environment characteristics provided more insight into Outcomes than unitary assessments.

I found support for Astin's (1985) theory of involvement in Elkins, Forrester, and Noel-Elkins' (2011) survey of the influences of out-of-class activities on students' perceptions of the campus community. Cluster and multivariate analysis of particular activities produced significant results indicating that involved students showed a higher

sense of community (Elkins et al., 2011). Their study showed the power of Astin's theory and framework to provide assessment of an educational program.

A variety of studies covered Astin's notion of student involvement/engagement. Elkins et al. (2011) noted that the terms involvement and engagement are frequently used interchangeably in the literature. Wolf-Wendel, Ward, and Kinzie (2009) supported that claim in their extensive review of student development literature for use of the terms involvement (Astin, 1985) and engagement (Kuh, 2008). In addition, personal interviews of Astin and Kuh showed they assigned similar meanings to the two terms (Wolf-Wendel et al., 2009). These authors identified involvement as being focused on student behaviors and engagement as being focused on institutional behaviors specifically related to providing an environment with development opportunities (Wolf-Wendel, et al., 2009).

Cabrera (2014) used Astin's (1985) I-E-O survey model to complete a qualitative analysis of college preparation characteristics affecting first-generation minority students at a state university. Kim and Bragg's (2008) investigation of community college student relationships between the Inputs characteristics of gender and educational background and Environment characteristics of career and technical education were significant to the output of preparedness. These findings contributed to their conclusion that the I-E-O model produced a valuable assessment of an educational program (Kim & Bragg, 2008). Heaney and Fisher (2011) concurred that using Astin's I-E-O model as their study's framework provided useful data to study education environments. Their survey resulted in data showing relationships between Inputs and Environment factors affecting the outcome of persistence in first-year university students (Heaney & Fisher, 2011).

Utilizing Astin's (1985) I-E-O model of assessment provided a framework around which to collect data and analyze reports of past behavioral changes (Astin & Antonio, 2012). An additional value of Astin's I-E-O model was that it allowed adjust for differences in student Inputs characteristics using multivariate analysis techniques. Astin and Antonio (2012), posited that using these techniques produced a "less biased estimate of the comparative effects of different environments on outputs" (p. 20). Lastly, the I-E-O model provided a reputable and established measurement tool to gather students' self-reported information evaluation behavior changes as quantifiable affective Outcomes of the development impact of the IL requirement.

Conceptual Framework's Contribution to Understanding of the Problem

Astin's (1985) I-E-O model of assessment for data collection and analysis methods provided the appropriate conceptual framework for assessing the impact of the IL requirement program. This framework provided the background of the problem including the preparedness issues surrounding student characteristic Inputs, the IL education delivery methods characteristic of the Environment, and the students' critical analysis behavior and confidence Outcomes. These model factors have the potential to fill the college's gap in general education assessment practices. This framework outlined how I could use students' changes in their academic behaviors to measure the impact of participation in the IL requirement for student development (Astin & Antonio, 2012), reinforcing Astin's (1999) belief that "it is not so much what the individual thinks or feels, but what the individual does, how he or she behaves, that defines and identifies involvement" (p. 519). Additional appeals of this model were its simplicity and its

potential to provide valuable insight into program impact. The model accommodated for varying beginning student characteristic Inputs, selected measurable educational environment aspects, and quantified the affective Outcomes of student behavioral changes or psychological levels of confidence.

Larger Educational Context in the Literature

Key associations and organizations responded to the national IL skills problem verifying the educational need (ASCCC, 1998; ACRL, 1989, 1998, 2000; CCCCO, 2011, 2013; Hellenius, 2007; SRJC, 2013c, 2014–15). The ACRL reports from the Presidential Committee on Information Literacy documented the strong student developmental need for IL education that resulted in the creation of the nationally recognized ACRL (2000) IL standards. In response, the ASCCC recommended that all community colleges in the state provide IL education in some form. The ASCCC supported further study of delivery methods developed out of their recommendations (Hellenius, 2007). The CCCCO created the Student Success Initiative from task force recommendations indicating the importance of providing underprepared students with development opportunities. In the early 2000s SRJC responded to the state and national call for IL education by institutionalizing a general education IL requirement.

The academic needs for IL critical evaluation skills and training are well documented in the professional literature. Numerous studies have been conducted that examined the information skills competency levels of students entering and attending colleges and universities. Gross et al. (2012) derived data from a series of empirical studies that indicated the IL need of first-year college students with below proficient

scores on a standardized IL test. Gross and Latham (2013) published further results from multiyear studies that indicated a clear need for the development of an IL educational intervention in the form of instructional modules.

Ritzhaupt et al., (2013) conducted a study using a standardized IL assessment with a focus on student demographic Inputs. Their results showed statistical differences among groups when the population was divided by student socioeconomic status (SES), ethnicity, and gender (Ritzhaupt et al., 2013). Chen et al. (2012), Head (2013), and York's (2013) findings all showed that substantial numbers of students struggle with information overload that can affect participation and cognitive processes. Based on these studies and reports, IL is necessary across disciplines so that students can be challenged to develop the ability to find accurate information and evaluate resources in various areas of endeavor. Taylor's (2012) longitudinal study produced statistically significant results indicating that millennial generation students' information searching behaviors were erratic and that these students did not routinely evaluate the quality of information provided by the sources they found.

Student Information Evaluation Preparedness

A number of studies highlight the value of information evaluation behaviors in academic research. Astin (1985) noted that student behavior is an important measure of student development that can be useful for assessing program impact. When reviewing the literature, I found few studies specific to the ACRL (2000) *Information Literacy Standard Three* (see Appendix I) critical evaluation performance indicators that I used for the study. These critical evaluation behaviors included confidence in applying criteria to

evaluate information and its sources, comparing new knowledge with prior knowledge to determine contradictions, understanding information through discourse with others, and determining if a search query should be revised to improve results.

Hogan and Varnhagen (2012) studied undergraduates who had been exposed to minimal IL education intervention. Their study showed that these undergraduate students had not developed information evaluation skills and were prone to using biased, dated, and otherwise inappropriate websites when asked to do research. The research of Hogan et al., was one of the only studies I found that addressed behaviors specific to the study.

Many librarian instructors used the currency, relevance, authority, accuracy, purpose (CRAAP) test to teach students information evaluation criteria (Meriam Library, California State University at Chico, 2010). Radom and Gammons (2014) conducted an assessment study of teaching the five Ws (who, what, when, where, why) method of inquiry as evaluation criteria. They concluded that both students and discipline faculty found value in the method.

Finley and Waymire (2012) examined bibliographies. Their study highlighted the importance of infusing IL education into business courses to meet underprepared students' need to analyze discipline specific information critically. Showman et al. (2013) emphasized the role creativity and judgment play in the undergraduate research process. Their findings also noted that students were not comfortable seeking help from others and were reluctant to ask for assistance when solving problems.

Underprepared students pose an increasingly important factor in community college education. Underprepared students require education in basic skills including IL

education to facilitate a successful pathway to completion (Gross & Latham, 2012).

Several studies and reports addressed the role of IL education in developing

underprepared students to a level where they are competitive with their peers in the

classroom (Community College Survey of Student Engagement [CCSSE], 2013; Conteh-

Morgan, 2002; ETS, 2014; Gross & Latham, 2012; Head, 2013; SRJC, 2013a). However,

little information on IL education for Latino students existed in the literature. Conteh-

Morgan discussed IL barriers that Latino English as a Second Language students

encounter and the importance of IL education to teach students to make connections

between new and known information.

A large percentage of the studies I found in the literature concerned the impact of

teaching IL at 4-year colleges and universities. Fewer studies covered community

colleges. Astin (1999) noted a finding from the CIRP longitudinal student development

study that, even when controlling for differences in student characteristics, the chance of

community college students dropping out is higher than if they attended 4-year colleges

and universities. As community colleges continue to incorporate new methods to meet

the needs of their underprepared students, studying the effects of the IL requirement can

offer data regarding the effects of the practice on student development.

Information Literacy Education Delivery Methods

For decades, educational literature has actively discussed information literacy.

The IL education movement of the late 1990s produced an abundance of scholarly

references to various aspects of IL educational delivery methods and students' academic

IL critical evaluation research competencies. Numerous research studies provided

national evidence of problems in the quality of students' research capabilities (ACRL,

1989; Grimes & Boening, 2001; Head & Eisenberg, 2009; Head, 2013; Kuhlthau, 1991;

Taylor, 2012; Thompson, 2003; Wieler, 2004).

Numerous studies in the literature assessed the success of various IL education

delivery methods (Bowles-Terry, 2012; Detlor et al., 2011; Dunn, 2002; Moore et al.,

2001; Sherman et al., 2012). However, I found few studies that addressed the role of IL

education in developing information evaluation skills (Detmering, & Johnson, 2011;

Gainer, 2012). Few studies examined the range of IL education delivery methods

employed by the 113 California community colleges. The exception was one study that

surveyed the IL education delivery methods used in the California community colleges

noting that the 1-hour instructional session was historically the predominant teaching

method (Hellenius, 2007). Zachery's (2010) dissertation was the one study I found that

attempted to examine student development in relation to required IL courses in the

California community college system. Zachery noted the challenge of collecting evidence

in this qualitative study of student development resulting from participation in required

IL courses and recommended development of quantitative assessment instruments.

Artman et al. (2010) addressed the issue of research writing skills being taught in

English classes and the importance of "one-shot" library instruction sessions in

complementing the process. In an older study, Orme (2004) examined the IL education

development of first-year college students using the web-based Texas Information

Literacy Tutorial (TILT). The study's findings showed the effectiveness of online

tutorials, and the concluded they were comparable to on-ground (face-to-face) instruction

(Orme, 2004). McBride's (2011) study focused on the integration of 21st-century literacies into IL courses. Fitzpatrick and Meulemans (2011) conducted a quasi-experiment examining two IL education delivery methods offered in conjunction with a developmental psychology course. The two delivery methods tested were a stand-alone self-paced IL assignment or the same assignment with the addition of a librarian-led IL workshop. Results showed significantly better scores when testers coupled the assignment with the workshop.

Information Literacy General Education Requirement Assessment

SRJC's general education IL requirement assessment gap was compounded by the lack of published literature regarding similar requirements at the community college level. Despite exhaustive research, I found no articles that evaluated affective behavioral changes linked to an IL degree requirement program.

The college committed to the general education IL requirement as its delivery method but had not specifically assessed the student development impact of this method. Assessment of general education requirements is essential to ensure students are learning what the institution has placed as its highest priorities (Andrews, 2012; Robertson, 2013; Siefert, 2011; Sorey & DeMarte, 2013). Sorey and DeMarte's study illustrated the importance of evaluating general education requirements for student development. Siefert introduced the Valid Assessment of Learning in Undergraduate Education (VALUE) as an assessment model of general education learning outcomes including written communication, inquiry, critical thinking, and information literacy. Robertson noted the importance of using evaluation criteria to keep the community college general education

program relevant, thereby increasing student engagement. This study also recommended removing general education courses that no longer met the criteria. Andrews discussed the important role that libraries play in supporting the general education program and advocated using technology to ensure relevance.

Most of the studies I found assessed teaching IL at 4-year colleges. Few assessed community colleges. I did not identify any scholarly studies in the professional literature for the last 10 years that directly addressed the assessment of the impact of a general education IL requirement course on student development of information evaluation behaviors. In addition, I could find no studies in the professional literature published within the last10 years that assessed the efficacy of various IL education delivery methods. However, the college remains committed to teaching IL to its students, suggesting the need for a reasonable model of targeted assessment.

Local Educational Context in the Literature

SRJC's OIR, (2013) reports that increasing numbers of underprepared students are enrolling aligned with state and national trends. These trends influenced SRJC's (2013e) focus on student development in its vision, mission, and values statement. Increased pressures for assessment of programs from accrediting bodies (ACCJC, 2014; WASC, 2013) encouraged the college's interest in the assessment of the effectiveness of its institutional programs. The college identified the general education IL requirement as one of those programs under review. Several local institutional documents illustrated SRJCs commitment to IL education and the gap in assessment to support its value to the institution (SRJC, 2013a, 2013b, 2013c, 2013d, 2013e, 2014–15; SRJC, OIR, 2013).

Underprepared Students Increasing in Number

California community colleges, in general, and SRJC in particular are experiencing increasing numbers of students testing into developmental English (SRJC, OIR, 2013). I was unable to access data on the IL skill levels of incoming students because the institution does not administer an IL placement test (ETS, 2014). It is important to measure a student's level of development because it is relevant to SRJC's (2013e) mission and supports statewide student success efforts (CCCCO, 2013). SRJC's *Scorecard* data showed that ESL students are not persisting to graduation as often as other ethnic groups (CCCCO, 2014a). I included a measure of ethnicity because of the high percentage (29.4%) of Latino students at SRJC (CCCCO, 2014a).

SRJC's (2013a) student demographics was similar to national statistics concerning the increases in enrollment of students underprepared in the information evaluation learning behaviors needed for college-level academic research (CCCCO, 2014c). This growth required the college to focus its mission more tightly on the development of students (SRJC, 2013e). Students at the college who began in remedial English and ESL courses showed lower completion outcomes for finishing English 1A within 6 years than did other groups (SRJC, 2013a). These students were found to lack the academic preparation necessary to be successful in courses that require research.

Information Literacy Requirement Delivery and Assessment

SRJC (2003, 2014–15) approved adding an IL requirement to its general education program. SRJC was one of the few California community colleges that implemented a stand-alone course, general education requirement as the delivery method

for IL education. The requirement addressed the IL education recommendations of the statewide Academic Senate (1998). SRJC (2013b) *Institutional Learning Outcomes* requiring students to critically analyze information and sources needed to succeed in academic settings was also addressed. To ensure the level of quality of IL education and to justify the commitment, SRJC (2013c) aligned LIR 10's official student learning outcomes with the ACRL (2000) IL standards. These standards also aligned with SRJC *Institutional Learning Outcomes* critical analysis outcomes and are forming the basis of SRJC's (2014) general education specific learning outcomes.

The college's assessment efforts included a broad assessment of the institutional learning outcomes performed longitudinally via SRJC's (2010, 2013d) *Student Surveys*. These *Student Survey* results showed students' self-reported gains were high for the critical analysis affective outcome. SRJC's (2013a) *Institutional Effectiveness Assessment Report* cited these gains as a benchmark measure of educational effectiveness. Despite these IL related gains, the college's shared governance committees responded in 2013 to several years of statewide budget cuts with discussions of eliminating the IL requirement without any talk of the impact of the IL requirement on student development (SRJC, Academic Senate, 2013; SRJC, EPCC, 2013). These discussions showed the importance of conducting targeted assessments to connect the broader institution level IL critical analysis gains to student participation in the IL requirement.

Saturation Reached in Literature Review

I conducted an extensive review of the educational literature using EBSCO, Sage, ERIC subscription databases, and a free database, Google Scholar. The searches focused

on the primary topic of information literacy and competency education. The secondary searches included the following terms and phrases: IL need, students, research, information overload, Internet, online, IL instruction delivery methods, IL state and national history, assessment, IL behaviors and abilities, general education program assessment, student success and development, evaluation, IL critical analysis, evaluation and thinking, learning outcomes, student involvement and engagement, IL education impact, community college, accreditation, survey methodology, student self-assessment, student self-reporting, and data analysis.

Relevance and Relationship of Literature to Proposed Research Study

The literature retrieved was well aligned with the problem identified and the rationale, purpose, and methods used in the study. The literature included an abundance of scholarly documents extolling the positive benefits of IL education on student success. The Sherman et al. (2012) qualitative study of a bachelor's degree graduation requirement found that an IL education positively impacted student performance. Researchers measured the success of different IL educational delivery methods in the literature. Some studies of the relationship between IL and student success were conducted by examining research paper citations and grades in a research-intensive course such as Psychology 1A. Others established correlations between IL education and student retention or program completion (Bowles-Terry, 2012; Detlor et al., 2011; Dunn, 2002). However, a gap existed in the literature relating to the assessment of a general education IL requirement program. This gap supported the need for a study of SRJC's program (2014–15). The literature review showed how student preparedness and IL

education delivery method assessment can have local implications for program

assessment and act as a contributor to larger social change.

Implications

This study's research questions and hypotheses provided implications for a

project that evolved from the research literature and findings. The primary requirement

for the project is to communicate efficiently the study's findings and recommendations to

busy faculty and administrative stakeholders who may not have time to read the entire

report. A white paper can provide an appropriate communication model for the study

results. The white paper's design can allow for policy recommendations based on the

study's research and results from the survey of learner-centered self-reported information

evaluation behavior changes to be communicated. Using a white paper as the product of

the study provides an informative context of the background of the problem using

evidence from the state, national, and local literature. The background can frame the

issues of student preparedness, IL education delivery methods, and the college's IL

requirement assessment gap as evidence of the problem. A white paper can also provide a

description of the study's methodology, use of Astin and Antonio's (2012) I-E-O model

as the theoretical framework, a summary of the study's data analysis results, and policy

recommendations regarding the college's future assessment practices. These

recommendations can form the basis for institutional discussion and inquiry into a new

mechanism for assessing the effectiveness of the general education IL requirement.

Summary

The problem prompting this study was the lack of targeted assessment of the impact on student development at the college of a general education course requirement designated as an IL education delivery method. An IL requirement delivered as a 1-unit course had been part of the local general education program at the college for more than a decade, yet no targeted assessment had been conducted to assess its impact. The college can use data from the study of program impact as a basis and support for future decision-making. The lack of specific assessment of the IL requirement was important locally because external funding pressures made it critical for the college to determine if it should continue to support the IL requirement at the college. Examining the success of the general education requirement as a delivery method by relating it to aspects of student development can have implications for policy recommendations regarding developing an IL requirement assessment mechanism. Section 2 describes the study's methodology, including the research design and the approach used, particulars of the setting and sample of participants, specifics of the instrument and materials, and details of data collection and analysis. The section includes comments on the protection of participants and potential limitations of the study and concludes with the data analysis results and interpretation. In Section 3, I describe the project that developed from the study, the assessment plan, and implications. In Section 4, I reflect on the project's strength, importance and implications for further research.

Section 2: The Methodology

Introduction

The purpose of this quantitative study was to examine relationships among student characteristics, aspects of the general education IL requirement, and subsequent frequency of student use of IL critical information evaluation behaviors and levels of confidence in relation to writing papers and participating in discussions in other courses. Astin's (1985) involvement theory framed the analysis of relationships between the IL requirement completion and student levels of confidence derived from its effect on their information evaluation activities related to writing papers and participating in discussions in other courses. I used survey methodology to gather data from students who completed the general education IL requirement and descriptive, cross-tabulation, correlational, and multiple regression analysis to determine relationships.

Astin's (1985) I-E-O model identified a framework for using survey research methods. The closed-ended items on the study's survey collected data on students' changes in information evaluation behavior experienced as a result of participation in the IL requirement program. I analyzed the quantitative data and used the results to determine whether data supported the institutional assumption of a relationship between the IL requirement and students' critical information evaluation development. Tables, figures, and appendices support this study. Findings from this study may assist with future institutional decision-making. Goals of this research were to gather data on student critical information evaluation behaviors and to create a basis for the college's future scheduled assessment practices.

I divided Section 2 into seven areas. The first area includes a description of the survey research design and approach, as well as the justification for and relationship of the quantitative research design to the problem of the study. The second area includes a description of the designated target population specifying size and makeup, criteria for participation, and participant eligibility and selection. I also cover sampling method, size, and characteristics. The third area describes in detail the survey instrument, the concepts measured, and the score's calculations and meanings. In addition, this section discusses how the instrument's validity and reliability were established using peer expert review and a pilot study. The fourth area details data collection and analysis methods including a description of procedures used and a discussion of the nature of the scale for each study variable. I cover assumptions, potential limitations, scope, and delimitations of the study in the fifth area. In the sixth area, I review the measures I took to gain informed consent, protect participants from harm, and ensure confidentiality. The final area outlines the data analysis results.

Research Design and Approach

Considering the intersection of the college's IL requirement assessment problem and its learner-centered values, I decided that survey research was a suitable approach for exploring the relationships between the variables identified in the research questions.

Research Design

I conducted a quantitative correlational study that used institutional data and the survey method for collecting data to explore relationships among selected student characteristics, participation in the IL requirement, and critical evaluation behavior and

confidence related affective Outcomes. The study relied on the postpositivist philosophy of scientific inquiry because I sought to gather quantitative data objectively using closed-ended items to test deductively Astin's (1985) theory of student involvement. However, I am a scientific realist who recognizes the challenge of making definite deductions in the study of human behaviors. Therefore, even though I used scientific techniques, I understood that I must consider and account for different self-concepts (Lodico, Spaulding, & Voegtle, 2010). The data collection methods involved gathering institutional data and designing a quantitative survey instrument using selected items adapted from two sources in addition to self-developed items. Survey items used multiple-choice and Likert-type scale response options. The data analysis methods used descriptive and correlational statistical procedures to test for relationships among the identified variables.

Research Design and Approach Justification

Using survey methodology had many advantages. Designing a survey provided a precise quantitative instrument for collecting data about the variables under study, answering the research questions, and testing the hypotheses. Astin and Antonio (2012) stated that a survey can be an ideal tool for the purpose of linking students' learning development changes to the evaluation of an educational program. Students were able to indicate how participation in the IL requirement affected their information evaluation behaviors in subsequent courses. The *Information Literacy Requirement Impact Survey* (see Appendix B) was administered 12 to 24 months after program participation. This timeframe was long enough to allow students to gain experiences in other courses but

was not so long after completion of the IL requirement course, LIR 10, that students forgot learning outcomes. Survey methodology supported the exploratory research goal of using a cross-sectional design to collect data at one point in time and provided a learner-centered basis for examining the impact of LIR 10 on student development. The survey was an efficient and cost-effective method to reach the designated target population, measure multiple variables, and test more than one hypothesis. An additional advantage was that the survey could be administered online for anonymous collection of a large volume of data.

Several constraints in the local setting prevented the use of an experimental study. Because all students were required to complete the IL requirement, it was not possible to form experimental and control groups. Pretests and posttests would have been of little value given that the point of the study was to determine how well the course prepared students for work in later courses. Also, grades could not be obtained because of institutional privacy concerns relating to the confidentiality of student records.

How Research Design Derives From the Problem

A lack of targeted assessment of the general education IL requirement's impact on student development constituted the problem this quantitative descriptive and correlational study was designed to assess. Astin and Antonio (2012) advanced the idea that self-reported data can be a useful psychological, affective Outcomes measure for initiating institutional discussion and self-evaluation of educational programs. Therefore, a survey using Astin's (1985) I-E-O model was an appropriate method to use learners'

critical evaluation development to assess the impact of a general education IL requirement delivery method on subsequent work.

The quantitative survey design method can provide sufficient data for showing relationships between program participation and self-reported information evaluation behavior changes. This relationship data could be used by the college to assess the general education IL requirement as a delivery method that may or may not have affected development changes in student learning and success. Ultimately, administrators will be able to use the results of the data analysis for making decisions regarding the program's educational impact, contribution, and potential continuation.

Setting and Sample

The college's local setting was the site of the problem of lack of assessment of the IL requirement as an education intervention. This northern California public 2-year community college offers 152 certificates and 111 majors in the associate degree program, with an unduplicated student headcount of 11,209 in the Summer 2013 term, 25,812 in the Fall 2013 term, and 26,735 in the Spring 2014 term.

Population

The students at the college who successfully completed the general education IL requirement course, LIR 10, with a grade of 2.0 or better, during Summer 2013, Fall 2013, or Spring 2014 semesters comprised the target population for this study. I used institutional data to identify a count of $N = 2012$ students who successfully completed LIR 10 in the study's designated period (CCCCO, 2014c). The enrollment, by semester, included 456 students in Summer 2013, 765 in Fall 2013, and 791 in Spring 2014.

Sampling Strategy

I used the total population purposive sampling technique to invite students to participate in the study. A purposive sample gives a nonrepresentative subset of students from a larger population (Creswell, 2012). It is a nonprobability sampling strategy that provides the potential to examine the items of interest for an entire target population of students who completed the IL requirement within the designated period. This target population was of a size that made it possible to invite all of the $N = 2012$ students having the particular characteristics required by the eligibility criteria.

An advantage of purposive sampling was that it provided the opportunity to focus on the specific population characteristics identified in the research questions. Total population purposive sampling was the appropriate method to achieve the goal of obtaining the largest sample of students from the population of interest and provided the most potential for the sample to be as representative as possible. By inviting the total target population to participate, the probability that each member could equally participate in the anonymous survey was increased (Creswell, 2012). To increase the likelihood of acquiring a representative response sample of the target population invited, I paid careful attention to the survey design with brevity as a goal and actively encouraged participation by sending prenotification and reminder emails.

Sample Size

To ensure the sample would be of sufficient size to allow conclusions regarding the results I determine the minimum sample size required for conducting the study. To do this, I calculated the sample number required for the study using an online a-priori

sample size calculator specifically designed for multiple regression (Soper, 2015). The calculator was designed based on Cohen's (1992) principles and statistical power tables. Cohen listed an effect size (f^2) of .02 as a small effect, .15 a medium effect, and .35 a large effect. I used the anticipated effect size (f^2) of 0.15 for a medium effect size and the convention of an alpha of 0.80 for the statistical power level to achieve, the number of predictor variables that are the independent variables of the study ($n = 8$), and the standard probability level of 0.05 of statistical significance. The calculation showed the study required a minimum sample size of $N = 108$ for statistical power.

Using the total population purposive sampling strategy, I invited all 2012 students in the target population to engage the most participants possible, aiming at achieving a 20% response rate. The study sample of $N = 592$ well exceeded the minimum sample size identified by the multiple regression power analysis calculator.

Participant Eligibility Criteria

The eligibility criteria I used to determine which community college students to include as study participants were program participation, age, and a passing grade for the class. Inclusion in the study's target population was based on the specific eligibility criteria of a minimum of 18 years of age and successful completion of the college's IL requirement course, LIR 10, with a grade of 2.00 or better during the designated semester time period. The inclusion criteria of the study excluded minors and students who had not passed the course. Table 1 indicates the number and percentage of students completing the information literacy requirement course in Summer 2013, Fall 2013, and Spring 2014

and the count and percentage of students who passed the course. This number of students

comprised the target population of the study.

Table 1

Student Enrollment Count and Success Count

	Enrollment (*N*)	Success (*N*)	% who passed
Spring 2014	1105	791	71.6
Fall 2013	1067	765	71.7
Summer 2013	609	456	74.9
Total	2781	2012	72.4

Note. Institutional data from the California Community College Chancellor's Office Data

Mart (CCCCO, 2014c).

I administered the survey 12 to 24 months after student participation in the IL

requirement. This period was short enough to ensure students could respond with recent

memories that connected their learning development to the IL requirement. It was also

long enough to allow ample time for students to have had information evaluation

experiences using IL skills and abilities in subsequent courses.

Recruitment of Participants

The OIR identified individuals meeting the full study's inclusion criteria from the

college's student information system. Identification was done using the study's eligibility

criteria of students who were 18 years of age or older and who successfully completed

the college's IL requirement course, LIR 10, with a grade of 2.00 or better during the

designated semesters (Summer 2013, Fall 2013, or Spring 2014). I then worked with the

OIR using email to invite all participants in the designated target population.

Characteristics of Selected Sample

In the survey, students were asked to provide data about their individual demographic characteristics including age category, gender, ethnicity, and primary language. They were also asked about their academic preparation or developmental characteristics as indicated by the number of college terms attended, English courses completed, prior information evaluation preparedness self-concept, and number of college-level research papers they had written. This demographic and academic preparation data formed the Inputs portion of Astin's (1985) I-E-O model. Inputs assessment took into account the differences that students brought to the study.

The survey also asked students to provide data related to the characteristics of the IL requirement course, LIR 10. The characteristics used in the study were course format, and the course length. The formats included *on-ground* or *online*. The course lengths included courses of *less than 8 weeks* in length, which was the *6 weeks* length option, and courses of *more than 8 weeks*, which included the *9* or *12 weeks* length options. This program characteristics data formed the Environment portion of Astin's (1985) I-E-O model. Environment assessment took into account the different aspects of the LIR 10 course that students participated in that could have a potential impact on student success.

Instrumentation and Materials

Due to the distinctive nature of the general education IL requirement as an education delivery method, I designed the survey instrument used. I performed an extensive review of the higher education literature that revealed an abundance of quantitative instruments focused on measuring a student's IL ability to search and cite

sources. Of the more than 30 instruments I reviewed, none was designed to capture the measurements I sought to assess in the variables. Therefore, I decided to use selected items from other instruments and scales, as well as self-developed items, to design the *Information Literacy Requirement Impact Survey* (see Appendix B). This survey provided an easy to use method for gathering learner-centered data from the study's population regarding the dependent variables identified in the research questions.

Development of the Instrument

Developing a survey instrument consists of numerous steps (Creswell, 2012). I identified the purpose for gathering data from these students as a first step. To do this, I selected several issues in the larger and local educational literature. These issues had been the basis for the selection of the conceptual framework, formulation of the research questions, and ultimately, for the development of the survey instrument. The foremost issue was community college student preparedness. The second issue was the variety of IL educational delivery methods being used by California community colleges. The third issue was the lack of professional or local assessment literature specifically addressing the student development impact of a general education IL requirement.

I gathered potential items from other instruments, and from the variables identified by the literature. I reviewed this list with an informal target group of one ESL instructor, two instructional librarians, one English instructor, and one director of institutional research. I used the group's comments to refine the the construction of the survey instrument. The objective was to focus on student Inputs and Environment characteristics, and the Outcomes of critical information evaluation behavior changes,

and levels of confidence. The instrument used a cross-sectional design and was online self-administered using the survey software, Survey Monkey. A closed-ended item design allowed for gathering of quantitative data from the designated target population at one point in time. I chose this design in order to achieve a numeric value more quickly for statistical analysis. Most survey items had only one question. Two had subitems. I kept the items short and avoided biased terms. All items used consistent response methods, taking into account students' likely abilities and willingness to answer the items.

I compiled the selected closed-ended items from other instruments and scales and wrote the self-developed items as the next step in constructing the instrument. I selected seven items from the SRJC (2013d) *Student Survey* instrument to reflect student characteristics and learning gains. SRJC's OIR gave permission to use items from the instrument. The *Student Survey* items had established reliability and validity based on use in a longitudinal institutional study since 2001. In addition, that instrument's demographic items aligned with the exact wording of the measures used by the CCCCO (2014c) statewide. For example, the Latino ethnicity was measured using the word Hispanic. I adapted the English course level item to add two answer choices. I adapted the learning gains item to make it specific to LIR 10. I wrote three self-developed items to gather college experiences since taking LIR 10 and to assess student perceptions of academic preparation. I compiled the behavior change item and responses from two sources. The item's wording was from the Astin and Antonio (2012) discussion of how to gather self-reported behavior changes based on items from Astin's CIRP longitudinal study (HERI, 2014). The response choices used the exact wording from ACRL's (2000)

Information Literacy Standard Three (see Appendix I) critical evaluation scale from selected performance indicator outcomes. This wording alignment added validity to the survey item because of the reliability of using nationally accepted outcomes. I self-developed two other items. I wrote the first using the exact wording structure suggested by Astin et al. for assessing students' level of confidence in an educational program. I wrote the second based on a specific need in the local setting to determine what students perceive would be the most satisfactory timing to take the IL requirement.

Concepts Measured by Instrument

Astin and Antonio's (2012) I-E-O assessment model conceptually framed the study and defined what concepts needed to be measured by the instrument. The concepts were student and Environment characteristics, the affective Outcomes of critical information evaluation behavior changes, and level of information evaluation confidence.

Inputs measures provided demographic and preparedness experience data about participants who completed the IL requirement. For purposes of this study, the student characteristic Inputs variables included the following measures: age, gender, ethnicity, primary language, terms attended, English course level, research preparedness, and number of papers written since completing LIR10. The Inputs variables were significant because they identified qualities that students brought with them and could show whether the IL requirement might be more effective for specific audiences and whether the level of success in the course was of greater impact than just being exposed to the information (Astin, 1991). Student characteristics data could be used to provide insight into how the IL requirement impacted affective behavior and psychological Outcomes for specialized

segments of the student population**.** The literature review identified the importance of IL

education for underprepared and Latino students that influenced the choice to include

Inputs survey items on these student characteristics to ascertain information like whether

a student took any developmental English courses.

Environment measures provided specific institutional program data about students

who successfully completed the general education IL requirement (SRJC, 2013c). For

purposes of this study, the IL requirement specific Environment variables consisted of the

program characteristics, including format/ mode of instruction (*on-ground*, *hybrid*, or

online), and length (*1*, *6*, *9*, or *12 weeks*). Astin (1999) described Environment variables

as those that influence aspects of students' abilities to involve themselves in the

educational experience. The Environment can be examined to identify any potential

relationships with both Inputs and Outputs variables (Astin & Antonio, 2012). The I-E-O

model showed how different Environment program characteristics could impact the

affective behavior change Outcomes in a study. For example, the course length aspect of

the Environment could have an effect on the affective information evaluation behavior

change Outcomes for students who may have had particular educational needs.

Outcomes measures provided self-reports of behavior change and levels of

confidence of participants who completed the IL requirement. For purposes of this study,

I aligned the affective Outcomes data regarding student behavior change directly with

measures from the college and national library standards. The SRJC (2013b) *Institutional

Learning Outcomes* critical analysis outcome (see Appendix J) used exact wording

directly from SRJC's (2013d) *Student Survey*. This longitudinal survey collected general

data indicating that students self-reported high gains for the critical analysis institutional learning outcome, but did not identify whether those gains specifically related to the IL requirement. The specific measures that defined IL critical information evaluation behaviors derived from selected performance indicators and Outcomes from ACRL's (2000) *Information Literacy Standard Three* (see Appendix I). The survey items that addressed the dependent variables used the exact wording from the performance indicator outcomes numbered 2 a, 4 a, b, and g, 6 a, and 7 a. These outcomes directly related to behaviors that community college students needed to critically evaluate information and its sources in academic settings. The affective Outcomes psychological data regarding student level of confidence in relation to the IL requirement aligned with Astin's (1985) student involvement theory. The study examined students' self-reported levels of confidence after completing the IL requirement in terms of writing papers and participating in discussions in other and subsequent courses. Astin considered these activities involvement and indicators of a student's level of confidence and therefore, affective psychological Outcome indicators of student development success.

Astin and Antonio (2012) designed a taxonomy to classify student Outcomes measures using type of Outcomes (cognitive or affective), type of data (behavioral or psychological), and time (short term or long term). They identified affective Outcomes as a measure of a student's beliefs, self-concepts, attitudes, etc. such as a self-report of the amount of time spent doing a task or participating in activities. In this study, I defined the word Outcomes as affective behavioral and affective-psychological long-term measures. The survey items related to affective behavioral Outcomes measures collected data about

the impact the IL requirement had on students' subsequent critical evaluation of the information needed in other courses. The survey item related to affective-psychological Outcomes measures collected data regarding the impact the IL requirement had on students' subsequent level of confidence regarding the ability to critically evaluate information needed in other courses.

The last item on the survey was students' recommendations of when it would be most helpful to take the IL requirement. The college had no set general education requirement pathway. As a result, many students completed the IL requirement at the end of their time at the college. California's Student Success Initiative stressed the importance of orienting students early to ensure all students have the foundational skills essential for achievement of a degree, certificate, or transfer (CCCCO, 2011). The concept of timing had implications for the IL education needs of underprepared students.

Calculation of Scores and Their Meaning

I separated the items of the survey instrument into Inputs of student demographic and preparation characteristics, Environment of LIR 10 characteristics, and Outcomes of behavior changes and levels of confidence. I assigned a numerical score to each response category for each item on the survey instrument using a codebook. For example, Item 9 measured the number of research papers written and used these scales: 1 (*0 papers*), 2 (*1–2 papers*), 3 (*3–4 papers*), 4 (*5–6 papers*), 5 (*7–8 papers*), 6 (*9–12 papers*), and 7 (*13+ papers*). Table 2 illustrated the study's codebook, listing the survey items and indicating the score (code) that corresponded to the meaning for each response category option as listed in the survey.

Table 2

Information Literacy Requirement Impact Survey Codebook

#	Survey items	Numerical score for response category
1.	Where have you taken classes since you completed LIR 10?	1 SRJC or another 2-year college, 2 4-year college/university, 3 private college/university, 4 no college/university
Inputs = student demographic & academic preparation characteristics (independent variables)		
2.	How old were you when you took LIR 10?	1 19 or younger, 2 20–24, 3 25–29,4 30–34, 5 35–39, 6 40–49, 7 50 or older
3.	What is your gender identification?	1 Female, 2 Male, 3 Other
4.	What is your racial/ethnic background?	1 American Indian, 2 Asian, 3 Black, 4 Filipino, 5 Hispanic, 6 Pacific Islander, 7 White, 8 Other
5.	Is English your primary language?	1 Yes, 2 No
6.	How many terms had you attended college before you took LIR 10?	1 0 Terms (just started college), 2 1–2 Terms (1st year of college study), 3 3–4 Terms (2nd year of college study), 4 5–6 Terms (3rd year of college study), 5 7–8 Terms (4th year of college study), 6 9–12 Terms (5th year of college study), 7 13+ Terms (6th+ year of college study)
7.	Up to and including the semester you took LIR 10, had you EVER taken any of the following courses?	1 Any College Skills English courses, 2 Any English as a Second Language (ESL) courses, 3 English 302 or 305, 4 English 100, 5 English 1A, 6 English 5, 7 No English course
8.	Before taking LIR 10 how prepared were you to evaluate the information required to write papers or participate in discussions in other courses?	5 Super prepared, 4 Somewhat prepared, 3 Don't know, 2 Somewhat unprepared, 1 Completely unprepared
9.	How many college research papers that required you to evaluate information had you written before you took LIR 10?	1 0 papers, 2 1–2 papers, 3 3–4 papers, 4 5–6 papers, 5 7–8 papers, 6 9–12 papers, 7 13+ papers
Environment = LIR 10 characteristics (independent variables)		
10.	In what format was your LIR 10 class?	1 On-ground (Face-to-face), 2 Online, 3 Hybrid
11.	What length was your LIR 10 class?	1 1 week (Credit by Exam), 2 6 weeks, 3 9 weeks, 4 12 weeks
Outcomes = behavior change & confidence level (dependent variables)		
12.	To what extent do you think taking LIR 10 contributed to your knowledge, skills, and abilities in the following areas:	
a.	Locating, analyzing, evaluating, and synthesizing relevant information	5 A lot, 4 Some, 3 A little, 2None, 1 Don't know/ Can't answer
b.	Drawing reasonable conclusions in order to make decisions and solve problems	5 A lot, 4 Some, 3 A little, 2None, 1 Don't know/ Can't answer
13.	How frequently do you do these actions now compared to how often you did them before you took LIR 10?	
a	I now determine whether the information satisfies my research need.	5 A lot more frequently, 4 Somewhat more frequently, 3 No Change, 2 Somewhat Less frequently, 1 A lot less frequently
b	I now review my search strategy and incorporate additional concepts as necessary.	5 A lot more frequently, 4 Somewhat more frequently, 3 No Change, 2 Somewhat Less frequently, 1 A lot less frequently
c	I now determine whether the information contradicts or verifies information used from other sources.	5 A lot more frequently, 4 Somewhat more frequently, 3 No Change, 2 Somewhat Less frequently, 1 A lot less frequently
d	I now compare information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias.	5 A lot more frequently, 4 Somewhat more frequently, 3 No Change, 2 Somewhat Less frequently, 1 A lot less frequently
e	I now select information that provides evidence for the topic.	5 A lot more frequently, 4 Somewhat more frequently, 3 No Change, 2 Somewhat Less frequently, 1 A lot less frequently
f	I now participate in classroom and other discussions.	5 A lot more frequently, 4 Somewhat more frequently, 3 No Change, 2 Somewhat Less frequently, 1 A lot less frequently
14.	After taking LIR 10 what is your level of confidence in writing papers or participating in discussions in other courses based on the information evaluation skills you learned?	5 Super confident, 4 Somewhat confident, 3 Neutral, 2 Somewhat unconfident, 1 Completely unconfident
Students' recommendation of timing		
15.	Which terms do you recommend as the most helpful to take LIR 10?	1 1–2 Terms (1st year of college study), 2 3–4 Terms (2nd year of college study), 3 5–6 Terms (3rd year of college study), 4 7–8 Terms (4th year of college study), 5 9–12 Terms (5th year of college study), 6 13+ Terms (6th+ year of college study), 7 Term taken does not matter 2

Assessment of Reliability and Validity

I gathered formal feedback of the survey instrument by testing for internal consistency, reliability, and validity as the final step of the development process. I did this by conducting a peer expert review and a pilot test.

Peer expert review. I began by using a panel of peer experts to establish the instrument's content validity. I invited four librarians from SRJC to do peer expert reviews of the survey instrument for usability and to determine if I needed to make any modifications. To qualify as peer experts, reviewers had to have a master's degree in the field of Library and Information Science and at least 3-years' experience teaching LIR 10 at the college. I structured the review process using a form (see Appendix C) to garner reviews that were consistent across the group.

Reviewers first reported how long it took to complete the survey. This measure ensured that the estimate of the time needed for survey completion was accurate. The times reported were 6, 7, 9, and 10 minutes, all within the time investment range for completing the survey I had listed. Next, the reviewers examined the survey's instructions and informed consent. All gave positive feedback. The last step in the peer review process included their evaluation of each of the survey items.

The peer review form had places for reviewer's notes to indicate if the items were appropriate, easy to understand, complete, and if I should use them in the survey. I established the criterion that 75% of the panel had to indicate that I should use an item for it to remain in the survey. Only one reviewer noted that an item should be deleted because it repeated what another item measured. In addition, the peer review form asked

about alignment of the affective behavioral Outcomes items on the survey with selected ACRL's (2000) *Information Literacy Standard Three* performance indicator outcomes (see Appendix I), as well as SRJC's (2013b) *Critical Analysis Institutional Learning Outcomes* (see Appendix J). All reviewers reported that the language in the items matched the exact wording of selected elements in the outcomes being measured. These reviews indicated that the content validity of those items was high and that they should measure what they were intended to measure. The reviewers made assorted comments recommending adjustments in wording, questioning structure, or noting questions as to why I included an item in regards to the length of the survey. Based on the comments, I deleted seven items that resulted in a more concise survey of only 15 items. I also rephrased two items for clarity and to increase ease of understanding. The instrument was then ready for pilot testing.

Pilot test. After I obtained approval from the Walden Institutional Review Board (IRB), I administered the pilot survey. The Walden approval number was 04-23-15-0319952. For the pilot study, I randomly selected one LIR 10 course in an attempt to capture a cross section of participants similar to the target population invited to participate in the formal study. I did this by putting each of the 43 section numbers offered in Spring 2015, excluding 2 sections I taught, into a hat and drawing one out. The instructor of the randomly selected LIR 10 section identified the individuals meeting the pilot study's eligibility criteria of students who were 18 years of age or older, and who had successfully completed the college's IL requirement course, LIR 10, with a grade of 2.00 or better during the designated semester (Spring 2015). I provided the LIR 10

instructor with the pilot study email text inviting students to complete the pilot version of the *Information Literacy Requirement Impact Survey*. The instructor then sent the pilot invitation email to the 24 eligible students. Participants were expected to complete the anonymous survey at their convenience within a 48-hour period.

To help identify potential problems with administration and implementation, I used the same online survey tool, Survey Monkey, for the pilot test as for the full study. Students took the survey and at the same time answered pilot specific items (see Appendix D) about the full survey's informed consent notice and items as a way to assess the instrument's accuracy in measuring what it intended to measure (Lodico et al., 2010). The first pilot specific item asked for a *Yes/No* response to determine if the survey item was easy to understand. The second asked for: *if you answered no, please explain*. The third asked for a *Yes/No* response to determine if the item should be used in the survey.

Given the voluntary nature of the pilot survey, only six of the 24 students invited chose to participate, representing a 25% response rate. This low response rate could have been due to the short timeframe for students to return the pilot survey. Student response rate may have benefited from a longer deadline and a reminder email. I saved the pilot survey responses into a secure digital file in Statistical Package for the Social Sciences (SPSS) and Microsoft Excel formats. The number of responses to the pilot test was too low to allow for analysis comparing the pilot test response sample group to the full study target population to examine for representativeness. The group included a mix of age categories ranging from *19* to *49* with no two from the same category. The group

included two *females* and four *males*. The group included four *white*, one *American*

Indian, and one *Hispanic* ethnicity.

Analysis of the results showed that all of the six respondents answered each full

survey item as well as all of the additional pilot specific items. Two students had attended

college for *1–2 terms*, three for *3–4 terms* and one for *13+ terms*. Prior to taking LIR 10,

one student had written *no papers*, another *1–2 papers*, three wrote *3–4 papers,* and one

wrote *5–6 papers*. Responses on the behavior change and level of confidence Outcomes

items varied, but most indicated positive responses. Responses to the pilot specific survey

items showed all six students answering *Yes,* that the survey items were easy to

understand and *Yes,* that they recommended use in the full survey. Based on pilot test

results and the positive feedback from the respondents about their experiences, I decided

that the full survey was ready to administer.

Processes Needed to Complete Instrument by Participants

To administer the survey, the college's OIR sent the invitation email (see

Appendix F) inviting the eligible students in the study's entire target population to

participate in the online survey via the Survey Monkey software. Students clicked the

link and self-administered the short survey (see Appendix B) by following simple

instructions. These instructions contained the informed consent notice, including the

purpose, risks, benefits, voluntary and confidential nature of the survey, participant's

ability to decline to participate without penalty, contact information for the researcher

and Walden University representative, and a statement about the student's ability to print

or save a copy. If students agreed to continue, the survey asked them to answer 15 closed-ended items taking 3–10 minutes to complete.

Where Raw Data Will be Available

The raw data for this study included the survey response data and aggregated institutional program characteristic data. I stored all of the raw data in secure electronic files accessible only to me. The survey response raw data I collected using Survey Monkey was stored in the SPSS file format and in a Microsoft Excel spreadsheet. The aggregated institutional program characteristic data provided by the college OIR was stored in a Microsoft Excel spreadsheet.

Data Collection and Analysis

I conducted the survey and compiled the response data. Using institutional data, I compiled the student demographic characteristics of the invited target population (CCCCO, 2014c). In addition, the college's OIR department provided aggregated institutional program data. The research questions and hypotheses influenced the nature of the scale I used for each variable. The types of variables, in turn, determined the data analysis methods and statistics methods I planned for the study.

Data Collection Required to Address Research Questions

The data collection process required to address the research questions involved conducting the survey in cooperation with the college as a community partner. A high response rate was critical for confidence in survey study results, so I focused all steps on that goal (Creswell, 2012). The college's OIR provided a letter of cooperation that outlined the OIR's authorized activities and responsibilities. Prior to data collection, I

provided the OIR with eligibility criteria designating the target population and the text for the prenotification of the survey (see Appendix E) email they would send. The OIR obtained the list of 2012 student email addresses for the eligible target population (CCCCO, 2014c). The list was kept confidential and stored in a secure file. Using that list, the OIR sent prenotification emails to the target population 1 week prior to the study's start date to inform them about the upcoming study.

Data Collection Processes

The data collection steps included the researcher administering the survey and the college gathering and disseminating aggregated institutional data activities. Using the online tool, Survey Monkey, I entered the text of the informed consent and survey items and generated a survey link. I provided the OIR with the text for the invitation to participate in the survey email (see Appendix F). The email explained the survey's purpose, procedures, and protections provided and provided a link to the online survey instrument allowing participants to complete it at their convenience within a designated 2-week period. The OIR sent an invitation email to each student from the designated target population list on the start date. I administered the survey including monitoring the anonymous online responses using the secure Survey Monkey program. The OIR sent a follow-up reminder email 2-days prior to the survey deadline to encourage a higher level of response using text I provided (see Appendix G). Because the response rate was below the 20% goal, the reminder email included an extension of 1 week to the survey deadline. I saved all the anonymous survey response results data in files in the Microsoft Excel and the SPSS formats. In addition, the OIR collected the Limited Data Set (LDS) containing

institutional program data for the number, format, and length of LIR 10 courses offered

during the designated study period, as agreed. All of these data were required in various

combinations to address the research questions.

Nature of the Scale for Each Variable

The survey instrument organized items into three groupings, including eight

student Inputs characteristics (independent variables), two Environment characteristics

(independent variables), and three Outcomes (dependent variables) consisting of two

behavior changes, and one level of confidence. I assigned numerical scores for the

responses to these items as outlined in Table 2. I analyzed these numerical scores to

determine the types of measurement scales that were needed.

The survey items all had categorical type responses that required nominal and

ordinal measurement scales. Nominal scale items included the participants' gender (Item

3), ethnicity (Item 4), primary language (Item 5), English course level (Item 7), and LIR

10 format or mode of instruction (Item10). Ordinal scale items included age category

(Item 2), number of terms of college attended (Item 6), prior preparation self-concept

(Item 8), number of papers written (Item 9), and LIR 10 length (Item 11). The survey

items measuring Outcomes used 5-point Likert-type categorical responses that were

ordinal measurement scales measuring two different gains in student information

evaluation learning (Item 12), changes in the frequency for six information evaluation

behaviors (Item 13), and levels of confidence with the learning experiences (Item 14). In

addition, the survey had two items not specific to the research questions. A nominal scale

item asked where participants had taken classes since completing LIR 10 (Item 1) to

identify any respondents who had not attended college so I could remove them in data clean-up. An ordinal scale item asked respondents to recommend the most helpful term for taking LIR 10 (Item 15) to gather student's opinion on optimal timing.

For the individual response type items, the numerical score for each response category increased as the value for the category increased. For example, the numerical score was higher for students in the older age category, those that had attended more terms, and those who had achieved higher levels of English courses. For the Likert scale type items, the numerical score for each response category increased as the value for the category become more positive. For example, the numerical score was higher for the category *A lot more frequently* than it was for the category *A lot less frequently*.

The survey contained two items with subitems that were measured using the Likert-type ordinal scale. Item 12 contained two subitems, and Item 13 contained six subitems. In the data analysis phase, I computed the sum of the numerical score of the responses for each item's subitem to form a composite. The scale of the composites formed in the computation became a continuous scale. The composite scale for Item 12, measuring gains in student information evaluation learning, ranged from 2 to 10. The composite scale for Item 13, measuring changes in the frequency of 6 information evaluation behaviors, ranged from 6 to 30. As the numerical score on the composite scale increased, the value for the response category became more positive indicating higher frequencies of information evaluation learning gains and actions.

The literature indicated some controversy about how to assign a measurement scale for Likert-type scale response data. Jamieson (2004) believed that Likert-type scale

data responses were ordinal categories and the intervals between them were not equal. Therefore, only nonparametric statistical tests should be used. Other researchers provided strong arguments for using parametric statistical tests, including factor analysis and correlation for numerically scored, Likert-type scale responses (Brown, 2011; Carifio & Perla, 2007). They noted the importance of using a 5-point scale or above with response categories that were conceptually continuous, intervals between responses approximately equal, and approximating a normal distribution. Given that I could locate no definitive answer, I considered the implications of these conflicting ideas for the study and decided that the Likert-type response categories in the ordinal survey items were equal distances apart. This decision allowed analysis of these data points using parametric correlation and regression tests. As a precaution, I could run equivalent nonparametric tests prior to making any data analysis conclusions, to determine if the tests had similar results or if I needed to run tests using a more conservative alpha level.

Data Analysis Plan

I planned to analyze the raw survey response data and aggregated institutional data using the most appropriate methods for addressing the research questions and rejecting or failing to reject the null hypotheses. Analysis of the data provides a method to examine the relationships among affective IL information evaluation behavior changes and confidence levels (Outcomes), aspects of the IL requirement (Environment), and differing student characteristics (Inputs) as variables (Astin & Antonio, 2012). These data interrelationships were the foundation for the assessment of the student development

impact of the college's IL requirement program. Therefore, they addressed the study's overarching question.

The categorical variables that result from the survey items can have nominal or ordinal measurement scales depending on what the items measured. I can compute composite variables from ordinal items that contain subitems resulting in variables with interval measurement scales. The different variables can contain a mix of measurement scales dictating the use of parametric and nonparametric types of statistical tests to examine relationships among the Inputs-Environment-Outcomes datasets.

The data analysis plan included response rate analysis, descriptive analysis, representative analysis, cross-tabulation analysis, correlation analysis, and multiple regression analysis. Response rate analysis can show the response level received from the designated target population that had been invited. Descriptive analysis can identify the survey participants and program characteristics. Univariate descriptive analysis techniques describe the response sample using frequencies, percentages, measures of central tendency, range, and standard deviation. Representativeness analysis can use the chi-square goodness of fit test to show if the response sample had a similar distribution to the target population. Bivariate analysis techniques, including cross-tabulation, chi-square for association, and correlation can examine relationships between pairs of categorical nominal and ordinal scale variables. Cross-tabulation analysis can show minor relationships. Correlation analysis, such as the Pearson product-moment, can show how strongly pairs of variables are related and in what direction. Correlations analysis will not differentiate between the independent and dependent variables and does not

indicate that a change in one variable causes a change in another (Creswell, 2012).

Multiple regression analysis can help explain the degree and character of the relationship

between a dependent variable (criterion) and a set of independent variables (predictor).

Regression analysis can help control for potential bias due to differences in student Inputs

(Astin & Antonio, 2012). It can provide a way to study "naturally occurring variations in

Environmental conditions and to approximate the methodological benefits of true

experiments by means of complex multivariate statistical analyses" (Astin & Antonio,

2012, p. 29). Multiple regression allows for examination of the relationships among a

single dependent variable (Outcomes) and two or more independent variables (Inputs and

Environment).

Assumptions, Limitations, Scope, and Delimitations

I made several assumptions in this study about the college's general education IL

requirement and survey research methodology. The limitations identified mostly related

to the survey methodology. The scope of the study was narrow in range and posed some

delimitations stemming from Walden University's project study requirements.

Assumptions

Assumptions about survey research methodology described the facts assumed to

be true but not yet verified. I identified several assumptions about the college's general

education IL requirement and survey methodology that were relevant to this study.

The college's general education IL requirement assumptions.

1. The college's general education IL requirement could be considered a high-
   impact practice. It increased students' research performance and oriented them

with critical information evaluation confidence. This practice created involved students more likely to engage in academic courses and able to successfully achieve their educational goals (Astin, 1999; CCCCO, 2013; Kuh, 2008).

2. Astin's (1999) belief was that it was "what the individual does, how he or she behaves, that defines and identifies involvement" (p. 519).

3. The SRJC (2013b) *Critical Analysis Institutional Learning Outcomes* (see Appendix J) were aligned with the ACRL (2000) *Information Literacy Standard Three* performance indicator outcomes (see Appendix I) and LIR 10 course level outcomes (see Appendix K). This alignment indicated IL requirement participation was the origin of critical analysis gains students reported in the college's longitudinal *Student Surveys* (SRJC, 2010; 2013d).

4. By successfully completing the IL requirement course, LIR 10, with a grade of 2.00 or better, students demonstrated they had introductory critical information evaluation knowledge and skills (SRJC, 2013c).

Survey methodology assumptions.

1. All members of the designated target population had access to email and the Internet at the time of the study.

2. Participants were motivated to provide survey response data to assess the student development impact of the college's general education IL requirement.

3. The participants in the online survey had successfully completed the IL requirement.

4. The survey instrument, methodology, and analysis were valid and adequate for measuring students' self-reports of critical information evaluation behavior changes and success.

5. Participants understood survey items and responded accurately and honestly to the best of their ability.

6. The self-selected survey respondents were representative of the designated target population.

Potential Limitations

The study of the college's general education IL requirement posed several limitations. Foremost was the uncertainty of attributing critical evaluation student development to participation in the IL requirement. Indicators of IL information evaluation behavior changes such as increased research confidence or increased involvement in course discussions were a challenge to measure definitively. These student success changes could be attributed to extraneous variables from other courses in the general education curriculum having research related course learning outcomes (see Appendix K). Also, students may have passed the IL requirement course, LIR 10, but may not have fully integrated the range of IL information evaluation behaviors into their practices. This requires a skills based assessment such as a pretest and posttest applied in the IL requirement course, LIR 10.

The study's use of a survey research design also posed limitations specific to that methodology. Participants provided self-reported data that could not be substantiated. Students taking a self-administered survey could have responded dishonestly or may not

have fully understood the closed-ended items. The survey asked students to identify some individual characteristics. Because the surveys were anonymous, I was unable to verify the accuracy of the self-reported student characteristic data using institutional records. A limitation of the *Information Literacy Requirement Impact Survey* (see Appendix B) was it measured how participants reported they behaved rather than how they actually behaved. (Astin & Antonio, 2012). However, given that SRJC (2013e) values itself as a learner-centered institution, an assessment of student self-reported behavior changes was highly suitable and provided useful insight into the relationships I was studying.

The literature on the use of self-reported data was mixed. Kuh's (2001) work with the *National Survey of Student Engagement* (NSSE) survey led to national benchmarks that were widely used in education to assess institutional effectiveness. The use of self-reported survey data reinforced by the literature showing the credibility of the method and put forth the belief that many student engagement and learning outcomes cannot be measured by skills-based tests. Pace's (1985) seminal report on the credibility of self-reports introduced some common measurement errors, such as nonresponse bias. The study also shared ways to improve the credibility of the methodology using question scales and test-retest comparisons. Kuh and Pike (2011) advocated how the construct validity of self-reported data can be supported if five conditions are met. The conditions included that respondents know the information, the questions are clear, the measure is conducted within a timely period, respondents consider the questions worthy of serious answers, and the questions do not threaten privacy.

Other researchers including Bowman (2010) and Porter (2011) questioned the evidence supporting self-reports as credible. Bowman's study showed that cross-sectional self-reported learning gains do not always align with longitudinal measurements of those gains and that in some cases students did show the ability to estimate their own gains. Porter also advocated for more objective measures, based on this review of the literature, by arguing that the definition of validity has changed as survey methodology gained in popularity. Astin and Antonio (2012) extended that the credibility of self-reported data can be increased if multiple regression analysis is used as a way to control for differing student Inputs and Environment independent variables when trying to explain the variation in dependent Outcomes variables. Gonyea (2005) identified the usefulness of self-reports but cautioned that they must be substantiated with objective measures. This caution aligned with others that survey measurements can be trusted if care is given to the design of the instrument (Kuh, 2001; Pace, 1985; Pike, 2011).

A constraint of survey methodology was the bias that could occur from failing to obtain responses from all members of the sample. Self-selected survey respondents could introduce bias because they may not have been entirely representative of the designated target population. Bias can occur when the questionnaire response rate is not randomly distributed, making the findings relevant only to the study (Creswell, 2012). This self-selection bias could result in a disproportionate number of members with specific characteristics made generalizing the results to the overall target population questionable.

A limitation of survey research studies is that the results are not generalizable. Survey research does not seek to generalize results to a larger population due to

restrictions such as time constraints and cost. Because of these restrictions, this study cannot generalize results to the target population or to the larger California community college setting. Despite this limitation, this project will elicit discussion among administrative and faculty stakeholders

The cross-sectional aspect of the study limited it to the 12–24-month time frame of enrollment in the IL requirement. This limited time frame could have potentially affected the representation of the population in relation to the total population of students enrolled at the college. Although I expected that the validity of the study would be sufficient to provide confidence that the results were definitive, I did not have confidence that I could generalize findings to other colleges in California and beyond. I could only cautiously generalize findings from the participants in this study response sample to the target group of individuals taking LIR 10 in the study's designated semesters. I did not have confidence generalizing the findings to the larger group of individuals taking LIR 10 in other semesters or to other higher education institutions with similar demographics and situations. However, because the survey method was successful in obtaining responses from an acceptable sample of students, the instrument could potentially be reapplied in subsequent years to compare how outcomes change and how changes could be applied to the LIR 10 course to help meet ongoing needs.

Similarly, generalizing survey results can be affected by the possible challenge of a low response rate that could result in response bias. In general, email surveys have a greater challenge with lower response rates than other methods (Lodico et al., 2010). All members of the designated target population may not have had access to email at the time

of the study or their email addresses may not have been valid. I used several strategies to encourage higher return rates including prenotification (see Appendix E), an anonymous survey, a brief instrument, and a follow-up email (see Appendix G). However, I had no guarantees that the response rate would be high or that those who responded were typical (Creswell, 2012). Members of the target population might have had numerous reasons for participating or not participating in an online survey, which could introduce bias from respondents having particularly strong feelings or opinions one way or the other about the research. A high response rate could lessen the potential for response bias, but even then a survey study would not provide evidence of the causal relationships needed for making generalizations.

A potential ethical limitation was my employment status at the institution where I conducted the study. The instructional role I had during Summer 2013, Fall 2013, and Spring 2014 semesters meant I could have had interaction with students in the population through their enrollment in the classes I taught. At the time of the study, I had no interaction with the students who participated nor was I involved in the identification of students meeting eligibility criteria for the study. A possibility existed that I could present a bias in writing up results in a manner that was more favorable to the college. I circumvented that possibility by the use of an entirely quantitative study.

Variables (Scope) and Boundaries of the Study (Delimitations)

The scope of this study was a community college general education IL requirement delivered via a 1-unit course, LIR 10, and its level of success in meeting institutional objectives during the course of a single semester. I limited the study's scope

narrowly to students in a single college based on Walden University's project study expectations. It was a study of the impact of a single course meeting a single general education requirement in a single community college. A successful quantitative study allows for the generalization of findings to the identified population. The limited scope of this study affected the degree to which respondents represented all community college students. Although the validity of the study was sufficient to provide confidence that the results were definitive, local conditions will have to be considered before generalizing to other colleges in California and beyond.

Delimiters included using an online survey composed of closed-ended items. This limited scope in that it provided only a set number of response choices and measured only students' self-reports. The mixed academic level of the community college student population was also a delimitation. The varied student information exposure level could have potentially affected information evaluation abilities. An additional delimitation included the fact that the study only included students who had taken a particular course during a specific time frame and who were at least 18 years old at the time of the survey.

The scope of this study was a community college general education IL requirement delivered via a 1-unit course, LIR 10, and its level of success in meeting institutional objectives during a single semester. I limited the study's scope narrowly to students in a single college based on Walden University's project study expectations. It was a study of the impact of a single course meeting a single general education requirement in a single community college. A successful quantitative study allows for the generalization of findings to the identified population. The limited scope of this study

affected the degree to which respondents represented all community college students. Although the validity of the study was sufficient to provide confidence that the results were definitive, local conditions will have to be considered before generalizing to other colleges in California and beyond.

Protection of Participants' Rights

The study contained multiple layers of participant protection. I based these protections on the ethical principles learned in the National Institutes of Health's Protecting Human Research Participants training (See Appendix H). The pilot and full survey data collection was anonymous and the research procedures did not specifically seek to include or exclude any members of a vulnerable group as membership in a particular group was not relevant to the study. The study's research procedures were designed to protect adequately all individuals including those that might have been part of any of the possibly vulnerable groups listed. No risks were identified, and data collection contained several steps to protect participants' and stakeholders' welfare. SRJC, the community partner, granted permission and provided a letter of cooperation. The research design and anonymous survey instrument ensured data confidentiality. The informed consent form described the study's risks, benefits, contacts, and protections in easy to understand language. No known risk of harm existed and participants could withdraw at any time. The study was reviewed and approved by the Walden University IRB. The Walden approval number is 04-23-15-0319952, and that approval expires on April 22, 2016.

Confidentiality

The college's OIR conducted participant recruitment, data collection, and dissemination activities as outlined in a letter of cooperation. The OIR Department removed all names and identifiers from the participant data. This data is being used, secured, and protected in accordance with institutional regulations and Title 20 of the United States Code of Federal Regulations § 1232g - Family Educational Rights and Privacy Act (FERPA; Legal Information Institute, 2015). I could not identify any applicable state laws that might be relevant. I followed all data collection procedures in accordance with best practices from the CCCCO (2013).

The college's OIR recruitment activities included generating and securely storing a confidential list of the target population. The OIR used this list of the population only to send survey emails at the designated times. I conducted data collection using Survey Monkey to collect anonymous student responses. At the end of the study I compiled the confidential Limited Data Set (LDS) comprised of anonymous survey response results data in the SPSS format and aggregated anonymous institutional data about student and Environment characteristics. Nothing in the file linked participant names to survey responses. When I completed the study, the OIR destroyed the list of the target population. All digital copies of the LDSs will be stored in secured files until no longer needed and then destroyed. The anonymous survey design ensured that I do not know the names or any identifiers of study participants. Thus, all published results of the study are, and will remain, confidential.

Informed Consent

An informed consent notice appeared on the opening screen of the online survey and in all recruitment emails. To begin the survey participants had to indicate that they chose to continue, that they understood they were taking part in a research study, and what was required of them.

The consent notice outlined the criteria for including participants and also the survey's purpose. The consent notice told students that participation was voluntary, and that participants would remain anonymous. The consent notice notified potential participants that the study had no known risks and offered them no direct benefits (except for the opportunity to develop awareness of learning development). The notice also told potential participants that the data collected would be handled as outlined above. I included researcher contact information and also contact information for the Walden University representative in case questions arose about the study or procedures. Potential participants were able to decline to participate or quit at any time without penalty (Lodico et al., 2010). Finally, the notice asked participants to acknowledge that they met eligibility requirements, agreed to participate by entering the survey, and reminded participants that they might print or save a copy for their records.

Protection from Harm

The informed consent notice communicated that no known risks or direct benefits for participation were identified, beyond the chance to reflect on learning development. The anonymous voluntary opt-in or out nature of the survey and secure data processing also provided participants with privacy protections. The survey procedures included a

briefing on what the items would ask to minimize any potential psychological distress or discomfort. The study allowed only adults (18-years old or above) to participate and did not include any experimental treatments. In addition, the conditions outlined in the college's Letter of Cooperation ensured that participants received institutional and Family Educational Rights and Privacy Act (FERPA) protections (Legal Information Institute, 2015).

Data Analysis Results

The following sections provide the results of the data analysis. Data analysis of the study's results consists of several steps aligned with the problem, conceptual and theoretical framework, and research questions and hypotheses. Following the data analysis plan the steps include cleaning the data set, determining the response rate of the sample, conducting descriptive analysis, comparing the representativeness of the sample to the target population, cross-tabulation analysis, chi-square for association analysis, correlational analysis, and multiple regression analysis.

Data Clean-up

The full data set consisted of the $N = 592$ responses I received from the survey data collection. I prepared the data for analysis using listwise deletion to omit $n = 67$ cases based on three criteria. The first criterion was to identify and remove all cases that had a nonresponse for any item on the survey ($n = 28$). The second criterion was that respondents needed to have used information evaluation skills in subsequent classes. I removed all cases with a college attended (Item 1) response that indicated they had attended *no college/university* since taking LIR 10 ($n = 17$). The third criterion was that

respondents needed to have taken an LIR 10 class. I removed all cases with a LIR 10 length (Item 11) response that reflected participation in a *1- week* length class ($n = 22$), which was a credit-by-exam test out option. I performed the detection using SPSS Missing Values Analysis and a manual examination of all variables to determine which cases met any of those three criteria. I made the assumption that the data had been collected correctly and chose not to remove any outliers. The final cleaned data set contained responses from $N = 525$ students who had completed the entire survey, had taken an LIR 10 course, and who indicated they had attended additional college courses after LIR 10. I used this data set for all data analysis.

I next recoded some variables to simplify the response options categories for selected items by combining them into fewer categories. For example, I cleaned up the multiple responses type variables by recoding these *mark all that apply* items into one variable. These included three variables, college attended (Item 1), ethnicity (Item 4), and English course level (Item 7). I recoded the variable, college attended (Item 1), into two categories, *SRJC or another 2-year College* ($n = 447$) or *4-year College/Private* ($n = 78$) because of the small number of responses for the *4-year College/Private* category when they were separate. I prioritized the multiple *mark all that apply* categories for ethnicity (Item 4) using the Student Characteristics Derived Data Elements Dictionary from the Management Information System of the CCCCO (2008). All of the ethnicities except *white* ($n = 321$) and *Hispanic* ($n = 136$) had very low responses numbers (*American Indian* [$n = 9$], *Asian* [$n = 26$], *African American* [$n = 14$], *Filipino* [$n = 7$], *Pacific Islander* [$n = 3$], *Other* [$n = 9$]). I recoded the ethnicity variable into two categories, *Non-

Hispanic and *Hispanic*. I based this decision on the low number of respondents for the

various ethnicities other than white and Hispanic and the need to consider the

underprepared aspect of Hispanic learners in the context of the local problem. I

prioritized the multiple *mark all that apply* categories for English course level (Item 7)

using the designations from the CCCCO (2014a) *Student Success Scorecard*. The

Scorecard designated students as college prepared by if their lowest English course level

was at the *transfer* level and unprepared (remedial) if their lowest English course level

was at the *below transfer* level. To achieve consistency with the CCCCO designations, I

recoded the 18 English course multiple response combinations from the survey into four

categories based on the CCCCO designation for student's college preparation level.

These categories included *no English courses*, *below transfer*, *initially below transfer*,

and *transfer*. I justified the focus on English course transfer level based on identification

of underprepared students as an issue within the context of the local and larger problem.

I recoded the two LIR 10 Environment variables. The LIR 10 format (Item 10)

had a very low response number for *hybrid* ($n = 6$). I combined the *on-ground* ($n = 170$)

and the *hybrid* ($n = 6$) responses into *on-ground* ($n = 176$). I justified combining the

responses based on the CCCCO (2008) distinction between *on-ground* and *online*

formats. The CCCCO designates that courses that are 51% or more taught at a distance

should be reported as *online* and below 51% as *on-ground*. The CCCCO does not list a

designation for a hybrid format. As the LIR 10 format, hybrid course had been taught at

below 51% *online*. I determined I could combine it with the *on-ground* format. The LIR

10 length (Item 11) variable contained three response categories, *6 weeks*, *9 weeks*, or *12*

weeks. The college designated term length as courses that were *more than 8 weeks* (long) and ones that were *less than 8 weeks* (short) courses (SRJC, 2015). I combined the LIR 10 Length *9 weeks* (*n* = 142) and *12 weeks* (*n* = 107) categories into one called *more than 8 weeks* (*n* = 249) to align with the college's course length distinction.

I also computed the variables for the two items that needed combining into a composite measure made up of the designated subitems. SRJC Critical Analysis (Item 12) contained two subitems (Items 12a and 12b), and SRJC Critical Analysis (Item 13) contained six subitems (Items 13a through 13f). I added the numerical scores of the subitem responses for each of the composites.

Response Rate

A limitation of anonymous survey research is the introduction of potential nonresponse or self-selection bias given that participants decide for themselves whether or not to respond. In deciding who should receive the survey, I could not assume a 100% response rate, given the relatively low response rates generated from online surveys. Laguilles, Williams, and Saunders (2011) noted it was unlikely an online survey will receive a 100% response rate, and Creswell (2012) indicated the average response rate to be somewhere between 10% and 20%. A higher response rate can increase confidence in data generated by the survey (Creswell, 2012). Low response rates can also increase the likelihood that the results will have some bias because respondents may not be representative of the entire target population. Testing for representativeness of the sample can detect the potential of the sample having this type of bias.

I calculated the response rate of the survey as the percentage of responses of the target population. In May 2015, I sent the survey to 2012 students with a goal of obtaining a 20% minimum response rate ($n = 404$) returns. At the end of 2 weeks I had received only an 18% response rate ($n = 371$) so I sent a reminder email that extended the deadline for an additional week. By the end of the 3-week deadline, I had received a 29% response rate ($N = 592$). When I cleaned the data, I subtracted $n = 67$ responses that were incomplete or did not meet the selection criteria. The response rate for resulting usable surveys was 26% with a sample size of $N = 525$.

Inputs-Environment-Outcomes Assessment Framework

Astin and Antonio's (2012) I-E-O model conceptually framed the study's assessment of the impact of the college's IL requirement on student development and defined what data would be needed. Therefore, I collected three distinct types of data aligned with the I-E-O theoretical constructs, as shown in Figure 2, using the survey instrument and aggregated institutional data. Survey Items 2–9 best described student characteristics Inputs (IV). Survey Items 10–11 best described the LIR 10 program characteristics Environment (IV), survey Items 12, 13, and, 14 best described the affective behavior change and confidence level Outcomes (DV). I used these data in the form of variables to specify the identified characteristics of students and the information evaluation behavior changes that were called for to address the broadly written hypotheses and answer the broadly written research questions.

Environment

= <u>IL Requirement Program Characteristics</u>
Q10 LIR 10 Format
Q11 LIR 10 Length
Independent Variables

A

B

Inputs

= <u>Student Characteristics</u>
Q2 Age Category
Q3 Gender
Q4 Ethnicity
Q5 Primary Language
Q6 Terms Attended
Q7 English Course
Q8 Preparedness Self-Concept
Q9 Papers Written
Independent Variables

C

Outcomes

= <u>Affective Behavior Changes
or Level of Confidence</u>
Q12 SRJC Critical Analysis
Q12a Information
Q12b Conclusions
Q13 ACRL Critical Analysis
Q13a Relevance
Q13b Strategy
Q13c Verify
Q13d Criteria
Q13 Evidence
Q13f Discussion
Q14 Confidence
Dependent Variables

Figure 2. Inputs-Environment-Outcomes model with study's data points.

This I-E-O model visually showed how the Inputs (independent variables) can affect both the Environment (independent variable) and the affective behavioral and psychological Outcomes (dependent variables). For example, Figure 2 show how a student's Inputs characteristic of English course level (A) could affect the decision to select the *on-ground* or the *online* format Environment (B). It could also influence the frequency of information evaluation behavior change Outcomes (C) she or he achieves. Equally, the student characteristic of ethnicity (A), for example, could have a direct effect on the level of affective behavior change Outcomes (C) regardless of if the IL

requirement course she or he took was *on-ground*, *hybrid*, or *online* format Environment (B). This model served as the basis for the cross-tabulation and correlation pairings, as well as the regression analysis reported later in Section 2.

Questions and Hypotheses

The college's gap in targeted assessment of its general education IL requirement led to the study's overarching question, which asked if a 1-unit general education requirement was an effective IL education delivery method for students. I addressed the overarching question using two researchable questions that focused on assessing significant relationships among the student characteristics identified in the problem (Inputs), participation in the IL requirement program (Environment), and changes in information evaluation behavior or levels of confidence (Outcomes). I tested each of the measurable research questions with null and alternative hypotheses.

The two research questions (RQ1 and RQ2) are similar in that they both look for relationships among identified student Inputs characteristics and program Environment characteristics (the IL requirement course format and length), but they differ in the Outcomes they measure. RQ1 measures the Outcomes of information evaluation behavior change and RQ2 measures the Outcome of the level of confidence. The research questions are aligned directly with the I-E-O framework assessment model, and so they become the lens through which I analyze the results. I used the data set of $N = 525$ responses from students who completed the survey to address the study's research questions.

Research Question 1

RQ1: What is the relationship between completion of the general education IL requirement course with different formats and lengths and frequency of information evaluation behavior changes among students with identified characteristics?

H_{01}: There is no statistically significant relationship between identified characteristics of students who completed the general education IL requirement course with different formats and lengths in terms of information evaluation behavior changes.

H_{a1}: There is a statistically significant relationship between identified characteristics of students who completed the general education IL requirement course with different formats and lengths in terms of information evaluation behavior changes.

Research Question 2

RQ2: What is the relationship between completion of the general education IL requirement course with different formats and lengths and how skills learned contributed to information evaluation confidence in other courses among students with identified characteristics?

H_{02}: There is no statistically significant relationship between identified characteristics of students who completed the general education IL requirement course with different formats and lengths in terms of how skills learned contributed to information evaluation confidence in other courses.

H_{a2}: There is a statistically significant relationship between identified characteristics of SRJC students who completed the general education IL requirement

course with different formats and lengths in terms of how skills learned contributed to information evaluation confidence in other courses.

Descriptive Analysis

To obtain a profile of the respondents, I conducted a descriptive analysis of the survey's variables from two perspectives. First, I examined descriptive statistics for the total number of cases ($N = 525$) of the response sample using Range, Measures of Central Tendency, Standard Deviation (*SD*), Variance (*V*), Skewness (*SE* = .10), and Kurtosis (*SE* = .21). The measures of central tendency described the participant responses using the mean (*M*) for interval type variables, the mode for nominal type variables, and the median for ordinal type variables (Everitt & Skrondal, 2010). The measures of range (spread) represented the maximum value minus the minimum value, standard deviation indicated the amount the scores deviated from the mean, and the variance showed the amount of variation around the mean. In comparison to a normal distribution, skewness showed the symmetry of the distribution from the center point and Kurtosis showed the height of the peak. Next, I examined the frequency of each survey item using counts (*n*) and percentages (%) to summarize the response data for each category in more detail and to assess potential univariate patterns (Blaikie, 2003). In this frequency analysis, I used counts to provide the number of responses for the categories and percentages to provide the relation of the values for each category to those of the entire response sample. Table 3 contains the descriptive statistics for the overall data set and the frequencies and percentages for the variable categories for each survey item.

Table 3

Information Literacy Requirement Impact Survey Item Descriptive Analysis

	F	%	Range	Mean	SD	Variance	Skewness	Kurtosis
1. College attended			5	1.66	1.61	2.57	2.04	2.29
2-year	447	85.1						
4-year/Private	78	14.8						
Inputs = student demographic and preparation characteristics (independent variables)								
2. Age category			6	3.06	1.87	3.49	0.87	-0.47
19 or younger	95	18.1						
20–24	189	36.0						
25–29	81	15.4						
30–34	43	8.2						
35–39	24	4.6						
40–49	52	9.9						
50 or older	41	7.8						
3. Gender			2	1.32	0.49	0.24	1.01	-0.38
Female	361	68.8						
Male	159	30.3						
Other	5	1.0						
4. Ethnicity			1	0.26	0.44	0.19	1.10	-0.79
Non-Hispanic	389	74.1						
Hispanic	136	25.9						
5. Primary language			1	1.13	0.33	0.11	2.26	3.14
English	459	87.4						
Not English	66	12.6						
6. Terms attended			6	3.61	1.45	2.09	0.66	0.15
0 Terms	21	4.0						
1–2 Terms	90	17.1						
3–4 Terms	170	32.4						
5–6 Terms	127	24.2						
7–8 Terms	63	12.0						
9–12 Terms	18	3.4						
13+ Terms	36	6.9						
7. English course			3	2.13	0.94	0.88	-0.83	-0.27
Below transfer	78	14.9						
Initially below transfer	178	33.9						
Transfer	228	43.4						
No English courses	41	7.8						
8. Preparedness self-concept			4	3.94	0.97	0.94	-1.19	1.09
Super prepared	142	27.0						
Somewhat prepared	291	55.4						
Don't know	25	4.8						
Somewhat unprepared	55	10.5						
Completely unprepared	12	2.3						
9. Papers written			6	4.14	1.86	3.44	0.22	-1.13
0 papers	26	5.0						
1–2 papers	89	17.0						
3–4 papers	113	21.5						
5–6 papers	94	17.9						
7–8 papers	59	11.2						
9–12 papers	49	9.3						
13+ papers	95	18.1						(*table continues*)

	F	%	Range	Mean	SD	Variance	Skewness	Kurtosis
Environment = program characteristics (independent variables)								
10. LIR 10 format			1	1.66	0.47	0.22	-0.70	-1.52
On-ground	176	33.5						
Online	349	66.5						
11. LIR 10 length			1	2.47	0.5	0.25	0.10	-2.00
Less than 8 weeks	276	52.6						
More than 8 weeks	249	47.4						
Outcomes = behavior change and level of confidence (dependent variables)								
12. SRJC Critical Analysis			8	7.78	2.01	4.03	-0.60	-0.72
10	145	27.6						
9	79	15.0						
8	104	19.8						
7	52	9.9						
6	64	12.2						
5	24	4.6						
4	55	10.5						
2	2	0.4						
12a. Information			4	4.06	1.03	1.05	-0.81	-0.45
A lot	229	43.6						
Some	158	30.1						
A little	79	15.0						
None	57	10.9						
Don't know/ Can't answer	2	0.4						
12b. Conclusions			4	3.72	1.09	1.19	-0.39	-0.98
A lot	157	29.9						
Some	164	31.2						
A little	111	21.1						
None	88	16.8						
Don't know/ Can't answer	5	1.0						
13. ACRL Critical Analysis			24	24.14	4.38	19.16	-0.36	-0.59
30	78	14.9						
29	32	6.1						
28	43	8.2						
27	34	6.5						
26	41	7.8						
25	22	4.2						
24	63	12.0						
23	30	5.7						
22	22	4.2						
21	21	4.0						
20	28	5.3						
19	20	3.8						
18	82	15.6						
17	3	0.6						
16	2	0.4						
12	2	0.4						
11	1	0.2						
6	1	0.2						
13a. Relevance			4	4.10	0.84	0.71	-0.36	-0.97
A lot more frequently	204	38.9						
Somewhat more frequently	174	33.1						
No change	141	26.9						
Somewhat less frequently	5	1.0					*(table continues)*	

	F	%	Range	Mean	SD	Variance	Skewness	Kurtosis
A lot less frequently	1	0.2						
13b. Strategy			4	4.10	0.81	0.65	-0.36	-0.81
A lot more frequently	193	36.8						
Somewhat more frequently	198	37.7						
No change	129	24.6						
Somewhat Less frequently	4	0.8						
A lot less frequently	1	0.2						
13c. Verify			4	4.07	0.86	0.73	-0.36	-0.86
A lot more frequently	202	38.5						
Somewhat more frequently	166	31.6						
No change	151	28.8						
Somewhat Less frequently	4	0.8						
A lot less frequently	2	0.4						
13d. Criteria			4	4.14	0.85	0.72	-0.41	-1.01
A lot more frequently	221	42.1						
Somewhat more frequently	160	30.5						
No change	139	26.5						
Somewhat Less frequently	4	0.8						
A lot less frequently	1	0.2						
13e. Evidence			4	4.10	0.89	0.79	-0.41	-0.98
A lot more frequently	225	42.9						
Somewhat more frequently	137	26.1						
No change	156	29.7						
Somewhat Less frequently	5	1.0						
A lot less frequently	2	0.4						
13f. Discussions			4	3.64	0.85	0.72	0.36	-0.64
A lot more frequently	109	20.8						
Somewhat more frequently	132	25.1						
No change	271	51.6						
Somewhat Less frequently	10	1.9						
A lot less frequently	3	0.6						
14. Confidence			4	4.11	0.83	0.69	-0.68	0.32
Super confident	197	37.5						
Somewhat confident	204	38.9						
Neutral	116	22.1						
Somewhat unconfident	3	0.6						
Completely unconfident	5	1.0						
Students' recommendation of timing								
15. Helpful term			5	1.36	1.17	1. 38	3.55	11.21
1–2 Terms	457	87.0						
> 2 Terms	38	7.2						
Terms doesn't matter	30	5.7						

The data in Table 3 did not have any variables showing large standard deviations

(*SD*), with most values being under 1. The exceptions were the variables with more

response categories including college attended (*SD* = 1.61), age category (*SD* = 1.87),

number of terms attended (*SD* = 1.45), number of papers written (*SD* = 1.86), SRJC

Critical Analysis ($SD = 2.01$) with information ($SD = 1.03$) and conclusion ($SD = 1.09$),

ACRL Critical Analysis ($SD = 4.38$), and most helpful term to take LIR 10 ($SD = 1.17$).

The variance followed the same overall pattern with most values for the variables falling

under 1. The exceptions were the variables college attended ($V = 2.57$), age category ($V =$

3.49), number of terms attended ($V = 2.09$), number of papers written ($V = 3.44$), SRJC

Critical Analysis ($V = 4.03$) with information ($V = 1.05$) and conclusion ($V = 1.19$),

ACRL Critical Analysis ($V = 19.16$), and most helpful term to take LIR 10 ($V = 1.38$).

For the skewness ($SE = 0.10$) and symmetry of the distributions, most variables showed

values around 1. The exceptions were the variables college attended (2.04), primary

language (2.26), LIR 10 length (0.10), and the most helpful term (3.55). Most variables

had positive values indicating a tail to the right. The exceptions were the variables

English course, the preparedness self-concept, LIR 10 format, SRJC Critical Analysis and

its subitems, and ACRL Critical Analysis and its subitems except for discussion, which

all had lower and negative values indicating a small tail to the left. Kurtosis ($SE = 0.21$),

showed a greater variation in the values among the variables with the majority ranging

from close to zero to just under .50. Other variables clustered around 1, except for the

variables college attended (2.29), primary language (3.14), and most helpful term (11.21).

Most values were negative indicating flatter distribution. The variables with positive

values were primary language, terms attended, preparation self-concept, confidence, and

most helpful term.

Next I used the I-E-O framework to structure the item by item analysis shown in

Table 3. In this analysis, I examine the frequency of the response options (shown in

italic) for each of the survey items and categorize them by calculating the percentage that formed the majority. Survey Items 1 and 15 were not aligned with the conceptual framework or the research questions. However, I still provided descriptive analysis.

Item 1. The variable, college attended, was included in the survey to filter out respondents who had attended *no college/ university* and thus did not meet the inclusion criteria, and the item was not used to answer the research questions. The findings indicated that the majority of 85% of the students taking the survey were still attending classes at *SRJC or another 2-year college* ($n = 447$) with only 15% at *4-year College/Private* ($n = 78$).

Inputs - Demographic and Preparation Characteristics (Independent Variables)

I included four items on the survey that examined the demographic characteristics of the respondents and four items that identified self-reported experiences that could potentially indicate the preparation level of the respondents.

Item 2. For the age category variable, the three highest responses were respectively, the age *20–24* ($n = 189$), *19 or younger* ($n = 95$), and *25–29* ($n = 81$) categories. The next age grouping in descending order was *40–49* ($n = 52$), *30–34* ($n = 43$), and *50 or older* ($n = 41$). The *35–39* ($n = 24$) age group was the lowest. The majority of 70% of the students were in the *29* and under ($n = 365$) age categories.

Item 3. The variable for gender showed the sample was predominately *female* ($n = 361$), which comprised 69% of the students. *Males* ($n = 159$) represented 30% of the respondents. The category for *other* ($n = 5$) had a very small number of respondents.

Item 4. The results for the variable indicating ethnic distribution were mixed, but two groups dominated. The *white* ($n = 321$) ethnicity group was largest at 61%. The *Hispanic* ($n = 136$) group was approximately 26% of the respondents. All of the other ethnic groups *Asian* ($n = 23$), *Black* (*African American*; $n = 14$), *American Indian* ($n = 7$), *Filipino* ($n = 5$), *Pacific Islander* ($n = 4$), and *other* ($n = 19$), were considerably less well represented 13% combined ($n = 72$). Given the strong division between the white and Hispanic ethnicities represented, the low frequencies for all the other ethnic groups, and the increasing Latino (Hispanic survey response item) demographic, I recoded categories of *non-Hispanic* ($n = 389$) and *Hispanic* ($n = 136$) and focused the examination on them. The *non-Hispanic* group was 74%, and the *Hispanic* category was 26%.

Item 5. The variable primary language of the sample was predominately *English primary language* ($n = 459$) which was a large majority at 87% while the *Not-English primary language* ($n = 66$) category was 13%.

Item 6. The highest response frequencies for the variable number of terms students had attended college were for *3–4 terms* (*3rd year of college*; $n = 170$), *5–6 terms* (*3rd year of college*; $n = 127$), *1–2 terms* (*1st year of college*; $n = 90$), *7–8 terms* (*4th year of college*; $n = 63$), *13+ terms* (*6th+ year of college*; $n = 36$), and *0 terms* (*just started college*; $n = 21$) respectively. Respondents had predominately attended more college terms with *3–4 terms* being the highest response category value at 32%. Those respondents with *3–4 terms* and higher ($n = 414$) were combined to represent 79% of the total while those under *3–4 terms* ($n = 111$) represented 21%.

Item 7. For the variable, English course level, the largest number of students had begun college at the *transfer* (*n* = 228) English course level. Next were those that started at the *initially below transfer* (*n* = 178) English course level, and then those at the *below transfer* (*n* = 78) English course level. The lowest response value was for the *no English courses* (*n* = 41) level. The largest group, 77% of students, had taken *transfer* English (*n* = 446) with 23% having taken only *below transfer* or *no English courses* (*n* = 119). However, regarding the local and national concern for underprepared students, if the *below transfer* and *initially below transfer* groups were combined (*n* = 256), that group was the majority at 49%.

Item 8. This item asked respondents to provide their self-concept of how prepared they were to evaluate information required to write papers or participate in discussions in other courses prior to taking LIR 10. The highest frequency reported feeling *somewhat prepared* (*n* = 291). The next group of respondents reported feeling *super prepared* (*n* = 142). A smaller number of students reported feeling *somewhat unprepared* (*n* = 55). The next smaller group reported that they *don't know* (*n* = 25), and an even smaller number said they felt *completely unprepared* (*n* = 12). Overall, the largest majority of students, 83%, expressed the self-concept that they felt they were prepared at some level (*n* = 433). Just 17% felt they didn't know or were not prepared (*n* = 92).

Item 9. This item requested information about the number of college research papers students had written that required them to evaluate information. Responses reported the frequency distribution at *3–4 papers* (*n* = 113), *13+ papers* (*n* = 95), *5–6 papers* (*n* = 94), *1–2 papers* (*n* = 89), *7–8 papers* (*n* = 59), *9–12 papers* (*n* = 49), and *0*

papers (*n* = 26). The largest number of students, 78%, had written *3–4 papers* (*n* = 410) or more. Only 22% wrote *1–2* or *0 papers* (*n* = 115).

Environment - Program Characteristics (Independent Variables)

Two survey items produced Environment variables that could be used to assess specific characteristics of the general education IL requirement program.

Items 10. This item measured the variable of the format (mode of instruction) respondents chose for the general education IL requirement course, LIR 10. The *online* (*n* = 349) format showed the highest frequency with 67% of the students taking it. The *on-ground* (*n* = 176) format represented 33% of the classes taken.

Item 11. This item measured the variable of the length of the chosen general education IL requirement course, LIR 10. The greatest frequency of respondents, 53%, indicated they had taken the shorter length course (*6 weeks*), represented by the category *less than 8 weeks* (*n* = 276). Those indicating the longer length courses (*9* or *12 weeks*), represented by the category *more than 8 weeks* (*n* = 249), were at 47% of the total.

Outcomes - Behavior Change and Level of Confidence (Dependent Variables)

Three survey items produced the study's Outcomes variables. I reported information evaluation behavior changes in two composite measures, one (Item 12) derived from the college (SRJC Critical Analysis) and one (Item 13) from a national library association (ACRL Critical Analysis). I reported information evaluation confidence in one measure (Item 14) based on reports of how the IL requirement contributed to the level of confidence in writing papers or participation in discussions in other courses.

Composite-Item 12. I combined two survey subitems that asked students to rate to what extent LIR 10 contributed to their critical analysis learning gains to create the SRJC Critical Analysis variable. The frequencies for the scale of the composite showed that 72% of the responses (*n* = 380) were in the top half of the scale (*7*, *8*, *9*, *10*) and 28% (*n* = 145) were in the bottom half of the scale (*2*, *4*, *5*, *6*).

Subitem 12a. This subitem of the SRJC Critical Analysis composite focused on locating, analyzing, evaluating, and synthesizing relevant information. The majority of students, 89%, reported that they had experienced some level of positive learning gains (*n* = 466). The highest number of the students, 44%, reported their learning gains were *a lot* (*n* = 229). A smaller number, 30%, reported *some* (*n* = 158). A few students, 15%, reported *a little* (*n* = 79) and an even smaller group, 11%, reported *none* (*n* = 57) or *don't know/ can't answer* (*n* = 2) if they had experienced any learning changes.

Subitem 12b. This subitem of the SRJC Critical Analysis composite focused on students' ability to draw conclusions decision making and problem solving. The majority, 83%, of students (*n* = 432) collectively reported that LIR 10 had contributed positively to their learning experience with these *a lot* (*n* = 157), *some* (*n* = 164), and *a little* (*n* = 111) learning gains. A smaller number of students (*n* = 93) said they experienced *none* (*n* = 88) or *don't know/ can't answer* (*n* = 5), which represented 17%.

Composite-Item 13. The ACRL Critical Analysis variable was the combination of six survey subitems that asked students to report how frequently they performed specific information evaluation actions now compared to how often they did them before taking LIR 10. I combined these subitems and the frequencies for the scale of the

composite showed that 70% of the responses ($n = 365$) were in the top half of the scale (*22*, *23*, *24*, *25*, *26*, *27*, *28*, *29*, *30*) and 30% of the responses ($n = 160$) were in the bottom half of the scale (*6*, *11*, *12*, *16*, *17*, *18*, *19*, *20*, *21*).

Subitem 13a. The first subitem of the ACRL Critical Analysis composite focused on evaluating the relevance of information. The majority of students, 72%, indicated they determined the relevance of information *a lot more frequently* ($n = 204$) or *somewhat more frequently* ($n = 174$) after taking the LIR 10 course. A smaller number of the students, 27%, reported they experienced *no change* ($n = 141$). A very small number (1%) selected *somewhat less frequently* ($n = 5$) or *a lot less frequently* ($n = 1$).

Subitem 13b. The second subitem of the ACRL Critical Analysis composite focused on reviewing search strategy. The majority of students, 75%, indicated they reviewed their search strategy more frequently either *somewhat more frequently* ($n = 198$) or *a lot more frequently* ($n = 193$) after taking the LIR 10 course. A smaller number, 25%, said they experienced *no change* ($n = 129$), or they did these information evaluation actions *somewhat less frequently* ($n = 4$), or *a lot less frequently* ($n = 1$).

Subitem 13c. The third subitem of the ACRL Critical Analysis composite focused on verifying information. The majority of students, 70%, indicated they did these information evaluation actions more frequently after taking the LIR 10 course with the highest category being *a lot more frequently* ($n = 202$) and then *somewhat more frequently* ($n = 166$). Fewer students, 30%, said they experienced *no change* ($n = 151$), and a very small number said they did this activity *somewhat less frequently* ($n = 4$) or *a lot less frequently* ($n = 2$).

Subitem 13d. The fourth subitem of the ACRL Critical Analysis composite focused on using criteria to evaluate information. The majority of the students, 73%, said they did this behavior more frequently after taking the LIR 10 course with *a lot more frequently* ($n = 221$) representing the largest group, then *somewhat more frequently* ($n = 160$). A smaller number, 27%, said they experienced *no change* ($n = 139$), or they did this behavior *somewhat less frequently* ($n = 4$), or *a lot less frequently* ($n = 1$).

Subitem 13e. The fifth subitem of the ACRL Critical Analysis composite focused on evaluating information for evidence. The majority of students, 69%, indicated they did this behavior more frequently after taking the LIR 10 course with the category of *a lot more frequently* ($n = 225$) the highest followed by *somewhat more frequently* ($n = 137$). A smaller number, 31%, said they experienced *no change* ($n = 156$), or they did the behavior *somewhat less frequently* ($n = 5$), or *a lot less frequently* ($n = 2$).

Subitem 13f. The sixth subitem of the ACRL Critical Analysis composite focused on participating in discussions. About half of the students, 52%, said they experienced *no change* ($n = 271$) after taking the LIR 10 course. The next highest group, 46%, said they did this activity more frequently indicated by *a lot more frequently* ($n = 109$) and *somewhat more frequently* ($n = 132$). A very small number, 2%, said they did this activity *somewhat less frequently* ($n = 10$) or *a lot less frequently* ($n = 3$).

Item 14. This item asked students to report on changes in their level of confidence in writing papers or participating in discussions in other courses based on the information evaluation skills learned in LIR 10. Responses indicated that 76% of the students said they were more confident with *somewhat confident* ($n = 204$) as the largest

group and *super confident* (*n* = 197) a close second. Those that said they were *neutral* (*n*

= 116), those that said they were *somewhat unconfident* (*n* = 10), and those *completely*

unconfident (*n* = 10) combined to represent 24% of the respondents.

Students' Recommendation of Timing

 Item 15. I included this item in the survey to gather potential data for future

research regarding students' recommendations of in which terms they believe would be

most helpful to take the general education IL requirement course, LIR 10. A majority,

87%, of the respondents, reported LIR 10 would be most helpful if taken in the *1–2 terms*

(*1st year of college study*; *n* = 457). I divided the remaining 13% of the responses from

six categories ranging from *2 terms* to *12+ terms* that I combined as *> 2 terms* (*n* = 38)

and the category *term doesn't matter* (*n* = 30).

Descriptive Analysis Interpretation

 I gained useful insights about the Inputs, Environment, and Outcomes aspects of

the response sample through inspection of the descriptive data. The inspection showed

that most of the students who took LIR 10 during the designated study period reported

feeling *somewhat prepared*. The majority of the students had attended *3–4 terms* or more,

had taken a *transfer* level English course, identified with the self-concept that they felt

somewhat or *super prepared* with information evaluation skills before taking LIR 10, and

had written *3–4 papers* or more. However, even though the students reported that they

came feeling *somewhat prepared*, for the Outcomes measured, the majority identified

that LIR 10 positively impacted the frequency of their SRJC Critical Analysis learning

gains changes, their ACRL Critical Analysis behavior changes, and their information

evaluation confidence for involvement in writing papers and participating in discussions other classes. Also, a large majority of the students recommended that LIR 10 would be most helpful if taken in the *1ˢᵗ or 2ⁿᵈ term*.

Representativeness Analysis

Because the survey was anonymous, I was unable to verify the accuracy of the self-reported data collected. However, I was able to compare whether the response sample was representative of the designated target population of all students who took the LIR 10 course that academic year, using institutional data containing the aggregated demographic and program characteristics. The target population was comprised of all students invited to take the survey. In this way, I was able to assess whether those who completed the survey were representative of the larger group. To determine how well the self-selected survey sample represented the distribution of the target population, I examined demographic characteristics and experience with the IL requirement course.

In Table 4, I compared the frequencies and percentages of the demographic characteristics of the $N = 525$ students who responded to the survey to those from the target population of 2012 students who were invited to take the survey. I conducted a chi-square goodness-of-fit test to determine whether the sample respondents had statistically significant differences in the age, gender, and ethnicity distributions compared to those in the designated target population. The minimum expected frequencies for the variables were age category ($n = 21$), gender ($n = 1$), and ethnicity ($n = 150.7$). The chi-square goodness-of-fit test indicated that the demographics variables age category [$\chi^2(6) = 38.39, p < .001$], gender [$\chi^2(2) = 475.36, p < .001$], and ethnicity [$\chi^2(1) = 89340.60, p <$

.001] were not similarly distributed in the participants who responded to the study as in the target population. The age category variable comparison showed a small variation of the response sample having a slightly higher proportions of ages *18–19*, *40–49*, and *50 or older* and less of ages *20–24*. The gender category showed a small variation of the response sample having slightly higher proportions of *females* and slightly less of *males*. The designated target population contained 62.8% *females* and 37.1% *males*. The response sample had 68.8% *females* and 30.3% *males*. The ethnicity showed a slight variation in the proportions of several ethnicities. However, when I conducted the chi-square goodness-of-fit test on the ethnicity variable for the *non-Hispanic* and *Hispanic* categories, the proportions were highly similar. This indicated that the numbers of *non-Hispanic* and *Hispanic* participants who responded to the study were not statistically significantly different from the proportions found in the target population [$\chi^2(2) = 2.01$, $p = .157$]. Therefore, the response sample can be considered representative for the ethnicity categories, *non-Hispanic* and *Hispanic*, of the designated target population. Although the age and gender comparison showed small differences between the groups, they did not prove to be statistically significantly. For the purposes of this study, I made the assumption that the response sample was meaningfully similar for the demographic characteristics. I based this assumption on the observation of the statistically significant ethnic distribution and the relatively small differences in the age and gender distributions.

Table 4

Comparison of Student Demographic Characteristics

	Target population		Response sample	
Age category	*N*	*%*	*N*	*%*
19 or younger	314	15.6	95	18.1
20–24	901	44.8	189	36.0
25–29	331	16.5	81	15.4
30–34	170	8.5	43	8.2
35–39	81	4.0	24	4.6
40–49	129	6.4	52	9.9
50 or older	86	4.2	41	7.8
Total	2012	100.0	525	100.0
Gender	*N*	*%*	*N*	*%*
Females	1239	62.8	361	68.8
Males	745	37.1	159	30.3
Other	28	.01	5	1.0
Total	2012	100.0	525	100.0
Ethnicity	*N*	*%*	*N*	*%*
American Indian	10	.05	9	1.7
Asian	88	4.4	26	5.0
African American/Black	45	2.2	14	2.7
Filipino	0	0.0	7	1.3
Hispanic/Latino	578	28.7	136	25.9
Pacific Islander	6	.03	3	.6
White	1143	56.8	321	61.1
Other (Unknown /Multi)	142	7.1	9	1.7
Total	2012	100.0	525	100.0
Non-Hispanic	1434	71.3	389	74.1
Hispanic	578	28.7	136	25.9
Total	2012	100.0	525	100.0

Note. Response data from the *Information Literacy Requirement Impact Survey*

conducted May 2015. Institutional data from the California Community College

Chancellor's Office Data Mart (CCCCO, 2014c).

Next, I compared the frequencies and percentages of the program characteristics variables of format and length between the response sample and the target population for the IL requirement course, LIR 10, as shown in Table 5. I conducted a chi-square goodness-of-fit test to determine whether the sample respondents reported the same distributions of LIR 10 format and length variables as those in the target population. The minimum expected frequency was 5.3. The chi-square goodness-of-fit test indicated that the LIR 10 format and length [χ^2 (2) = 541.77, $p < .001$] variables were not similarly distributed in the participants who responded to the study as in the target population as illustrated in Table 5. The differences indicated in the data set were that the target population had a higher distribution for the *on-ground 6 weeks* (14.6% vs. 13.1%), *on-ground 12 weeks* (15.6% vs. 10.3%), and the *online 6 weeks* (54.2% vs 39.4%) formats and lengths. The response sample was higher for the *on-ground 9 weeks* (9.0% vs 3.2%), and the *online 9 weeks* (17.2% vs. 10.4%), and *online 12 weeks* (10.1% vs 1.0%) formats and lengths. Based on these results, the distributions were considerably different, so I could not consider the program characteristics of the response sample to be representative of the target population of students invited to take the survey. A possible explanation for this variation was that the students in the response sample may not have accurately remembered the length of the class they took. More respondents indicated they had taken longer course lengths than was possible compared to the baseline numbers of the target population of what course lengths the college offered. For the purposes of this study, I made the assumption that the response sample's LIR 10 course length concept was invalid and the program characteristics comparison was not meaningfully similar.

Table 5

Comparison of LIR 10 Formats and Lengths

	Target population LIR 10		Response sample LIR 10	
Format and length	*N*	*%*	*N*	*%*
On-ground 6 weeks	14	14.6	69	13.1
On-ground 9 weeks	3	3.2	47	9.0
On-ground 12 weeks	15	15.6	54	10.3
Online 6 weeks	52	54.2	207	39.4
Online 9 weeks	10	10.4	89	17.0
Online 12 weeks	1	1.0	53	10.1
Hybrid 9 weeks	1	1.0	6	1.1
Total	98	100.0	525	100.0

Note. Response data from the *Information Literacy Requirement Impact Survey*

conducted May 2015. Institutional data obtained from the SRJC.

Representativeness Analysis Interpretation

I conducted representativeness analysis to assess the data for potential response

bias limitations that survey research can introduce. Based on the results of the

representativeness analysis, I accepted the assumption that for this study the demographic

characteristics were meaningfully similar because the ethnicity variable was significant

statistically and the differences for the age and gender variables were small. However, I

did not accept that the program characteristics for this study were meaningfully similar

due to the discrepancies in LIR 10 lengths reported by the response sample. I did not

believe that the error in reporting for the LIR 10 course length variable limited the ability

to draw conclusions from the other findings. The findings for the representativeness of

the LIR 10 format program characteristic and the demographic characteristics were all

meaningfully similar. The findings from this study will not generalize to other groups,

but the representativeness analysis findings provided confidence that the response sample

was similar to the target population for the demographic characteristics.

Cross-Tabulation Analysis

I used cross-tabulation as a measure of association to examine relationships

between pairs of categorical variables including Inputs and Environment item responses.

The results of the univariate descriptive analysis guided the bivariate analysis of simple

cross-tabulation to examine frequency connections (Blaikie, 2003). I also conducted chi-

square tests for associations between the nominal by nominal and the nominal by ordinal

Inputs and Environment independent variables to determine if any variables had

statistically significant relationships at the $p <= .05$ level. One of the assumptions of the

chi-square test was that no more than 20% of the cell frequencies within a pairing can be

less than 5, and none can have frequencies less than 1 (Blaikie, 2003).

The results of the chi-square tests showed that 12 pairings between independent

variables were positively significantly associated. The pairings included ethnicity and age

category [$\chi^2(6) = 17.86$, $p = .007$], ethnicity and primary language [$\chi^2(1) = 136.65$, $p <$

.001], ethnicity and terms attended [$\chi^2(6) = 19.46$, $p = .003$], ethnicity and English course

[$\chi^2(3) = 9.26$, $p = .026$], ethnicity and LIR 10 format and LIR 10 length [$\chi^2(6) = 23.27$, p

$= .001$], primary language and terms attended [$\chi^2(6) = 20.58$, $p = .002$], primary language

and LIR 10 format and LIR 10 length [$\chi^2(6) = 20.32$, $p = .002$], English course and age

category [$\chi^2(18) = 42.36$, $p = .001$], English course and primary language [$\chi^2(3) = 11.68$,

$p = .009$], English course and terms attended [$\chi^2(18) = 49.96$, $p < .001$], English course

and papers written [$\chi^2(18) = 77.48$, $p < .001$], and English course and LIR 10 format and LIR 10 length [$\chi^2(18) = 22.30$, $p = .219$].

Cross-Tabulation Analysis Interpretation

The results of the bivariate cross-tabulation analyses provided evidence regarding which of the categorical type Inputs and Environment characteristics variables might warrant further inspection in the correlation analysis. Based on the chi-square results, I excluded the variable gender from the correlation analysis because it did not have any significant pairings due to low cell frequencies for the category of *other* ($n = 5$). I included the independent variable categories of age, ethnicity, primary language, number of terms attended, English course level, number of papers written, LIR 10 format, and LIR 10 length in the correlation analysis.

Correlational Analysis

I conducted a zero order multiple correlation test to study the effects of all of the Inputs, Environments, and Outcomes variables simultaneously. The purpose of this bivariate test was to determine whether any significant relationships existed among the variables as a way to indicate which I should include in the regression analysis. I included only the significantly correlated variables found earlier in the cross-tabulation analysis, so gender was not included in the correlation. The assumptions of measurement scale, linearity, no outliers or unusual points, and normality were met. I used the Pearson product-moment (r) correlation coefficient in the multiple correlation test to show how strongly and in what direction relationships existed between the pairs of variables (Astin & Antonio, 2012). The r coefficient value range was from -1.0 to +1.0. Using a critical

value table (Chew, 2015) I obtained the expected correlation coefficient of $r > 0.074$ that is appropriate for a sample size of $N = 500$. Also, I used Cohen's (1992) standard for assessing the multiple correlation effect size or strength of the relationships between variables. A coefficient value close to 0 indicates no relationship. Coefficients between .02 and .14 represent a small relationship, between .15 and .34 a medium relationship, and above .35 a large relationship. Positive values mean when one variable gets larger, the other also gets larger. Negative values mean when one variable gets larger, the other gets smaller.

Table 6 showed 43 correlations that were statistically significant and were greater or equal to $r (524) = > 0.074$, one-tailed. Given that all of the study's remaining variables correlated significantly with one or more of the other variables, I concluded that all should be included in the multiple regression test. The significant variables included age category (Item 2), ethnicity (Item 4), primary language (Item 5), number of college terms attended (Item 6), English course level (Item 7), prior preparation self-concept (Item 8), number of papers written (Item 9), LIR 10 format (Item10), LIR 10 length (Item 11), SRJC Critical Analysis for gains in student information evaluation learning (Item 12), ACRL Critical Analysis for changes in the information evaluation behaviors (Item 13), and levels of confidence (Item 14).

Table 6

Means, Standard Deviations, and Zero-Order Correlations for all Variables

Variables	M	SD	2.	4.	6.	7.	8.	9.	10.	11.	12.	13.	14.	5.
2. Age category	3.06	1.87	---											
4. Ethnicity	0.26	0.44	-.17***	---										
6. Terms attended	3.61	1.45	.35***	-.16***	---									
7. English course	3.13	0.94	-.20***	-.03	.15***	---								
8. Preparedness self-concept	3.94	.10	-.10**	-.21***	.11**	.22***	---							
9. Papers written	4.14	1.85	.17***	-.08*	.41***	.18***	.27***	---						
10. LIR 10 format	0.66	0.47	.00	-.15***	.00	.14***	.17***	-.02	---					
11. LIR 10 length	0.47	0.50	.00	.05	.03	-.02	-.01	.04	-.19***	---				
12. SRJC Critical Analysis	7.78	2.01	.14**	.14**	-.01	-.12*	-.35***	-.15***	-.15**	.04	---			
13. ACRL Critical Analysis	24.14	4.38	.10*	.15**	-.05	-.10*	-.38***	-.14**	-.15***	.05	.79***	---		
14. Confidence	4.11	0.83	.09*	-.04	.06	.04	.06	.01	-.11*	-.04	.43***	.44***	---	
5. Primary language	0.13	0.33	-.13**	.51***	-.16***	-.07	-.17***	-.03	-.10*	.08*	.14**	.09*	-.05	---

* *p* < .05, ** *p* < .01, *** *p* < .001, one-tailed.

Correlation Analysis Interpretation

  Inputs. For the seven variables that represented the Inputs, several variables

existed with the largest positive correlations. These pairings included the variables

ethnicity with primary language ($r = .51$), the number of terms attended with the age

category ($r = .35$), and the number of terms attended with the number of papers written ($r

= .41$). The other variable pairings showed small or medium correlations. The

demographic variables age, ethnicity, and primary language all had small or medium

negative correlations with the other Inputs variables. However, age had small positive

correlations with all three Outcomes variables although ethnicity did not. The pairings for

the other preparation variables, showed no surprises. For example, the English course

variable showed a medium positive correlation with the preparedness self-concept

variable and a small negative one with the two behavior change Outcomes variables. I

would expect this, as higher-level English courses require more research papers, allowing

students to gain IL preparation and, therefore, not attribute that behavior change to the

LIR 10 class. A surprising result was that the confidence Outcomes variable showed

small positive correlations with all of the Inputs variables except ethnicity that showed a

small negative one.

  Environment. The two variables that represented the Environment were

correlated with each other, which was no surprise. The variable LIR 10 length was only

correlated with 1 other variable and that was a medium negative correlation with LIR 10

format ($r = -.19$). The LIR 10 format variable was correlated with 3 Inputs variables.

Those correlations were a medium negative relationship with ethnicity ($r = -.15$), a small

positive relationship with English course ($r = .14$), and a medium positive relationship with the variable preparedness self-concept ($r = .17$). The LIR 10 format variable also had a small negative correlation with the confidence Outcomes variable ($r = -.11$). Overall, these results were not a surprise given that the demographic analysis showed that the majority of student respondents reported feeling *somewhat prepared* or *super prepared* prior to taking LIR 10.

Outcomes. The three variables that represented the Outcomes showed very strong positive correlations with each other. The positive pairings were ACRL Critical Analysis with SRJC Critical Analysis ($r = .79$), confidence with SRJC Critical Analysis ($r = .43$), and confidence with ACRL Critical Analysis ($r = .44$). The strong correlation between the SRJC Critical Analysis variable with the ACRL Critical Analysis variable was not a surprise given that the measures were shown to be aligned in Section 1. Other small correlations between the Outcomes variables and the Inputs or Environment variables existed. These correlations showed no surprises as all followed the results shown in the demographic analysis.

Multiple Regression Analysis

I used a hierarchical multiple regression analysis to examine relationships among the Inputs, Environment, and Outcomes variables. Astin and Antonio (2012) stated that multiple regression is a multivariate statistical technique that allows for assessment of the degree and character of the relationship among one dependent variable (criterion) and several independent variables (predictors). They believed this analysis method can help control for potential bias due to differences in student Inputs. It can provide a way to

study "naturally occurring variations in Environmental conditions and to approximate the methodological benefits of true experiments by means of complex multivariate statistical analyses" (p. 29). Astin and Antonio recommended using a blocked stepwise multiple regression for I-E-O assessment. They suggested the purpose of using this hierarchical type multiple regression was to be able to assess the changes to the variability of the dependent variable from each of the added independent variables in the regression models. The results of the multiple regression analysis provided data relevant to answering RQ1 and RQ2. The Research Questions were written broadly to allow measurement of multiple independent variables and dependent variables in the regression analysis. I prepared the regression equation using all of the study's variables except gender (Item 2), as indicated from the correlation and cross-tabulation analyses results I obtained previously. For each Outcomes variable, I entered the independent variables into the regression in three blocks. The demographic Inputs block included the variables age category (Item 2), ethnicity (Item 4), and primary language (Item 5). The preparation Inputs block included the variables number of college terms attended (Item 6), English course level (Item 7), prior preparation self-concept (Item 8), and number of papers written (Item 9). The Environment block included the variables LIR 10 format (Item10), and LIR 10 length (Item 11). The study design met all assumptions of linearity, independence of errors, homoscedasticity, unusual points, and normality of residuals.

Research Question 1 Answered

I considered RQ1 using the results of two hierarchical multiple regression tests conducted on two dependent variables, SRJC Critical Analysis (Item 12), and ACRL

Critical Analysis (Item 13). The first multiple regression analysis results for the SRJC

critical analysis dependent variable indicated that six independent variables were

significant. The hierarchical multiple regression coefficients predicting the SRJC Critical

Analysis variable from ethnicity, age category, primary language, self-concept of prior

preparation, number of papers written, and LIR 10 format are shown in Table 7. The

initial inclusion of the ethnicity variable to the prediction of SRJC Critical Analysis

(Model 1), led to a statistically significant increase in R^2 of .02, $F(1, 523) = 11.21$, $p <$

.001. The addition of the age variable to the prediction of SRJC Critical Analysis (Model

2), led to a statistically significant increase in R^2 of .05, $F(1, 522) = 13.51$, $p < .001$. The

addition of the primary language variable to the prediction of SRJC Critical Analysis

(Model 3), led to a statistically significant increase in R^2 of .06, $F(3, 521) = 10.37$, $p <$

.001. The addition of the self-concept of prior preparation variable to the prediction of

SRJC Critical Analysis (Model 4), led to a statistically significant increase in R^2 of .15,

$F(4, 520) = 22.74$, $p < .001$. The addition of the papers written variable to the prediction

of SRJC Critical Analysis (Model 5), led to a statistically significant increase in R^2 of .16,

$F(5, 519) = 19.10$, $p < .001$. The addition of the LIR 10 format variable to the prediction

of SRJC Critical Analysis (Model 6), led to a statistically significant increase in R^2 of .16,

$F(6, 518) = 16.74$, $p < .001$.; adjusted $R^2 = .15$. These six predictors accounted for 16.2%

of the variance in the SRJC Critical Analysis variable. The significant independent

variables in the model accounted for a relatively low percentage of the variance in the

dependent variable.

Table 7

Regression Coefficients and Standard Errors for SRJC Critical Analysis

	SRJC Critical Analysis											
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Variable	*B*	*β*	*B*	*β*	*B*	*β*	*B*	*β*	*B*	*β*	*B*	*β*
Constant	7.61**		7.01**		6.98**		9.80**		9.92**		10.08**	
Ethnicity	.66**	.15	.80**	.17	.57**	.13	.30	.07	.30	.07	.25	.06
Age category			.18**	.17	.19**	.18	.14*	.13	.16**	.15	.16**	.15
Primary language					.59*	.10	.42	.07	.45	.07	.44	.07
Preparation self-concept							-.65**	-.32	-.60**	-.29	-.57**	-.28
Papers written									-.09*	-.09	-.10*	-.09
LIR 10 format											-.36*	-.09
R^2	.02		.05		.06		.15		.16		.16	
F	11.21		13.51		10.37		22.74		19.10		16.74	
ΔR^2	.02		.03		.01		.10		.01		.01	
ΔF	11.21		15.51		3.94		56.52		4.04		4.29	

*Note. N = 525. * p <.05, ** p <.001.*

The second multiple regression analysis results for the ACRL Critical Analysis dependent variable indicated that four independent variables were significant. The hierarchical multiple regression coefficients predicting the ACRL Critical Analysis variable from age category, self-concept of prior preparation, and LIR 10 format are shown in Table 8. The initial inclusion of the ethnicity variable to the prediction of ACRL Critical Analysis (Model 1) led to a statistically significant increase in R^2 of .02, $F(1, 523) = 11.27, p < .001$. The addition of the age variable to the prediction of ACRL Critical Analysis (Model 2) led to a statistically significant increase in R^2 of .04, $F(2, 522) = 9.78, p < .001$. The addition of the self-concept of prior preparation variable to the prediction of ACRL Critical Analysis (Model 3) led to a statistically significant increase in R^2 of .16, $F(3, 521) = 31.78, p < .001$. The addition of the LIR 10 format variable to the prediction of ACRL Critical Analysis (Model 4) led to a statistically significant increase in R^2 of .16, $F(4, 520) = 25.01, p < .001$; adjusted $R^2 = .16$. These four predictors accounted for 16.1% of the variance in the SRJC Critical Analysis variable. The significant independent variables in the model accounted for a relatively low percentage of the variance in the dependent variable.

Table 8

Regression Coefficients and Standard Errors for ACRL Critical Analysis

	ACRL Critical Analysis							
	Model 1		Model 2		Model 3		Model 4	
Variable	*B*	*β*	*B*	*β*	*B*	*β*	*B*	*β*
Constant	23.76**		22.82**		29.74**		30.06**	
Ethnicity	1.45**	.15	1.67**	.17	.84*	.08	.73	.07
Age category			.29*	.12	.17	.07	.17	.07
Preparation self-concept					-1.61**	-.36	-1.55**	-.34
LIR 10 format							-.77*	-.08
R^2	.02		.04		.16		.16	
F	11.27		9.78		31.78		25.01	
ΔR^2	.02		.02		.12		.01	
ΔF	11.27		8.13		73.10		4.13	

*Note. N = 525. *p<.05, **p<.001.*

Based on results of the two multiple regression tests I conducted for RQ1, I accepted the null hypothesis (H_{01}) for some variables and the alternative hypothesis (H_{a1}) for others as shown in Table 9. I answered RQ1 sing the hypothesis testing results.

Table 9

Results of Hypotheses Tests for Research Question 1

H_{01} **Accepted**	H_{a1} **Accepted**
There is no statistically significant relationship between identified characteristics (gender, terms attended, and English course) of students who completed the general education IL requirement course with different formats in terms of information evaluation behavior changes (SRJC Critical Analysis and ACRL Critical Analysis).	There is a statistically significant relationship between identified characteristics (ethnicity, age category, primary language, preparedness, self-concept, and papers written) of students who completed the general education IL requirement course with different formats in terms of information evaluation behavior changes (SRJC Critical Analysis and ACRL Critical Analysis).

RQ1: What is the relationship between completion of the general education IL requirement course with different formats and lengths and frequency of information evaluation behavior changes among students with identified characteristics?

The results of the regression analysis explained the statistically significant relationship between the variables in two ways. This test showed which of the independent variables were not needed in the multivariate context because others better explained the variance in the dependent variable. The variance was explained first by the elimination of nonsignificant independent variables (predictors) from the equation and secondly by indicating the amounts of the variation explained by the specific predictor. For example, the Environment variables related to completion of the general education IL requirement course showed that the LIR 10 format was significant for explaining a small portion of the frequency of the information evaluation behavior changes for the Outcome variables SRJC Critical Analysis and ACRL Critical Analysis. LIR 10 length was not significant. I did not include the variable LIR 10 length in Table 9 as in the original

hypothesis because the regression model results were not significant. However, because length was tied to format in practice, in that all course formats have a length, it was not practicable to consider length separately. Therefore, I do not believe that failing to find a significant statistical relationship of length with other variables was meaningful. The Environment variable of taking LIR 10 in the *online* format decreased the frequency of information evaluation learning gains. In addition, several identified characteristics existed that were significant and explained a portion of the variance. For example, the results indicated that the demographic characteristics Inputs variables of being *Hispanic* and being *older* increased the frequency of information evaluation behavior changes. The preparation characteristics Inputs variables of being *prepared* as the prior preparedness self-concept and having written more papers decreased the frequency of information evaluation learning gains. All other variables did not have significant effects on the variation of the dependent variable.

Research Question 2 Answered

I considered RQ2 using the results of one hierarchical multiple regression test conducted on the dependent variable, confidence in writing papers or participating in discussions in other courses (Item 14). The multiple regression analysis results for the confidence dependent variable indicated that two variables were significant. The hierarchical multiple regression coefficients predicting the confidence variable from age category and LIR 10 format are shown in Table 10. The initial inclusion of the age variable to the prediction of confidence (Model 1), led to a statistically significant increase in R^2 of .01, $F(1, 523) = 3.92$, $p < .048$. The addition of the LIR 10 format

variable to the prediction of confidence (Model 2), led to a statistically significant

increase in R^2 of .02, $F(2, 522) = 4.98$, $p < .007$; adjusted $R^2 = .02$. These two predictors

accounted for 1.50% of the variance in the confidence variable. The significant

independent variables in the model accounted for a relatively low percentage of the

variance in the dependent variable.

Table 10

Regression Coefficients and Standard Errors for Confidence

| | Confidence | | | |
| | Model 1 | | Model 2 | |
Variable	*B*	*β*	*B*	*β*
Constant	3.98**		4.12**	
Age category	.04*	.09	.04*	.09
LIR 10 format			-.19*	-.11
R^2	.01		.02	
F	3.92		4.98	
ΔR^2	.01		.01	
ΔF	3.92		5.99	

*Note. N = 525. *p<.05, **p<.001.*

Based on the results of the multiple regression tests I conducted for RQ2, I

accepted the null hypothesis (H_{02}) for some variables and the alternative hypothesis (H_{a2})

for others as shown in Table 11. I answered RQ2 using the hypothesis testing results.

Table 11

Results of Hypotheses Tests for Research Question 2

H_{02} **Accepted**	H_{a2} **Accepted**
There is no statistically significant relationship between identified characteristics (gender, ethnicity, primary language, terms attended, English course, preparation self-concept, and papers written) of students who completed the general education IL requirement course with different formats in terms of how skills learned contributed to information evaluation confidence in other courses.	There is a statistically significant relationship between identified characteristics (age category) of students who completed the general education IL requirement course with different formats in terms of how skills learned contributed to information evaluation confidence in other courses.

RQ2: What is the relationship between completion of the general education IL requirement course with different formats and lengths and how skills learned contributed to information evaluation confidence in other courses among students with identified characteristics?

The results of the regression analysis explained the statistically significant relationship among the variables. The Environment variables related to completion of the general education IL requirement course showed that the LIR 10 format was significant for explaining a small portion of the frequency of the information evaluation behavior changes for the Outcomes variable of how skills learned contributed to information evaluation confidence in other courses. LIR 10 length was not significant. I did not include the variable LIR 10 length in Table 11 as it was in the original hypothesis as indicated above. The Environment variable of taking LIR 10 in the *online* format decreased the frequency of confidence. The Inputs variable age category was the only significant identified characteristic that explained a portion of the variance. The *older* age categories increased the level of information evaluation confidence in other courses. All other independent variables did not have significant effects on the variance of the dependent variable.

Multiple Regression Analysis Interpretation

Considering the study's results, the college would do well to include the data in determining how effectively the IL education program characteristics of the LIR 10 formats and lengths meet the needs of students, especially the underprepared students. The college could also benefit from further consideration of the Inputs survey items measuring the preparation characteristics. The preparation characteristics were measured by the variables number of terms attended, preparation self-concept, English course level, and number of papers written. In the instrument development stage, I may not have included the best measures to indicate preparation. For example, the variable, terms attended, could have been problematic because students may have attended a large number of terms but not had classes that required much research. In the two regression tests for RQ1 related to the frequency of behavior changes Outcomes variables, I had the concern that the regression model for the preparedness self-concept variable was inconsistent with the models of the other independent variables. In general, the Inputs preparation characteristics variables of being prepared as the prior preparedness self-concept and having written more papers decreased the frequency of information evaluation learning gains. Practical implications of the regression analysis results for the IL education experiences are that students' self-reported feelings of prior preparation affected the ability of the other independent variables to predict more variability of the Outcomes variables.

Astin's (1985) I-E-O framework assessment model was appropriate for answering the research questions. The I-E-O framework constructs worked well to describe the

issues, frame the study, and measure the variables. In addition, I considered the results in relation to the appropriateness of Astin's (1985) theoretical assumption that highly involved students are more likely to reach their educational goals. The college assumes that its core courses provide a baseline for all of its students and that the general education IL requirement helps ensure that students have the IL critical analysis skills and abilities needed to effectively write papers and participate in class discussions. I would recommend conducting additional quantitative studies for assessing the IL requirement and all other general education requirements. However, I think the best results would come from using the I-E-O assessment model in a longitudinal study to allow for comparison of groups.

In terms of the methodology, I would restructure the survey items to collect data using interval scale so that it could be used more easily with parametric tests. Also, I would recommend that future study also attempt to gather experimental data to triangulate with the survey data. An experiment examining LIR 10's impact on grades could show a deeper aspect of student involvement impact. An interesting finding was how little the independent variables addressed the variation in the regression results. All three multiple regression tests I conducted had large constant values and small r values. The constant represented the predicted value of the dependent variable when all other variables were 0 (UCLA: Statistical Consulting Group, 2015). The high constant value indicated that a large proportion of the variance was not attributed to the independent variables in the model. The results of all three multiple regression tests showed that the independent variable predictors accounted for small percentages of the variance in the

dependent Outcomes variables (SRJC Critical Analysis R2 = 16.2%, ACRL Critical Analysis R2 = 16.1%, Confidence R2 = 1.50%). These results of the regression analysis indicate that I should be cautious about making deeper conclusions regarding the meaning of the findings. It also relates to an important finding from the descriptive analysis results, in which student responses indicated they strongly endorsed taking the IL requirement course, LIR 10, in their *1st or 2nd term* of college.

The low level of variation explained by the independent variables in the regression analysis could have been caused by the blocked stepwise hierarchical regression test used. Astin and Antonio (2012) recommend this type of regression test to address the issue of having multiple Inputs independent variables correlated with the dependent Outcomes variables. They believe that the blocked stepwise regression test measures all of the independent variables as they are related to the theory constructs and that this provides the best prediction of the variability of the Outcomes variable. Nau (2015) further supports the stepwise regression option as being more powerful for fine-tuning the model than a single multiple regression option. Nau also cautions that stepwise regression can result in a poor model based on the fact that predictors close to the cut-off point may be excluded or, alternatively, may be included possibly resulting in a completely different model.

The survey instrument and methodology were effective for gathering a large learner-centered response sample. The regression analysis was valid and adequate for measuring students' self-reports of critical information evaluation behavior changes and levels of confidence. Because the survey method was successful in obtaining responses

from an acceptable sample of students, the instrument could potentially be reapplied in subsequent years to compare how Outcomes change and how changes could be applied to the LIR 10 course to help meet ongoing needs. However, the limitations of the survey methodology, such as response bias or inaccurate self-concepts, limits possible application to other groups completing the IL requirement. Students reported feelings of being prepared for research, but if experimental measures were done using grade data different result may emerge. Astin and Antonio (2012) believe the complexity of regression analysis allows for predictions from survey data, but the study's regression results did not prove reliable enough to consider using them in a predictive capacity.

Results Support a White Paper for Policy Recommendations

Astin's (1985) I-E-O conceptual model using survey research methodology proved to be an effective method of assessing the college's general education IL requirement. These survey study results directly addressed the college's assessment gap previously identified by providing specific learner-centered data about the general education IL requirement. I believe the findings from this study provide relevant support for the development of a white paper for policy recommendations. I can use the white paper as a tool to communicate the evidence from the research literature showing the background of the issues surrounding the problem, the data analysis results, and policy recommendations to administrative and faculty and decision makers.

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Summary

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The cross-sectional survey design I used was appropriate for gathering quantitative data. The study survey assessed LIR 10, the required course, to determine

whether a relationship existed between participation in the general education IL

requirement and critical information evaluation behavior changes or levels of confidence

among students. The closed-ended items investigated student respondents' self-reported

behavior changes and levels of confidence as a result of participation in the college's

general education IL requirement. The survey design provided a way to use learner-

centered self-reports to conduct targeted assessment of the IL requirement. The setting of

a large community college in northern California provided an adequate target population

of more than 2,000 students who took the IL requirement in the designated academic

terms. From this target population, I could pull the random sample based on identified

eligibility criteria. The target population was representative of the college's ethnicity

breakdown between non-Hispanic and Hispanic students. I designed a survey instrument

using selected items from SRJC's (2013d) *Student Survey*, educational issues identified in

the literature, and the SRJC (2013b) *Institutional Learning Outcomes* critical analysis

outcomes (see Appendix J). I also included an item measuring information evaluation

behavior changes using the wording of selected ACRL (2000) *Information Literacy*

Standard Three (see Appendix I) performance indicator outcomes. Lastly, I developed

items to gather data on areas not covered by existing instruments. After peer expert

review, I made adjustments. A pilot test gave positive results ensuring that the instrument

was understandable and that respondents could easily complete the items. These survey

measures aligned with the study's research questions and hypotheses that defined the

variables, how they would be scored, and the Inputs, Environment, and Outcomes data

that would be collected. I outlined the study's assumptions and discussed survey

methodology and potential limitations of the general education IL requirement. The study's design also included multiple protections for participants including data confidentiality, a comprehensive informed consent notice, and an anonymous design to protect from harm. I collected data for three weeks and received $N = 525$ usable responses. I then conducted data analysis using descriptive analysis, cross-tabulation, correlation analysis, and multiple regression analysis. I presented the data analysis results and provided interpretation noting any consistencies or inconsistencies. The multiple regression results provided the data needed to address the hypotheses and answer the research questions. Finally, I noted that the findings and research indicated that a white paper with policy recommendations would be the most appropriate project genre to communicate the results of this study to the college. In Section 3, I describe the project that developed from the study's findings and research. In Section 4, I reflect on the project's recommendations and implications for further research.

Section 3: The Project

Introduction

The problem that I addressed in this study was a gap in the college's assessment of the effectiveness of the general education IL requirement. In Section 3, I provide information about the selection of a white paper as the project genre and include a description of the project and its goals. I conducted a literature review that highlights the practical basis for the use of a white paper and the research and findings as the basis for the recommendations I made in the project. I outline the particulars of the project's implementation and evaluation plan. I also include a discussion of the projects study's local, state and national, and social change implications.

Description and Goals

I used Astin and Antonio's (2012) I-E-O model to frame the project. This theoretical model formed the basis of the literature review of issues surrounding the problem, the development of the *Information Literacy Requirement Impact Survey* collecting students' self-reports, and the data analysis conducted to examine relationships among demographic and preparation characteristics, program characteristics, and information evaluation behavior and level of confidence.

Project Description

The project I created is a practice and policy recommendation white paper that I will disseminate to the college's stakeholders for use in making informed decisions. I used a simple outline to structure the white paper focusing on the problem, the study, and the solution. The content of the white paper is presented in a way that engages the

college's key administrative and faculty stakeholders so they can thoroughly understand and evaluate the research and findings of the study. A change in assessment practices will not happen at the college if the stakeholders do not focus on the solutions presented in the white paper. The project consists of an introduction, the problem section including background information aligned with the three issues surrounding the college's assessment gap, the study section including the conceptual I-E-O assessment model, data collection and data analysis results, the recommendation section including recommendations for practice and for future research, the conclusion, and references.

Within the white paper, I combined the evidence derived from scholarly research with the data collected from the study's quantitative survey to suggest strategies the college can use for examining existing assessment practices. The study examined relationships among student characteristic Inputs, program characteristic Environment and behavior and confidence Outcomes. The purpose of the white paper is to share with stakeholders the highlights of the issues and relationships identified in the data analysis relevant to the evaluation of the effectiveness of the IL general education requirement delivery method. These policy and programmatic recommendations, informed by the research and findings, are intended to form the basis for discussion and inquiry regarding assessment practices within the college's shared governance structure.

Project Goals

The white paper project had three goals. The project's first goal was to communicate the background of the college's IL, general education requirement assessment gap problem to administrative and faculty stakeholders. Providing

information in an easy to interpret way can influence readers to make decisions (Boktor, 2013; Gordon & Graham, 2003; Kantor, 2010; Mattern, 2013; Srikanth, 2002; Stelzner, 2010). The second goal was to educate stakeholders about how the study findings can be useful for decisions regarding the effectiveness of the IL requirement. Through sharing of the project, a third goal was the identification of individuals interested in continuing the discussion of institutional change to improve assessment practices. It will be through discussions that the college's collaborative decision-making processes will determine the effectiveness of the IL general education requirement.

Rationale

This study and the associated project are significant because a gap existed in the required assessment of IL practices at the college. I chose the white paper as the appropriate project because of the study's goal to communicate details of the assessment gap practices problem and to provide recommendations relevant to data-based decision making. A white paper is an excellent forum for sharing recommendations grounded in research literature and study findings (Gordon & Graham, 2003).

White Paper Connects Research to Recommendations

The literature provides support for the white paper project genre. Gordon and Graham (2003) stated that white papers use facts and logic derived from literature and research evidence to persuade and make policy recommendations. Mattern (2013) agreed that white papers can influence stakeholders through informative content showing problems as opportunities. Therefore, the white paper is an effective format to inform educational stakeholders regarding a problem and possible solutions (Graham, 2015).

White Paper Connects Findings to Recommendations

The project genre of policy recommendations in the form of a white paper evolved logically from the results of the survey study's targeted assessment of the IL requirement. The white paper can effectively communicate a high-level description of the study's findings and implications for the recommended policy and programmatic changes related to the college's assessment gap problem. The study had a high response rate indicating that students were interested in the survey content. The descriptive findings identified the sample population, the program details, and frequency of information evaluation behavior and confidence changes. The correlation and multiple regression findings of this study indicated significant relationships among student demographic and preparation characteristics and the format and length of the IL requirement course in relation to the behavior and confidence Outcomes. In addition to informing stakeholders about the findings, the white paper can communicate the issues surrounding the problem and the study, and provide charts or graphics to illustrate the data results.

White Paper Addresses the College's Assessment Gap Problem

The college has not assessed its assumption that a relationship existed between students' IL requirement participation and development of critical information evaluation behaviors. The content of the white paper directly addresses this problem of a gap in the college's assessment practices by providing a concise, research-based background of the problem, an overview of the study, and recommendations based on data resulting from the use of a theory-based assessment model. Astin and Antonio's (2012) I-E-O assessment model offered a relevant and learner-centered model for assessing general

education requirements. Boktor (2013) suggested that the value of white papers lies in providing a way for research findings to be accessible and potentially useful for solving educational problems. Using the I-E-O model can increase the effectiveness of current assessment practices by promoting the use of data for decision-making. Presenting findings in the white paper format provides information to those who can act on the research results and make necessary changes to existing assessment practices. I addressed the study's problem through respondent self-reporting of student and program characteristics, behavior change, and confidence level data. Broad assessment data intended to measure the effectiveness of student IL learning gains is available from the college. However, an assessment gap existed specific to the IL requirement. The general education course, LIR 10, has not been evaluated using specific criteria. Through this project, I can provide administrative and faculty stakeholders with quantitative student self-reported data derived through a targeted assessments process. These data have the potential to more fully inform and demonstrate that IL education, as indicated by student respondents who had completed the LIR 10 course with a grade of 2.0 or better, had a positive impact on information evaluation skills, including increased confidence. This project serves to promote understanding of IL education practices that impact students' success and provide administrative and faculty stakeholders with increased understanding of how to best assess the effectiveness of the general education program. The white paper may inform administrative and faculty stakeholders of the issues related to general education requirement assessments and spur discussion around the timing of student

completion of the IL requirement. The white paper may also encourage reform efforts including new approaches to general education requirement pathways.

Review of the Literature

This literature review reflects the appropriateness of a white paper to make policy recommendations that address the problem of a gap in the college's assessment practices. I describe the white paper's historical origins, structure, and benefits as an information sharing format to present the research-based and theory-based recommendations that evolved from the study's findings. Those recommendations align the findings with the issues surrounding the college's assessment gap problem including underprepared students, IL education delivery methods, and assessment of general education requirements.

Historical Origins of the White Paper

A white paper is a research-based report that efficiently informs and persuades an identified audience (Hoffman, 2006; Kemp, 2005; Mattern, 2013). Historically, white papers were considered to be a form of grey literature and typically included research findings (Juricek, 2009). Grey literature referred to publications not available through normal channels, for example, unpublished works, reports, working papers, and proceedings (Boekhorst, Farace, Frantzen, Boor, & Croon, 2004). The concept of a *white paper* evolved in the federal government as a way to describe an authoritative and informative report (Sakamuro, Stolley, & Hyde, 2015). Stelzner (2007; 2010) noted the word was first used in the early twentieth century by the British government. White

papers provided officials with a format that allowed for timely assembling, dissemination, and absorption of information.

Structure of the White Paper

Although no official standards exist for a white paper, the genre adheres to a common format and structure (Graham, 2013; Mattern, 2013; Stelzner, 2010). Gordon and Graham (2003) noted that white papers inform decision makers with a short, easy to read, and authoritative tone based on well-researched facts. Both Mattern and Stelzner emphasized the need for a compelling title to get the reader's attention and explain what the paper contains. Graham and Mattern noted that white papers generally include an introduction, a problem description, data, proposed solutions, and a conclusion. Sakamuro et al. (2010) believed that clear headings allow the reader to scan effectively through the document. Astin and Antonio's (2012) I-E-O theoretical model framed the study and the white paper's problem description.

The literature stressed the importance of considering the intended audience while structuring the white paper. Keys to an effective white paper include describing the problem accurately, making technical terms and examples easy to read, understanding the audience, and focusing on the interest of the reader (Graham, 2013; Kemp, 2005; Mattern, 2013; McKeon, 2005). Kemp suggested using simple terminology to convince decision makers of the need for change. Parker (2013) added the importance of constructing a white paper that remains relevant for an extended period. Stelzner (2010) argued that a key to successful writing of white papers is to focus on the needs of the reader. White paper writers should simplify and explain complex information so the

intended audience can understand the problem and proposed solutions (Gordon & Graham, 2003; McKeon, 2005).

Kantor (2010) stated that communications have become abbreviated, and decision makers are not likely to read a long white paper. As a result, this type of report needs concise and articulate writing. Stelzner (2007) and Graham (2013) recommended that white papers should not exceed 12 pages in length to retain the audience's interest. Anderson (2013), Kantor, and Srikanth (2002) argued against using a traditional text-heavy structure, noting how that format can be a disadvantage when trying to engage time- and attention-challenged stakeholders. They advocated using elements such as smaller blocks of text, color, images, graphics, charts, and callouts to create an engaging structure and improve readability by bringing attention to important considerations. Careful attention to the structure can provide an easily read format that tells a story.

Benefits of White Paper as an Information Sharing Format

The literature supported the choice of a white paper as an efficient method to share the policy recommendations derived from the project study's findings. Sakamuro et al. (2015) described the white paper as a specialized tool for disseminating information about an identified problem to a targeted audience. Graham (2015), McKeon (2015), and Stelzner (2010) furthered how this tool can be useful to recommend timely and trustworthy solutions to decision makers. White papers are likely to enlist support for education change initiatives as they can convince decision makers that implementing a recommended action could work (Graham, 2013). The white paper promotes change by

connecting Astin and Antonio's (2012) I-E-O theory, the study's findings, and the critical research literature to inform the content of the recommendations

The recommendations shared in the white papers can encourage change, but for the findings from the study to have value, decision makers need to read it and use it. The white paper can provide background of the problem and potential solutions to readers in a visual format (Gordon & Graham, 2003; Graham, 2013). Educational stakeholders must read and process large amounts of information prior to reaching a decision. The white paper can list policy recommendations in an easy to read, time-saving format (Graham, 2013). Stelzner (2007) argued that variety, accessibility, and breadth make the format versatile and useful. The white paper is an appropriate selection for the project because I can structure the research and study findings in an engaging information sharing format. The project provides a strong message that encourages college stakeholders to recognize the importance of the data and value of the policy change recommendations regarding an assessment of the IL requirement.

Research, Theory, and Results Support Content of Project

White papers demonstrate how research and theories interconnect to guide adaptation to change, thereby keeping pace with educational demands. Through the study, I located research identifying the issues surrounding the college's problem of a gap in targeted assessment including student preparation, IL requirement education delivery, and general education requirement assessment. Using the I-E-O assessment framework, I connected that research with the data analysis results from the study to substantiate the

recommendations I made for college policy and programmatic changes encouraging timely implementation at no cost.

Before I introduce the recommendations that evolved from the study, I must revisit the limitations of using survey methodology that I previously identified. These limitations can cause uncertainty by attributing self-reported behavior or confidence changes to involvement in the IL requirement. In the case of this study, I gave careful attention to the design of the *Information Literacy Requirement Impact Survey* instrument to ensure it satisfied all these conditions and included the use of peer expert and pilot testing. Also, a large sample size was obtained, and I compared multiple analysis techniques. Given these conditions, I made the assumption that the study's use of survey methodology was carefully executed, and the data analysis results can provide preliminary support for policy change recommendations.

Student Preparation

The data analysis identified significant positive relationships between students completing the IL requirement and their self-reported behavior changes and confidence in subsequent courses. It suggests a need to modify registration practices to ensure students enroll in the IL course in their first or second term. The first policy recommendation relates to adjusting enrollment practices that can help underprepared students.

1. Use the study's learner-centered self-reports to develop a process prioritizing that the IL requirement is completed early in the general education requirement pathway.

The results of the study supported this recommendation. The multiple regression results showed the independent Inputs variables of age category, ethnicity, preparation self-concept, and papers written were all significant in explaining portions of the variability of three Outcomes variables. Higher levels of preparation were positively associated with other student characteristics and with information evaluation behavior changes and confidence levels. In the descriptive results, student responses indicated 87% reported that taking the IL requirement course, LIR 10, in the first or second term of college study would be the most helpful for writing papers and participating in discussions in other courses. The data showed the importance of students completing the general education IL requirement at the beginning of their time at the college.

The literature supports the notion that underprepared students benefit from IL education. Bronstein (2014) studied the self-concepts students had of their information seeking behaviors using an online survey. The findings showed that respondents' indications of high levels of self-efficacy were significant on three scales with a correlation between outcomes and age. Mulvey (2009) highlighted the problem of how academically underprepared students can have skill levels well below their classmates and the importance of support courses to bridge the gap. Varlejs, Stec, and Kwon (2014) studied nineteen high schools and found that library resources were limited. As a result, students were not receiving the IL preparation needed to be successful in college courses. Roscoe (2015) shared how the numbers of underprepared Latino students were increasing and that they had unique academic support needs that colleges need to address. Tovar (2015) concurred that support programs had an impact on Latino/a community college

student's success. Johnston, Partridge, and Hughes (2014) identified challenges that ESL students experience with IL academic expectations of reading and understanding information sources and gave insights into how educators can improve their approaches. Kuh and Gonyea (2015) conducted an exploratory study of undergraduates' use of the library using self-reported questionnaire data from more than 300,000 students. Their findings showed students' experiences were related to engaging in academically challenging activities requiring critical thinking and having more interactions with instructors but not necessarily information literacy. They furthered the idea that the library contributed to positive learning for students, especially underprepared students. They advocated that colleges acknowledge the valuable role IL plays in developing student's information evaluation skills. Frost, Strom, Downey, Schultz, and Holland (2010) advocated for colleges to provide more learning communities that can integrate learning for students by connecting academic services such as library instruction. Schnee's (2014) qualitative study also supported the value of learning communities for underprepared students. Cho and Mechur Karp (2013) found that students who participate in academic support courses in the first semester, especially those underprepared, were more likely to take classes in subsequent semesters. Gurantz (2015) studied California community college registration priorities and student characteristics. Findings showed that newer students tended to take more units but can become lost if a class is not available. Findings also indicated that colleges should review policies, funding, and staffing allocations to ensure that they offer sufficient courses in areas with impacted enrollment. Adjusting practices to ensure students enroll in the IL requirement courses

early in their college experience could empower students with the knowledge and skills

needed for research success throughout their educational experience at the college.

IL Requirement Education Delivery

The study provided background evidence regarding the different IL education

delivery methods used by California community colleges. SRJC instituted the method of

a general education requirement course, LIR 10. The program characteristic measured in

the study's survey examined the students' reports of the formats and lengths of LIR 10 in

which they had participated. The data suggests that even though students reported feeling

prepared when they began the LIR 10 course, the course still positively affected their

frequency of information evaluation behaviors and levels of confidence. The second

policy recommendation relates to continuing to support the IL requirement.

2. Use the study's findings as an indicator that the IL general education

   requirement course is an effective delivery method that should be supported

   ensuring that formats and lengths of course offerings meet the needs of all

   student demographics.

The results of the study supported this recommendation. The self-reported

descriptive data showed the majority of students attributed their higher frequencies of

information evaluation behaviors and increased confidence levels to IL requirement

course, LIR 10. The study's cross-tabulation results supported that finding showing the

LIR 10 format and length was positively associated with ethnicity, primary language, and

the number of papers students had written. The correlational analyses also showed the

LIR 10 format had significant positive relationships with the Inputs variables of the

English course level students had achieved, the self-concept of students' information

evaluation preparedness and confidence levels. The multiple regression results showed

the Environment variable LIR 10 format was significant in explaining portions of the

variability of the frequency of information evaluation behaviors and confidence

Outcomes variables. Based on those results, I concluded that students consider the IL

general education requirement to be an effective delivery method and that it should be

supported by the college. The data results also provided insight for making future course

offering program decisions that match the needs of all student demographics. The

descriptive results indicated the students who identified ethnicity as Hispanic showed a

preference for LIR 10 courses with longer lengths and the on-ground format. Analysis

indicated that the majority of students, 53%, had taken LIR 10 in the shorter length (*6

weeks*) course, and 67% (*n* = 349) of students had taken the *online* format. The findings

show that more study is needed to make conclusions regarding the impact of format.

The literature supports that consideration should be given to policy decisions

necessary for continuing the IL requirement. Mayer and Bowles-Terry (2013) shared

ways that IL instruction can engage students in subject specific research papers and

projects. Schroeder and Cahoy (2010) articulated the affective learning and critical

thinking competencies that IL students must use in completing research assignments in

other courses. Cahoy and Schroeder (2012) further noted that affective IL learning is

often challenging to measure and that self-reports can be valuable when observation

research is not possible. They advocated that IL affective learning outcomes be included

in IL standards to have the most impact. Bryan (2014) studied the ACRL standards and

demonstrated that IL instruction supported many of the university's critical thinking outcomes. Hicks and Sinkinson (2015) also found a connection between critical thinking and IL. They noted that faculty and librarians should partner to develop pedagogical strategies to maximize student learning. Radcliff and Wong (2015) provided pretest and posttest research to support the role that critical thinking plays in the IL by incorporating argument learning outcomes into information evaluation. Hofer, Townsend, and Brunetti (2012) observed that librarians can use the concept of learning thresholds to help struggling students integrate IL instruction to encourage engagement with IL skills such as information evaluation needed in other classes. Seeber (2015) also supported using IL threshold concepts noting that changes in online searching technologies require students to critically evaluate strategies and information sources like never before.

The literature supports the college considering programmatic decisions regarding the formats and lengths of IL requirement course offerings. Cho's (2011) research showed that interaction in an online course can have a large impact on student satisfaction. Nicholson and Galguera's (2013) study considered the role that the Internet place in literacies of all kinds. They stressed that online skills are essential for engagement in educational work. They examined the use of social media and other interactive online tools used by educators and found that although most students were able to use them, some had significant challenges. Rao, Cameron, and Gaskin-Noel (2009) shared the positive learning results they received from incorporating core competencies, such as critical thinking, into an online class. Machado and Afonso (2015) also stressed that interactivity influenced satisfaction and successful learning outcomes in

their study of a standardized test delivered to more than 5,000 South American students in the online format. Simpson (2013) noted that graduation rates can be 20% lower in online classes and stressed the need for student support to ensure success.

Support existed in the literature for the value of online learning. In an early study, Lim, Morris, and Kupritz, (2006) found no significant differences in learning outcomes between online and a hybrid/blended delivery formats. Clark and Chinburg (2010) studied the learning outcome differences among undergraduate students who had received library instruction in the online and face-to-face formats. A citation analysis of term papers also showed no significant differences in research performance between the online and face-to-face students. Wolff, Wood-Kustanowitz, and Ashkenazi (2014) used regression analysis to examine how different community college student characteristics affected performance in an online and face-to-face biology course. They concluded that preparation characteristics and format of delivery had significant effects on course completion and retention. Virtue, Dean, and Matheson (2014) pointed out the increased use of online learning objects in education and showed the value of assessing student learning in the format. Their study's results showed that 96% of the students surveyed reported increased understanding using the online tutorial. Silk, Perrault, Ladenson, and Nazione's (2015) had similar findings from a study that compared the effectiveness of library instruction in the online and in-person formats. Although they showed differences in research learning outcomes, they did not note any significant differences between the course formats.

General Education Requirement Assessment

The study provided background evidence of the college's assessment gap and best practices for general education requirement assessment. The study's results provide implications for policy changes and remediation of the assessment gap problem by assisting stakeholders with institutional decision making related to the assessment of the effectiveness of the IL requirement using the alternate approaches and practices identified through this study.

3. Use the *Information Literacy Requirement Impact Survey* to conduct targeted assessment of the IL general education requirement on a 3-year basis and correlate the findings with the college's triennial Student Survey results.

The data analysis results of the study supported this recommendation. The cross-sectional results from this study can form baseline data for such assessment. This study used theory-based research methods to develop a targeted quantitative survey instrument.

The study's descriptive and correlation results data regarding student and program characteristics and self-reported behavior changes and increases in confidence suggested that the IL requirement course had an impact. The *Information Literacy Requirement Impact Survey* instrument, based on Astin and Antonio's (2012) I-E-O assessment model, was successful in collecting self-reported data specific to the IL requirement program. The descriptive data from the study showed that 72% of the student responses ($n = 380$) indicated that participation in the IL requirement was the origin of their critical analysis knowledge and abilities measured by the college in its broad institutional assessment measurement (SRJC, 2013d). These results relate to the college's general education IL

requirement assumption that its Critical Analysis *Institutional Learning Outcomes* (SRJC, 2013b; see Appendix J) aligned with the national ACRL (2000) *Information Literacy Standard Three* performance indicator outcomes (see Appendix I) and the IL requirement course, LIR 10, course level outcomes (SRJC, 2013c; see Appendix K). The documentation of these three measures demonstrates that they all examine the same outcomes. However, that alignment had not been previously tested. The college's broad assessment of the Critical Analysis *Institutional Learning Outcomes* (2013b) through its triennial *Student Survey* (2013d) did not differentiate whether the high critical analysis learning gains that students reported were due to participation in the IL requirement through LIR 10 or were gained through other means such as participation in English 1A. The study's targeted assessment results fill that gap and show that the IL requirement has an impact.

The literature supports that consideration should be given to the augmentation of assessment practices that can be implemented in an easy and timely manner incurring little or no cost to the college. Given concerns such as Pascarella's (2001) questioning of the validity of self-reported learning gains, I will recommend the college also consider supplementing the survey assessment with more objective measures. Pace (1985) suggested using question scales and test-retest comparisons. Pascarella and Astin and Antonio (2012) advocated that a pretest and posttest assessment instrument be used when students begin college and again at the end of their educational experience. Porter (2011) identified time-use diaries as a credible approach but cautioned that it was an expensive and time-consuming method. Gonyea (2005) encouraged triangulating self-reported

survey data using multiple data sources. I recommend consideration of a supplemental study using college records, such as grade-point-averages, of students who have taken the IL requirement course and those who have not (Anaya, 1999). Finally, I recommend that the college consider using a standardized programmatic IL skills assessment instrument so assessment results can be obtained immediately after course completion and compared across course sections (Oakleaf, 2014). A lack of research literature specifically related to an assessment of a general education IL requirement existed. These recommendations will encourage additional study, which will add to the literature on the topic.

The purpose of this literature review has been to place the project genre and policy recommendations in the scope of the existing literature. This information will be used to structure the white paper and provide evidence for the recommendations. The study provided background evidence of the extent of the problem and issues surrounding the gap in general education requirement assessment practices and research support for the recommendations. That background evidence combined with the recommendations will be used to ground the white paper and educate stakeholders about the implications of the study (Gordon & Graham,, 2003). The research literature, theory, and study results support the use of a white paper for policy.

Saturation Reached in Literature Review

This literature review focused on the development of the format, content, and recommendations made in the white paper. I conducted an extensive review of the educational literature using EBSCO, Sage, ERIC subscription databases, and a free database, Google Scholar, as well as searches of the open web using Google. The

searches focused on the primary topic of white paper and yielded a limited number of scholarly research items and references on the topic. The secondary searches for this literature review included the following keyword terms and phrases: executive summary, policy recommendations, dissertation writing, gray literature, program evaluation, community college, education, workplace, evaluation research, education delivery, general education program assessment, student involvement and engagement, Inputs-Environment-Outcomes assessment, and quantitative analysis. I initially limited the search criteria to the last 5 years of publication. For topics that did not yield results, I expanded the criteria to include the last 10 years of publication. I used scholarly academic journal articles when available. Due to the lack of scholarly journal articles on the topic of the white paper, I used a free web search to locate references. I used the same criteria whenever possible. The literature review searches related to the recommendations focused on the items most important to recommendations. These included student success courses, first-year programs, underprepared students, remediation, developmental education/college preparation, face-to-face, on-ground, online, embedding IL instruction, general education, and Latino/Hispanic students.

Project Implementation Description

The dissemination plan for the project includes the distribution of the project in three venues: email and presentations at the college, potential presentations at library and education conferences, and attempts to publish in related journals. I require few resources to disseminate this project. Possible barriers to implementation of the dissemination plan exist, but I have identified potential solutions that should make the process go smoothly.

The dissemination plan's goal is to initiate discussion and education of stakeholders to encourage them to consider the study's research and findings to inform future decision making.

Potential Resources and Existing Supports

The most important resources I will need for dissemination of the project are time and access to the identified audiences. The first dissemination venue is the college. The goal of presenting this project to administrative and faculty decisions makers requires few resources and primarily the use of existing supports. The only resource I require for reaching the college audience is email, to share the project and to communicate requests for time on the various meeting agendas to present to the designated groups. The college has a robust shared governance structure of committees and councils, and I will use that existing support. As a member of the college community, I have knowledge of the local stakeholder groups within the existing support structure. I will present at the regularly scheduled meetings of the multiple groups relevant to general education, future assessment practices, and potential registration pathway changes. Administrative and faculty stakeholder recognition of value is an important first step to information acknowledgment and putting the project's recommendations to use. The college stakeholders are aware of the assessment gap problem, and provided strong support for the study. For the other two dissemination venues, email again will be the only resource I require. Potential conference presentations or locating publishing opportunities will require time, networking, and outreach via email.

Potential Barriers and Solutions

The major barrier to implementing the project dissemination plan at the college would be sharing the white paper's recommendations with administrative and faculty stakeholders if I am unable to persuade them to include the presentation on the appropriate meeting agendas. A possible solution would be to network in advance and share an overview of the project with graphs in the email request I send to the committee leaders in charge of the agendas. A more challenging barrier to project implementation may be the potential refusal of the administrative and faculty stakeholders to consider the white paper's findings and recommendations valid because they are based on survey data. Despite the evidence to the contrary included in the project, some administrative and faculty stakeholders may not consider survey data to be as valid as experimental data. A possible solution would be to remind stakeholders of the college's learner-centered values and how survey data provides a method for the student voice to be quantified. In addition, I will share Astin's (1985) long history of using the I-E-O assessment model of survey assessment in education and how regression analysis techniques can increase the depth of survey measurements. I could also encounter resistance to the recommendations of the project related to making a change from the current assessment practices for general education requirements or to the idea of making a change to require completion of the IL requirement in the first or second term of registration. I could address these barriers by further discussion of the issues and recommendations. At each presentation, I will provide opportunities for stakeholders to ask questions and to supply them with further data as necessary. These opportunities will allow stakeholders to voice concerns

or support that I can use to continue networking at the college to improve the chances of implementation of the project's policy recommendations. Finally, negativity may be encountered in the conversation process from individuals who may not see the value of the IL requirement and do not consider the study's data as sufficient evidence to change their views. O'Banion (1997) believed for the change process to be successful, stakeholders must embrace a common value in the educational reform process. This project is only the first step in the process. Decisions and change within the shared governance structure of community colleges happen slowly. Developing institutional support for this project requires understanding key players and the value of the support they bring to the decision-making process and knowing who may assist in influencing change within the college. Active involvement of all stakeholders with a shared goal will be necessary to achieve any sustainable change in the college's assessment practices.

Implementation Proposal and Timetable

The white paper is the format I will use to disseminate the results of the study and project to key college administrative and faculty decision makers responsible for the general education program. The success of this project relies on the ability to implement effective communication of the recommendations to these stakeholders. Distribution of white papers has expanded to include both hard-copy and digital forms (Stelzner, 2010). Graham (2015) noted that dissemination methodology should align with the purpose of the white paper to reach the intended audience. The college values sustainability, so the dissemination plan uses only email to reach the identified administrators, department chairs, and key faculty. I will electronically distribute the white paper project in the

Portable Document Format (PDF) format to ensure that no digital compatibility issues would evolve with reading it. I will create a short project introduction email message indicating the purpose of the white paper report and indicating the results are from a doctoral study of a local problem. I will also include a brief description of the project study. The organized, concise format of the white paper, as well as the research-based recommendations presented, have the potential to catch the attention of administrative and faculty stakeholders and to effect a change in the college's current assessment practices of general education requirements. At the very least, the comments or questions from readers of the white paper will frame the dialog for such change.

The dissemination goals for the project include presenting in person or via email to the college's stakeholders. The key stakeholders are the college's administrative and faculty decision makers who are responsible for academic programs, including the general education requirements and student service programs that interface with the requirements. I will send the project introduction email directly to the administrative decision makers including the Vice-President of Academic Affairs and the Academic Affairs Deans. In addition to the administrators, I will distribute the email to the presidents and chairs of the identified shared governance committees and councils with a request to be put on a future meeting agenda to present the project to their groups. These groups include the Faculty Academic Senate comprised of elected members representing all academic departments, the EPCC consisting of members responsible for the coordination of college academic planning, the Academic Calendar/Registration Committee responsible for structuring the college's priority registration process, and the

Department Chairs Council comprised of the elected department leaders. I will also send the email request to present the project to the chairs of relevant department level stakeholders including the Library & Information Resources Department, the English Department, and the Counseling Department. A week before I am scheduled to present at a designated meeting, I will email the white paper to all committee and council members to encourage informed discussion. At the meetings, I will present an overview of the identified problem, insights gained from the results of the study, and recommendations.

The project's recommendations focus on identifying changes needed in assessment and registration pathway practices that have the potential to maximize students' learning gains and ultimate completion success. This presentation format will provide the best opportunity to promote the recommendations from the project most directly to key stakeholders. These conversations with key stakeholders will allow for exploration of the study and data analysis that can identify where the organization stands on committing to an implementation plan. In addition, through these dialogs I may identify other stakeholders who may be able to provide additional support to ensure further dissemination of the project.

For implementation of the conference presentations and article publishing, I will determine the dates and locations of relevant conferences and statewide meetings and send email requests to present. Finally, I will write an article for publication based on the problem, findings, and recommendations outlined in the project. I will send publishing requests to relevant library and education publications such as the Journal of Academic Librarianship, Reference Services Review, Journal of Information Literacy,

Communications in Information Literacy, Journal of Education, The Journal of Educational Research, Academic Senate for California Community Colleges Rostrum, and the Community College Journal.

The proposed timetable for implementation of the project at the college venue is one academic semester, approximately 4 months. This timetable allows sufficient time for administrative and faculty leaders to schedule presentations at designated meetings. I plan to coordinate the presentations noted previously within one month and complete the presentations as soon as possible, depending on the timing of monthly and quarterly scheduled meeting dates. The semester timetable will ensure that I can present to all relevant administrative and faculty stakeholders in a manner that will best generate discussions of the problem, issues, and recommendations from the study and to allow for follow-up after asking for feedback. For the conference and article publication, I may need additional time to submit and get the proposals accepted and then make presentations, depending on the timetables of conference schedules. I intend to complete and submit an article for publication within 6 months of project completion but am unable to define a timetable for when the article will be published.

Roles and Responsibilities of Student and Others

As the researcher, I have the primary role of managing the dissemination plan for this project. I will handle all communication with stakeholders via email along with my presence at meetings and conferences. My responsibilities include the above-mentioned email communications, being accepted onto appropriate committee meeting agendas, and identifying potential conferences to present and publications to submit the article. The

only others I depend on are the designated committee, council, and department chairs who would schedule the project presentation on their agendas.

Project Evaluation Plan

The inclusion of a structured evaluation plan is a critical project component to ensure that communication of recommendations occurs. I chose to use a goals-based evaluation for the project (Lodico et al., 2010). The purpose of this evaluation revolves around measuring the effectiveness of how well I achieve the dissemination goals outlined for the implementation of the project. The process of evaluating practices is ongoing for educational institutions (Spillane, 2012). The use of the project's defined goals for evaluation purposes will keep the process focused and manageable. I can also use the evaluation to determine whether any adjustments are needed to improve the communication goals outlined. By making the evaluation of dissemination goals part of the process, I will be able to collect immediate feedback from participants at meetings or by email. Spillane noted that working within an organizational routine, such as the college's shared governance process, can be an effective method to transform work practices. The largest gain that communicating the project provides is the application of research to practice. For example, communicating the project's recommendations to key stakeholders may lead to the college identifying and implementing changes in registration practices that could require students to complete the general education IL requirement in the first or second term.

The dissemination aspect of the project will be evaluated. The plan for dissemination involves presenting the project at college meetings, potentially presenting

at conferences, and potential publication of an article in Library or education based academic journals. One way I can evaluate the effectiveness of the project will be to ask the stakeholders to respond to the white paper with questions or comments. I will use an informal request for evaluation to do that. When I present the white paper including the problem, the study, and the recommendations to administrators, committees, and departments, I will end with a call for responses and questions that includes contact information to encourage further discussion. The nature of the feedback will reveal whether the white paper has served its purpose in effectively communicating the results to the appropriate stakeholders. Further dialog could then occur regarding the next steps that should be taken based on the feedback obtained. Working closely with the stakeholders will also help evaluate whether more research is necessary or desired regarding general education requirement assessment practices at the college. Finally, should I be successful in presenting the white paper at an academic conference, I will evaluate that project dissemination by taking questions at the end and will include contact information for further inquiries from conference attendees. If I am able to publish the project as an article, contact information will be included to encourage feedback.

Project Implications

The project, in the form of a white paper, highlights the components of a study designed to examine an assessment gap practices at a community college. The study provided data to determine the impact of the IL requirement on students' information evaluation behaviors and confidence levels. The white paper will make recommendations for improvement of existing assessment practices and encourage further research.

Local Implications

The project will inform local decisions by filling the assessment gap. It has the potential to provide data relevant for IL education at other community colleges. The white paper addresses a specific need at the college, that of revising an assessment practice to one that could provide targeted learner-centered data. The data from this study provides information that can be used at the local institutional level to evaluate assessment practices and program effectiveness. The data has broader implications for stakeholders seeking to learn more about how the general education requirement as an IL education delivery method contributes to student involvement or engagement. The study results can provide the first stage of data-collection in a longitudinal assessment plan.

Project implications to the college include the project providing information and research findings relevant to the issues surrounding the college's assessment gap problem. Issues include increasing numbers of underprepared students who may not possess IL skills and abilities, the IL education delivery method options available, and the need to regularly assess general education requirements. The results of this study can be used to inform stakeholders of a theory-based assessment method for evaluating the impact of the IL requirement on student success. The policy recommendations will provide faculty and administrative stakeholders with data they can use to make informed decisions as they determine the effectiveness of the IL requirement. Moreover, Astin and Antonio's (2012) I-E-O assessment model can be used to show the college is complying with meeting educational accreditation standards relating to information literacy. This model may also provide information that could be useful for decision makers in regards

to continuing to support the general education IL requirement and supporting a requirement that students take the course in the first or second college term.

The findings from this project are the groundwork from which administrative and faculty stakeholders may design, present, and encourage changes to assessment practices. Sharing the data results of this study may encourage college leaders to appreciate the value of assessing general education requirements in a targeted way. The recommendation that the college consider the use of Astin and Antonio's (2012) I-E-O assessment model as a general education assessment method can aid in assuring and improving higher education quality. Although this single survey study may not allow results to be generalized, administrative and faculty stakeholders can utilize the I-E-O model for insight into the college's assessment practices.

State and National Implications

This project has the potential to extend benefits beyond the local college campus to the statewide community college system and the national community college system. The study's data will add to the IL education literature regarding the student development impact of a particular delivery method. California community colleges have the unfunded mandate of delivering IL education to their students. Most do so using one-hour instructional sessions or by infusing the instruction into English or other discipline-based courses. Information about changes in reported student behavior related to the critical evaluation of information resulting from a required IL course could be useful (Kuh, 2008). An assessment of an IL education delivery method aligned with the ACRL (2000) *Information Literacy Standard Three* (see Appendix I) could provide data of value to

community colleges nationally. The data has the potential to go beyond the local need to inform IL education delivery at other California community colleges, as well as community colleges nationally. Through the study's self-reported findings, the IL requirement was shown to be a successful educational delivery method. More California community colleges may want to consider implementing an IL component within their associate degree requirements. The project study has broader impact potential in that it will add to the IL literature regarding the student development impact of this method of delivery on students' IL information evaluation behaviors. Also, the use of the I-E-O assessment model in general education programs may enhance understanding of the academic quality of requirements such as the IL educational program and provide a stronger sense of the student development impact. Educators may use this study and project as a reference for survey research relating to quality standards and students' perceptions of quality. The study and project may also be used to encourage assessment of IL educational methods, specifically at community colleges. Contributions to the research literature add to the knowledge base and positively impact social change.

Social Change Implications

Even larger implications of the impact that IL education can have on students exist. Gainer (2012) noted that IL education has social change implications. The potential benefit for society based on the increased awareness of the impact of IL education delivery is the effect IL education can have on students' future workplace information evaluation performance. The self-reported findings of this study showed IL education had significant relationships with changes in student's critical evaluation behaviors and

confidence. These information evaluation behaviors include those associated with

workplace performance and the civic collaboration essential to informed members of

society. A broader change implication lies in the fact that effective IL education can

prepare students with the information evaluation abilities and confidence needed for the

problem-solving and decision-making needed to be informed members of a democratic

society in regards to civic participation. The recommendations put forth in this project

support positive social change. Increasing students' critical analysis skills early on may

lead students to complete higher levels of education, which in turn will help produce

more highly educated participants for the workforce and society.

Summary

The project, including policy recommendations presented in the form of a white

paper, evolved from the identified problem and findings of this research. The data

gathered from this study provided details regarding relationships among community

college student and program characteristics, and information evaluation behaviors and

confidence levels. These findings addressed the assessment gap at the college and formed

the basis for discussion and inquiry into the effectiveness of the general education IL

requirement. The findings also provided an example of the I-E-O assessment model in

action through the gathering and analyzing of data to assess a general education

requirement. Evaluation and implementation of the study project ensure that the

recommendations reach key stakeholders. The project was designed to make policy

recommendations that would inform decision making and lead to a stronger long-term

data-driven assessment process. The implementation plan will bring awareness to the data

relationships from the project to gain administrative and faculty stakeholder support and encourage discussion as to the possibility of future changes in assessment practices. This study has local, state, and national as well as social change implications. Locally, the study fills a community college's need for assessment data regarding the student development impact of a particular IL education delivery method. This data has the potential to go beyond the local need and inform IL education delivery at other California community colleges, as well as community colleges nationally. Lastly, an even larger social change implication showed the impact of IL education delivery can affect students' future workplace information evaluation performance and future levels of civic participation. In Section 4, I reflect on the project's strengths and limitations, its importance, broad implications, and recommendations for practice and further research.

Section 4: Reflections and Conclusions

Introduction

The problem addressed in this study and project was a gap in the targeted assessment practices of a community college related to the effectiveness of a general education IL requirement. This section provides information regarding the project's strengths and limitations in addressing that problem including reflections on the importance of this work and recommendations for alternative approaches to the problem. This section also covers what I learned about scholarship, project development and evaluation, and an analysis of myself as a practitioner, project developer, and leader. In this section, I discuss the project's potential implications for social change at the individual, local, and societal levels. The section concludes with potential project applications and recommendations for future research and study.

Project Strengths & Limitations

Creating a white paper was the project I selected for communicating policy recommendations to the college. A white paper offers several strengths and few limitations in addressing the problem of a gap in the targeted assessment of the college's general education IL requirement.

Strengths

A white paper can inform and initiate discussion among administrative and faculty stakeholders regarding the college's assessment gap problem and the recommended solutions derived from the study. The structure of the white paper supports that goal and can be used to help administrative and faculty stakeholders solve an

educational problem. The white paper can be an efficient method of informing stakeholders about the three issues surrounding the problem of the college's IL requirement assessment gap, the findings of the study, and the policy recommendations. The project's clear and engaging blocks of text, images, and charts can provide information in a time-saving format for stakeholders to get information about the problem's issues.

I based the project's recommendations on learner-centered, assessment data. The volume of these data reflected students' willingness to participate in the survey research study. As stakeholders seek to solve the assessment gap problem, they can potentially use that data and the resulting recommendations in multiple ways for programmatic decision-making. For example, a substantial proportion of students, 26% of those eligible, responded to the survey. Students' self-reports regarding their learning experiences in the IL requirement course can be useful in helping stakeholders determine the effectiveness of the program. The white paper can show what students feel is working in the program and what might need improvement. These self-reports about students' successes in developing the Outcomes of information evaluation behavior and confidence ultimately provided support for the recommendations for policy solutions. Student feedback formed the foundation for understanding the issues. For example, strong student feelings existed regarding the most helpful time frame for being exposed to the critical information evaluation knowledge attributed to the IL requirement course. The white paper can provoke discussion about requirement pathways for student completion of the IL

requirement, thereby increasing the potential for student success in writing papers and participating in discussions in other courses while students are at the college.

Presenting the research findings to college administrators brings their awareness to the important part this course has played in promoting academic success and may lead to modifying current assessment practices. This project serves to promote understanding of IL education practices that impact students' success and provides administrative and faculty stakeholders with increased understanding of how to best assess the effectiveness of the general education program. The white paper can educate stakeholders about the usefulness of theory-based policy recommendations that address the college's need for regularly targeted assessment of the IL general education requirement. In addition, the white paper draws attention to the researcher-developed survey instrument that can be used to assist administrators with their required reassessment practices.

The project helps to bridge the communication gap with administrative and faculty stakeholders and provides them with the opportunity to develop an understanding of the purpose and need for regular, targeted, student based reassessment of general education requirements. The information gained from the study's research and results data can motivate stakeholders to implement effective reassessment strategies revealed by the analysis of the study's data. Also, I can use the white paper as the foundation for an article that shares the body of knowledge concerning assessment of a general education IL requirement using students' self-reports. Finally, this project has value because it exemplifies how positive results can occur through careful research practices.

Limitations

The white paper has some limitations in its ability to inform and initiate discussion among administrative and faculty stakeholders. The white paper structure of a minimum of 12 pages may be too long for busy stakeholders to read. Even though the content is broken up into chunks of focused text, some stakeholders may not take the time needed to read the entire document. The project may not contain enough images and charts for the reader who prefers visual information. Although the Portable Document Format (PDF) format is compatible across computer platforms and useful for printing, it can be cumbersome to use. Also, the PDF format is static, and some may prefer a more interactive reading experience. Overall, the presentation structure chosen for the white paper may be too passive to initiate excitement and discussion about the identified gap in targeted assessment practices problem. Beyond the potential problems with the structure, the writing itself could be a limitation. I wrote the background of the problem and the policy change recommendations concisely and the information may not be detailed enough for some readers to understand the context. The dissemination methods for sharing the project could also pose some limitations. The plan to email the white paper directly to administrative and faculty stakeholders could fail if they do not read the white paper. I may be unable to persuade stakeholder committee chairs to include the presentation on the appropriate meeting agendas. The possibility existed that none of the stakeholders will respond with any comments or questions thus limiting the dialog for discussing an institutional change.

Possible limitations of validity could arise if administrative and faculty stakeholders question the self-reported learner-centered assessment data. The potential refusal of the administrative and faculty stakeholders to consider the white paper's findings and recommendations as valid existed because they are based on survey data. Some stakeholders may not consider survey data to be as valid as experimental data. Also, the uncertainty existed of a researcher attributing student critical evaluation development to participation in the IL requirement. Indicators of IL information evaluation behavior changes such as increased research confidence or increased involvement in course discussions are challenging to measure definitively. Those developmental changes could be attributed to extraneous variables such as other courses in the general education curriculum having related research course learning outcomes.

The study's use of a survey research design posed limitations specific to that methodology contributing to possible project limitations. Participants provided self-reported data that could not be substantiated. Students taking a self-administered survey could have responded dishonestly or may not have fully understood the closed-ended questions. A limitation inherent in survey research studies is that the results are not generalizable. However, it was not the purpose of this study to generalize results to the target population or the larger California community college setting. Nonresponse bias can affect the process of generalizing results. Members of the target population might have had numerous reasons for participating in an online survey that could introduce bias from respondents having particularly strong opinions one way or the other regarding the research. The high response rate lessened the potential for response bias, but even so, a

survey study will not provide evidence of the causal relationships needed for making generalizations. The survey required students to identify a number of individual characteristics. Because the surveys were anonymous, I was unable to verify the accuracy of the self-reported student characteristic data using institutional records.

It is possible that the stakeholders may be resistant to changes in assessment or registration practices such as those recommended by this project. Thompson (2010) noted that the field of education undergoes constant reform that causes leaders of change to have to work hard to get stakeholders attention. Decisions and change within the shared governance structure of community colleges happen slowly. The proposed dissemination timetable of four months for implementation of the project could be unrealistic and may require adjustments if the dialog takes longer than expected.

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Recommendations for Alternative Approaches

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This study's learner-centered survey assessment provided valuable data as an approach to addressing the identified problem. I chose to use a survey collecting self-reported data as a method to assess the impact of participation in the IL requirement program. This data could then be used by the college to judge the effectiveness of its IL general education requirement. I conducted the study at the end of one 16-week semester and included only the students enrolled during one calendar year.

I also considered alternative ways of addressing the problem. Alternative methods could be to collect student feedback from a longer period or to increase the number of participants invited to take the survey. For example, the college could develop an alternative using a biyearly time frame for reassessment to include more students.

Another alternative could be for the college to use time-studies to allow students to reflect on their learning experiences along the way. An additional alternative approach could be to develop assessment instruments such as a pretest and posttest to obtain a measurement of students' IL skills and abilities. This approach would involve collecting data from students early in their college journey and then again at the end. An assessment such as this could more objectively measure student development. Another alternative approach could be to for the college to compare the GPA of students in two groups, those who took the IL requirement and those who did not.

Scholarship, Project Development, and Leadership and Change

The sections below present details regarding the personal learning and growth I experienced specific to the research and development of the project. I reflect on the change leadership experience I gained as a scholar, practitioner, and project developer.

Analysis of Self as Scholar

As an educator in the dynamic information studies field, it is vital to stay current and informed on effective educational delivery practices. I found the learning I gained through the review of literature invaluable. I built upon prior knowledge and broadened the scope of what constitutes effective educational practice. Thompson (2010) observed that the term scholar represents an individual who practices inquiry to use research and theory to increase knowledge. Through interacting with a large number of peer-reviewed scholarly works, I learned the importance of a disciplined academic study. Through developing and conducting the study, I learned the importance of scholarship resulting from a high-quality level of research on which to ground the resulting project.

This project study provided the opportunity to practice research skills. As I explored potential education problems at the college, I immersed myself in research, seeking out literature about information literacy, assessment, policy development, survey methodology, evaluation practices, and related topics. After preliminary research, I decided to design a study to assess student Outcomes of behavior and level of confidence changes having the potential to provide assessment data related to the effectiveness of the IL requirement program. I then collected relevant literature based on the issues of student preparedness, IL delivery methods, and program assessment practices. I also used the literature for learning about the statistical testing techniques needed for analyzing the data I collected. I believe a high level of scholarship was essential to help identify the significant relationships that existed between the dependent and independent variables used in the study. It was necessary to use research-based literature to develop a white paper project to communicate the research and findings of the study and to support the resulting recommendations addressing the problem.

As I began to realize the degree to which the literature and data guide research, the scope and direction of my scholarship changed. Steven-Long, Schapiro, and McClintock (2012) noted that scholars experience multiple learning gains beyond developing intellect as they seek to understand a problem and connect data to theories and practices. I focused on applying my skills to understand more deeply the issues influencing the assessment of student information evaluation learning gains, behavior changes, and confidence levels. Steven-Long et al. stressed the importance of scholars seeking multiple perspectives and utilizing theoretical concepts. Thompson (2010) agreed

that grounding scholarship in theory is key to understanding educational problems. I learned that academic scholarship encouraged depth of research. I considered possible descriptors and combination of terms to search the literature involved in this study and project. The knowledge and vocabulary I gained through this process have further developed my ability to communicate problems and solutions to stakeholders by researching and communicating the best practices and most useful theories for assessing student IL behavior changes.

Analysis of Self as Practitioner

As a practitioner, I have worked in the field of information literacy instruction for many years as a librarian and an instructor. Thompson (2010) noted that the word practitioner describes a person engaged in a profession who uses theories. I applied practical experience with information literacy and educational theories as a foundation for constructing the study. As a reflective practitioner, I have been able to consider a problem, apply current knowledge, and develop new understandings that I can apply to create change. Steven-Long et al. (2012) noted the value of combining practical experience and research within a theoretical framework for influencing individual, local, and societal change. I evolved professionally and as a practitioner as I actively engaged in the process of identifying the targeted assessment gap problem at the college. That evolution expanded as I learned the process of finding potential solutions to the problem and began doing a study. The results of the survey I conducted provided the information I needed to be a leader-practitioner. I used that knowledge to develop a focused set of recommendations.

This project study is an example of my personal growth as a practitioner. I applied what I learned through the literature review and data analysis to a real world problem aligning practices with institutional needs. As a practitioner conducting research for this study, I adhered to the highest code of conduct and strictly followed Walden IRB's guidelines and suggestions. I applied procedures that ensured that I gather valid, reliable data to effectively answer the study's research questions. I learned how to utilize data collecting and statistical software to assist in analyzing large volumes of data. Throughout this study, I dedicated myself to obtaining first-hand experience researching and applying current research to investigate an educational problem in an area in which I possess practical knowledge. Steven-Long et al. (2012) noted that being a scholar-practitioner involves being an active participant in research to improve educational practices. Through the process of inquiry required as I conducted this study, I have become skilled as a scholar-practitioner capable of leading change in the college's required assessment practices (Schultz, 2010). The process of researching literature and using a theoretical framework have contributed to my ability to make reliable policy change recommendations to the college administrative and faculty stakeholders. According to Thompson (2010), combining research grounded in theory with practical understanding of working in the field provides a scholar–practitioner with unique insights as an educational leader. I believe this experience will be useful as I use the white paper project to the motivate policy changes in general education assessment practices.

Analysis of Self as Project Developer

As a project developer, I utilized leadership skills throughout the study. A leader makes informed decisions based on extensive research and practical experiences. Hattie (2015) described a leader as a change agent who focuses on the impact of an educational program, effectively communicates, challenges self and others, and embraces errors as a way to learn. One of the most important facts that I learned about project development was that a plan for change should derive from the research, theory, and findings. When advocating for change in educational assessment practices, a practitioner needs to determine that the change is possible so the new practice can become commonplace. Thompson (2010) noted that effective project management for leading change requires understanding and inclusion of the entire system in the plan. The study stressed that a leader should consider how changes made in one program affect other programs.

I believe that effective project development depends on personal involvement in sharing information and also self-evaluation. I was careful to incorporate only research-based practices and cautiously analyzed findings into the policy recommendations. Hattie (2015) observed that evidence is vital to demonstrate that a new practice can have an impact on the effectiveness of the educational program. I designed the project using theory and research to frame the problem, carefully collecting data to get learner-centered reports, and then applying more research to support the project delivery method and policy change recommendations. I learned that implementation of a project requires not only analysis to determine if the project addresses the problem but also includes an evaluation plan to assess its effectiveness in meeting the intended goals. The

recommendations in the project offer potential solutions that best fit the college system, and that the college can implement with only slight modifications to the assessment practices currently in place.

While developing the implementation plan for the project, I gained experience in using a leadership approach. I determined how to convey the study's findings to motivate stakeholders to want to change assessment practices. I realized the importance of obtaining institutional and colleague support to be able to motivate changes in assessment practices. Thompson (2010) noted the importance of a leader creating a climate of trust through communication to support stakeholders through policy changes they may choose to implement. Thompson also stated that obtaining a commitment from stakeholders is critical to sustaining any system changes. Completing this study and presenting the findings to college stakeholders does not guarantee assessment practices will change. Stakeholders may not want to let go of the time and experience they have invested in mastering the old practices. As a scholar-practitioner, I will use a leadership approach to show administrative and faculty leaders how the results of this study relate to the importance of regular targeted assessment practices. Obtaining a commitment by sharing research and data can help college leaders understand the problem and motivate them to make informed policy decisions.

Reflection on the Importance of the Work

This project study experience has strengthened my intention to engage in research efforts that positively impact student development. In my capacity as a scholar-practitioner and project developer, my research and leadership efforts will continue to

focus on assessing student learning experiences to advocate for practices that will contribute positively to increasing students' and the college's academic success rates. Providing reliable data that the college can use for assessing the effectiveness of a general education requirement shows the importance of this study. Through this project study, I became a scholar capable of contributing to social change. The research skills acquired through this study and project helped to focus and coordinate my knowledge, experience, and practice. As a result, I hoped to motivate college administrative and faculty stakeholders to recognize the impact of IL education on students' affective behavioral changes and level of confidence growth in ensuing courses. This learner-centered survey study provided quantitative research results that advanced practical application of the resulting policy recommendations related to assessment practices in the college setting. The project, as a product, can be used by administrative and faculty decision makers at the local institutional level to evaluate the college's assessment practices impacting student achievement and ultimately program effectiveness. The data is of broader importance to the scholarship of students related to how the IL requirement as an IL education delivery method contributed to their engagement and success in other college courses. Finally, the study has the potential to provide the first stage of data collection in a long-term longitudinal assessment plan.

Implications, Applications, and Directions for Future Research

A scholar-practitioner can influence social change on many levels. The white paper project has the potential for impacting positive social change at the individual, organizational, and societal levels.

Social Change at the Individual Level

This study project experience has strengthened my intention to engage in research efforts that positively impact student development. As a continuation of my role as a scholar-practitioner and project developer, my research and leadership efforts will continue to focus on assessing student learning experiences, In this way, I can inform and support practices that positively contribute to increasing students' academic success rates.

Emerging Internet technologies created an educational paradigm shift requiring increased student capacity to analyze new information for quality and relevance. Effective IL education helped students gain the information evaluation skills and abilities needed for problem-solving and to make informed decisions (York, 2013). Students recommended receiving IL education early to promote success in completing papers and participating in discussions in other courses. A prospective outcome of this study is the development of students who are better prepared to critically analyze the kinds of information needed in both academic settings and the workplace setting.

Social Change at the Organizational Level

The primary implication for institutional social change resulting from this project is the application of these findings, evidenced by implementing data-based decision-making processes relative to future assessments of general education requirements. In light of the research and study data regarding IL education delivery methods and student's IL critical analysis behaviors, assessors of the effectiveness of delivery methods need to take these behaviors into account. Using the white paper project, I have offered the I-E-O assessment model and the *Information Literacy Requirement Impact Survey*

instrument as a solution to the college's gap in practice in the hope that it will positively impact future assessment practices at the college. Schultz (2010) noted that if stakeholders can agree on implementing assessments that combine theory and practice, the result will be thriving learning environments. The intended impact is greater than just a one-time assessment. The additional value lies in educating stakeholders about the I-E-O assessment model with the goal of shaping programmatic decisions, thus enhancing the effectiveness of future assessment processes using student's reports of success.

The study and white paper project provide data that the college can use to assess the student development impact of its IL education program. College stakeholders were considering dropping the general education IL requirement without considering data indicating whether or not it had a positive impact on students' critical analysis learning gains. The self-reported data derived from this project study suggests that the general education IL requirement delivery method is promising for impacting the IL critical analysis behaviors and confidence of community college students. A data-driven targeted assessment will ensure the college is presenting its students with the most effective program possible to develop IL critical evaluation skills and knowledge. These IL critical evaluation competencies help ensure that students can efficiently and effectively obtain and use information to solve academic research problems. The findings will inform the college's development of any future IL education assessment projects. The data obtained from this study and presented in the white paper can assist stakeholders in making informed decisions about assessment practices.

Social Change at the Societal Level

The study and project have state and national implications and applications. The study fills a community college's need for assessment data regarding the student development impact of a particular IL education delivery method. This data has the potential to go beyond the local need to inform IL education delivery at other California community colleges, as well as community colleges nationally. An even larger social change implication exists as the impact of IL education delivery can affect students' future workplace IL information evaluation performance and civic participation.

The study project's data will add to the IL education literature regarding student development impact of a particular IL education delivery method. Shipan and Volden (2012) introduced the importance of the concept of policy diffusion and how policies spread between institutions. They noted that scholar-practitioners participating in policy advocacy at their community colleges were in a perfect position to encourage broad policy change across the system between institutions. California community colleges have the unfunded mandate of delivering IL education to their students. Most do so using one-hour instructional sessions or by infusing the instruction into English or other discipline-based courses. Kuh (2008) reports that information about changes in student behavior resulting from a required IL course could be useful. An assessment of an IL education delivery aligned with the ACRL (2000) *Information Literacy Standard Three* (see Appendix I) provides data that can be of value to community colleges nationally.

Educators may use this project study as a reference for survey research using the I-E-O model. The project study could also encourage ongoing assessment of IL

education, specifically at community colleges and related to quality standards and students' evaluation of information quality. Not all students come to the community college prepared with information evaluation skills. Required IL education can provide a way for all students to gain key critical analysis skills. This has the potential to provide equality in the classroom and increase marginalized student success in other courses requiring research (Schultz, 2010). Given the impact IL has on critical evaluation skills and those associated with civic collaboration among informed members of society, IL also has social change implications (Everett, 2015; Gainer, 2012; Monge, & Frisicaro-Pawlowski, 2014).This study project's potential is multifaceted. It will inform local decisions by effectively filling the assessment gap and could provide useful data for IL education at other community colleges. It will also add to the IL literature regarding the student development impact of this method of delivery on students' IL information evaluation behaviors.

Contributions to research literature in this area can add to the educational and critical analysis knowledge base that can beneficially impact social change. The IL literature contained numerous studies and reports addressing the importance of IL skills and abilities in workplace settings beyond the community college. Bird, Crumpton, Ozan, and Williams (2012) conducted a survey of alumni to determine what development of IL competencies had on their performance after graduation. Their findings showed that students identified advanced navigation and evaluation skills as the IL competencies most relevant to them (Bird et al., 2011). Sokoloff (2012) conducted a study of workplace managers who identified the ability to critically evaluate information and use it for

recommendations and decisions as most valuable. Travis (2011) studied transferability of IL skills to the workplace and found that respondents credited their IL skills for obtaining their jobs. Head's (2012) PIL study on IL in the workplace included a focus group of recent graduates from the college. The report's findings indicated that graduates found the IL workplace challenges to be urgent deadlines and vague research assignments with minimum feedback (Head, 2012). Employers in the same study listed unmet expectations as challenges, including the employee's inability to conduct research as a member of a team and lack of persistence in digging deeper for solutions (Head, 2012). Monge et al. (2014) concluded IL skills are vital in information-based workplace environments. These studies illustrate how positively students and employers view IL knowledge and skills and the importance of including IL education at a community college as a community benefit.

Methodological and Theoretical Implications

This study goes beyond simply adding to the literature regarding IL education. It has the methodological implication of providing a carefully created and tested survey instrument that can be used by future researchers to collect student self-reports of information evaluation behavior and confidence changes. The study also has the theoretical implication of adding to the literature showing a survey design based on Astin and Antonio's (2012) I-E-O assessment model to study students' self-reported information evaluation development.

Recommendations for Practice

This study's research and findings have several practical applications for the college. The white paper lists these applications as recommendations for practice. I developed these recommendations for programmatic and policy changes based on the issues identified in this study including student preparation, the IL requirement as an education delivery method, and general education requirement assessment. The college can apply these recommendations as solutions for its targeted assessment gap problem by using the study's findings to evaluate and enhance the effectiveness of its IL requirement.

1. Use the study's learner-centered self-reports to develop a process prioritizing that the IL requirement is completed early in the general education requirement pathway.

2. Use the study's findings as an indicator that the IL general education requirement course is an effective delivery method that should be supported ensuring that formats and lengths of course offerings meet the needs of all student demographics.

3. Use the *Information Literacy Requirement Impact Survey* to conduct targeted assessment of the IL general education requirement on a 3 year basis and correlate the findings with the college's triennial Student Survey results.

The IL requirement effectiveness research should not end with this project study. More research is needed to evaluate the effects of the IL general education requirement on students' critical analysis learning outcomes.

Recommendations for Future Research

To fully investigate if the IL requirement positively contributed to student development, additional research is needed. More assessment will be essential for administrative and faculty stakeholders to evaluate the IL requirement's effectiveness.

1. Conduct longitudinal or repeated survey research on the general education IL requirement using the *Information Literacy Requirement Impact Survey* instrument to increase the reliability and validity of this study's results.

2. Use Astin and Antonio's (2012) I-E-O assessment model to assess other general education requirements.

3. Conduct additional data collection related to the timing of when in their academic career students should complete the IL requirement to provide insight into the optimal timing for delivery of IL education to increase the requirement's usefulness for students.

4. Conduct a case study of a research intensive course comparing students self-reports to instructor reports of information evaluation measures and triangulating those results with the students' grade data.

5. Use objective data collection methods such as comparing the grade-point-averages of groups of students who took the IL requirement course with those who did not.

6. Use a standardized IL skills assessment instrument such as a pretest and posttest to collect assessment results immediately after course completion and compare them across courses.

7. Conduct qualitative research such as interviews or focus groups to provide a rich data set of learner-centered comments to validate whether or not the IL requirement continues to meet students' and the institution's needs.

Continuing assessment of the IL requirement using the I-E-O assessment model can help stakeholders understand how the independent variables of demographic and preparation characteristics, and the effects of the IL education delivery method impact students' affective information evaluation behaviors and confidence in other courses.

Conclusion

This quantitative research study and white paper project outlined a local educational problem; the lack of targeted assessment practices at a community college. The study examined relationships between student characteristics, aspects of the general education IL requirement, and subsequent frequency of student use of IL critical information evaluation behaviors, confidence in writing papers, and participation in discussions in other courses. The study and white paper summarized the research and associated findings and made recommendations related to future targeted assessment of the impact of the general education IL option for equipping students with the information evaluation knowledge and skill set needed for successful involvement in other courses. The study provided recommendations for future research and an assessment instrument and method I recommended for future use. The relationships identified in the research provided the basis for the recommendations I offered in the white paper.

The *Information Literacy Requirement Impact Survey* involved assessment of student self-reports. The study's findings provided supportive data that key stakeholders

can use to gauge the effectiveness of the general education IL requirement as an educational delivery method. Using a survey aligned with the learner-centered mission of the college, I obtained relevant findings supporting the effectiveness of the IL education delivery method. Because the study was successful, the survey produced an instrument that the college can reapply in subsequent years to see how Outcomes change and how the college can apply changes to the LIR 10 course to help meet ongoing needs.

The study's assessment produced results from three types of data analysis: descriptive, correlation, and multiple regression. The subsequent findings provided data to support a recommendations type project. The descriptive data provided a profile of the students, and the univariate analysis showed that the majority of students reported that the IL requirement had a favorable impact on their information evaluation behaviors and confidence. The cross-tabulation and correlation analyses provided bivariate data that showed all variables in the study had one or more significant relationships with other variables measured, except for gender, and thus I used them in the regression analysis. The multiple regression provided multivariate data that answered the study's research questions and hypotheses and showed that some student (Inputs) and program (Environment) characteristic variables were significantly related to the Outcomes variables. Results of data analysis justify the identification of the college's assessment gap problem and the need to share and further evaluate the target specific indicators of the program goals and objectives. The overall results revealed that students reported favorably on their IL learning experiences in the IL delivery system.

Astin and Antonio's (2012) I-E-O assessment model framed the study and the white paper by emphasizing the relationship patterns. It provided the background of the problem showing the preparedness issues surrounding student characteristic Inputs, the IL education delivery methods characteristic of the Environment, and the students' critical analysis behavior and confidence Outcomes that will fill the college's gap in general education assessment practices. The study results were the center point of the white paper providing informative background of how the data collection and analysis results answered the research questions regarding the relationship between the student characteristics, the IL requirement and students' reported feelings of critical information evaluation development. The recommendations are the white paper's cumulating point.

This project builds upon the SRJC (2013b) *Institutional Learning Outcomes* assessments currently practiced by the college but gives targeted information specific to the IL requirement program that can inform decision makers about the contributions of this specific general education requirement. The study's results presented data that stakeholders can use as a starting place for an improvement of the college's assessment practices. The study also provided theory-based evidence that the college can use to assess the effectiveness of the general education IL requirement.

The findings from this research study and project have the potential to support social change in the education community. A college that can offer effective information literature education influences societal change by promoting student critical analysis behaviors that impact students' ability to think critically in their other courses, workplace, and civically. Promoting student success and providing higher level skilled workers to

compete in a global workforce enhances the potential for positive societal change. If the study's findings are effective in garnering the college's support, individuals and educational organizations could benefit. This study offers a starting place for educational decision makers to best approach future assessment practices. Stakeholder feedback will be invaluable for assessing this project and informing future research. The education community can be especially resistant to change, and this may prove to be true for the changes in assessment practices recommended by this project. Through the practices of feedback, process revisions, and success stories, the college can accept these changes.

My scholar-practitioner journey does not end with the completion of this study project. Completing this project provided the opportunity to place research into practice by promoting more focused assessment opportunities. These opportunities could contribute to social change by helping students obtain timely skills needed to succeed academically, and qualify and compete for higher-level jobs within the community.

Implementing program change requires leadership at all levels of the institution. The leadership of a scholar-practitioner can benefit the college by identifying a problem such as the need to assess how community colleges monitor general education requirements and actively seeking solutions that can result in effective changes. Leaders also campaign to obtain support for institutional change among key stakeholders. Taking a leadership role will help monitor the outcome of changes to practices as well as provide an opportunity to continue researching the effectiveness of the modified practices. As a result of the work and data from this study and project, I have acquired the knowledge required to lead a drive for change at the college, hence becoming a leader for change.

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Appendix A: The Project

Recommendations for Increasing the Impact of the General Education Information Literacy Requirement

A White Paper by Phyllis Usina, Walden University

p. 1

Executive Summary

Santa Rosa Junior College (SRJC) has used a 1-unit general education course as an information literacy (IL) requirement since 2002. In that time, the college has conducted no targeted assessment of this delivery method. In response to several years of budget constraints, college stakeholders considered ending the IL requirement in 2013. *Critical Analysis Institutional Learning Outcomes* data indicated students had IL related learning gains, but an assessment gap existed regarding the impact the IL requirement had on these gains.

This targeted doctoral capstone study used Astin and Antonio's (2012) I-E-O assessment model. Two research questions explored relationships among the Inputs of student demographic and preparation characteristics, the Environment of IL requirement course formats and lengths, and the Outcomes reports of frequency of affective information evaluation behaviors and confidence in writing papers or participating in discussions in subsequent courses. The anonymous *Information Literacy Requirement Impact Survey* instrument was administered online in the Spring 2015 semester. Self-reports from 525 students age18 or over who had completed the IL requirement course with a grade of 2.0 or better during the 2013–2014 academic year were collected. Data analysis showed that relationships existed between the Inputs, Environment, and Outcomes variables measured.

Based upon the study's research and findings, this report provides three policy recommendations. The first recommendation involves using the study's learner-centered self-reports to modifying registration pathways to support early completion of the general education IL requirement. Students recommended the IL requirement be completed in the first or second term of college attendance. A second recommendation encourages continued support for the IL requirement as an effective delivery method ensuring that formats and lengths of course offerings meet the needs of all student demographics. The majority of students reported that the IL requirement had a favorable impact on their information evaluation behaviors and confidence. Most students reported completing the IL requirement in their third or fourth semester and felt they were already somewhat prepared. However, they attributed a greater frequency of information evaluation behaviors changes and higher levels of confidence to participation in the Il requirement. A third recommendation suggests that the college use the *Information Literacy Requirement Impact Survey* to conduct targeted assessments of the IL general education requirement on a 3-year basis and correlate the findings with the college's triennial Student Survey results. The study's response rate of 26% fully completed surveys demonstrated student comfort with the survey and supported the methodology's alignment with the college's learner-centered values.

These policy recommendations; modifying registration pathways, continuing support for the IL requirement, and conducting targeted assessment on a 3-year basis, form a foundation that can inspire future research. The successful use of the I-E-O model provides stakeholders with a framework to fill the college's assessment gap. The study also provides theory-based data that can be used to gauge the effectiveness of the general education IL requirement. Offering effective information literature education influences societal change by promoting student information evaluation behaviors and confidence. These behaviors are associated with improved workplace performance and the civic collaboration essential to informed members of society.

Introduction

More than a decade has passed since Santa Rosa Junior College (SRJC) instituted a 1-unit general education information literacy (IL) requirement. In that time, the college conducted no targeted assessment of this delivery method. Data was needed to determine if the IL requirement equipped students with effective academic research abilities impacting their critical analysis gains. The college could benefit from data showing if the general education IL requirement delivery method is meeting the changing needs of the institution and its students. The purpose of this quantitative survey study was to address the gap in assessment using students' reports of frequency of critical information evaluation behaviors and confidence in academic settings as a result of participation in the IL requirement course while controlling for differing student characteristics. Such an assessment could assist stakeholders in making future decisions relating to the program and ensure that resources are being used to best effect. The college, like other colleges, struggles to respond to demographic shifts, budget restrictions, accreditation standards, and changing government regulations. These competing pressures make it essential for colleges to regularly examine the relevance of required general education courses to students' programs of study. Data collection involved an anonymous survey instrument that measured students' demographic and preparation characteristics, IL course format and length, and frequency of information evaluation behaviors, and levels of confidence.

This study provided targeted data college decision makers can use to assess the efficacy of the general education IL requirement delivery method. It supplements the college's broad institutional level assessment, currently in use, with a targeted survey component designed to determine if the requirement's IL development goals for students are being met.

Contents

Context of the Problem

The problem prompting this study was a community college's lack of targeted assessment of the student development impact of its general education IL requirement. In 2002, the college's faculty and administrators made the assumption that a general education requirement would be the IL educational delivery method best suited to developing student research competencies in other courses. In so doing, they signaled their commitment to the development of IL critical evaluation skills and knowledge in students. This commitment originated from the radical paradigm shift that Internet technologies produced in how students conduct academic research. This shift necessitated increased student capacity to critically evaluate information.

Concerns about students' IL critical information evaluation performance dated back to the 1980's (Association & Research Libraries [ACRL], 1989, 1998; Kuhlthau, 1991) and research showing students' deficiencies in IL abilities continued to affect higher education up to the present (Chen, Pedersen, & Murphy, 2012; Gross & Latham, 2012; Head & Eisenberg, 2009; Head, 2013; Ritzhaupt, Feng, Dawson, & Barron, 2013; Taylor, 2012). As a result of these concerns, the scope of IL education developed and expanded. In the 2000s, the ACRL (2000) published its *Information Literacy Competency Standards for Higher Education*. ACRL's *Information Literacy Standard Three* included critical thinking components related to analyzing information that enabled students to use information to increase their knowledge. Multiple authors continued to acknowledge the growing need for IL support in education. Effective IL education became necessary to help students gain the information evaluation abilities needed for problem-solving and making informed decisions (York, 2013).

The literature review revealed a lack of published studies assessing the efficacy of a required general education course as the IL education delivery method that compounded the college's assessment gap. The college's assessment of its *Institutional Learning Outcomes* (2013b) uses a broad *Student Survey* (2013d) that reflects student's self-reported affective gains. Students report high learning gains for the critical analysis outcomes that include IL abilities. However, the survey does not address the question of whether participation in the IL requirement course, LIR 10, is responsible for those gains. The college's evaluation allows for a broad, standardized assessment of student development but does not specifically assess the impact of the general education requirement for IL education delivery. Given that no specific IL requirement assessment process was implemented, local shared governance committees discussed the question of discontinuing the IL requirement.

Three relevant issues surrounded the college's IL requirement assessment gap problem. These spanned the larger education context of the United States and the state of California, and the local setting of a community college. These issues included increasing numbers of underprepared students who may not possess IL skills and abilities, the IL education delivery methods options available, and the need to regularly assess general education requirements.

Theoretical and Conceptual Framework

Astin and Antonio's (2012) Inputs-Environment-Outcomes (I-E-O) assessment model evolved from their work on large-scale longitudinal student surveys.
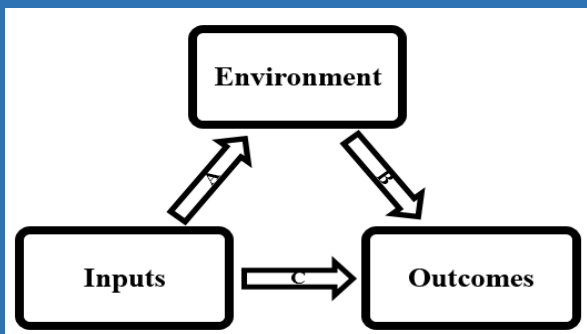
The Inputs-Environment-Outcomes (I-E-O) model shows how Inputs can affect the educational Environment that can affect Outcomes. Inputs can also directly affect Outcomes.

The I-E-O assessment model focused the study's problem, data collection, and analysis investigations on three issues surrounding the college's IL requirement assessment gap problem.

The I-E-O assessment model highlighted the need to include the preparedness issues surrounding student characteristic as Inputs, the characteristic defining the IL education delivery methods of the Environment, and the frequency of critical information evaluation behaviors and confidence levels as affective Outcomes. The I-E-O relationship patterns also define what concepts needed to be measured by the self-developed survey instrument used for data collection, the techniques selected for data analysis, and the policy and programmatic recommendations.

Research Questions

The use of the I-E-O assessment model to provide insight into the impact of SRJC's IL requirement program gave rise to one overarching and two research questions.

Is a 1-unit general education requirement an effective IL education delivery method for students at a community college?

Affective Behavior Change

RQ1: What is the relationship between completion of the general education IL requirement course with different formats and lengths and frequency of information evaluation behavior changes among students with identified characteristics?

Level of Confidence

RQ2: What is the relationship between completion of the general education IL requirement course with different formats and lengths and how skills learned contributed to information evaluation confidence in other courses among students with identified characteristics?

The identified student characteristics referred to in the research questions include age, gender, ethnicity, primary language, terms attended, English course level, research preparedness, and number of papers.

Data Collection

Considering the intersection of the college's IL requirement assessment gap and its learner-centered values, survey research was the ideal approach to explore relationships between the issues surrounding the problem. Some may perceive limitations in using survey methodology and question attribution of self-reported behavior or confidence to participation in the IL requirement. In the case of this study, however, careful attention was given to the design of the self- developed *Information Literacy Requirement Impact Survey* instrument. Validity was increased by adapting items from the SRJC (2013d) *Student Survey* instrument and information evaluation performance indicator outcomes from ACRL's (2000) *Information Literacy Standard Three*. In addition peer expert review, pilot testing, a large sample size, item scales, and rigorous analysis techniques were used. Given these conditions and that the study's use of survey methodology was carefully executed, the data analysis results can provide preliminary support for policy change recommendations.

In Spring 2015, data was collected online anonymously in cooperation with the college as a community partner. Participation was voluntary and limited to students a minimum of 18 years old who completed the IL requirement course with a grade of 2.0 or better during the 2013–2014 academic year. All 2012 students in the target population were invited to engage the most participants possible

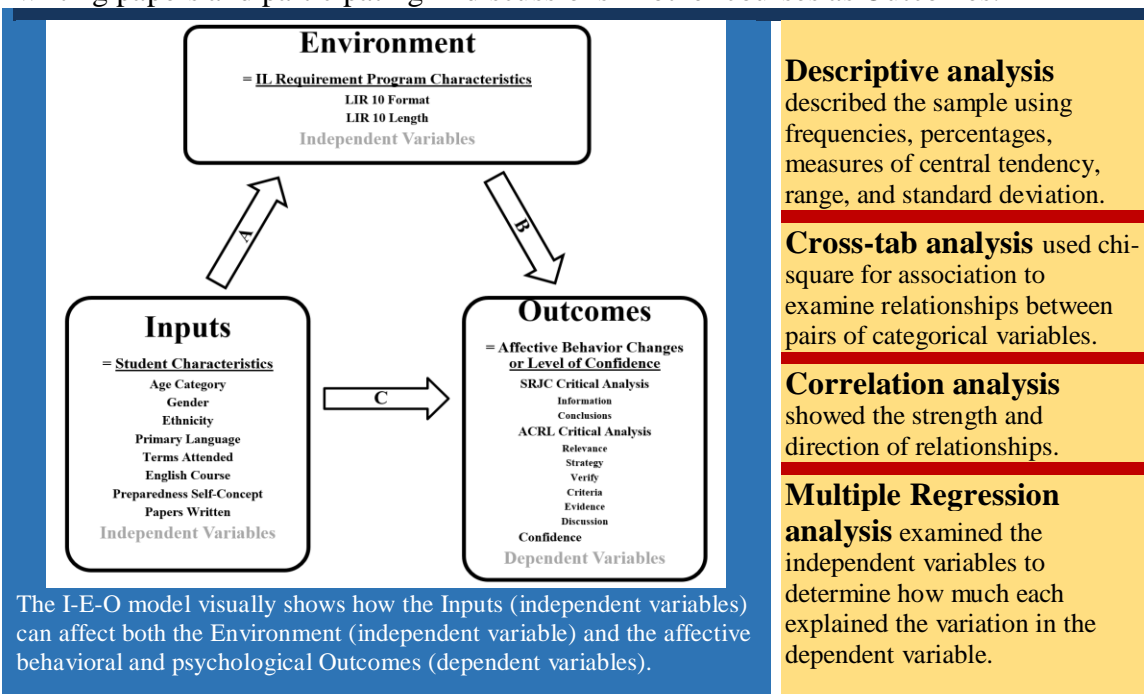|	Enrollment (N)	Success (N)	% that passed
Spring 2014	1105	791	71.6
Fall 2013	1067	765	71.7
Summer 2013	609	456	74.9
Total	2781	2012	72.4

The study's total population purposeful sample return was 592 surveys, a 29% response rate. Responses that were incomplete or did not meet the selection criteria (n = 67) were subtracted. The response rate for resulting usable surveys was 26% with a sample size of N = 525. The survey was administered twelve to twenty-four months after program participation. This timeframe was long enough to allow students to gain experiences in other courses but was not so long after completion of the IL requirement course, LIR 10, that students forgot learning outcomes.

The last item on the survey was students' recommendations of when would be most helpful time to take the IL requirement. The college had no set general education requirement sequence or pathway a student must follow. As a result, many students completed the IL requirement at the end of their time at the college. California's Student Success Initiative (SSI) stressed the importance of orienting students early to ensure all students have the foundational skills essential for the achievement of a degree, certificate, or transfer (CCCCO, 2011). The concept of timing had implications for the IL education needs of underprepared students.

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Data Analysis

This study answered the research questions by testing for significant relationships between the student demographic and preparedness characteristics as Inputs, IL requirement course format and length as Environment characteristics, and critical information evaluation affective behavior changes and confidence levels in relation to writing papers and participating in discussions in other courses as Outcomes.

The I-E-O model visually shows how the Inputs (independent variables) can affect both the Environment (independent variable) and the affective behavioral and psychological Outcomes (dependent variables).

Descriptive analysis described the sample using frequencies, percentages, measures of central tendency, range, and standard deviation.

Cross-tab analysis used chi-square for association to examine relationships between pairs of categorical variables.

Correlation analysis showed the strength and direction of relationships.

Multiple Regression analysis examined the independent variables to determine how much each explained the variation in the dependent variable.

Representativeness of the Response Sample

This study conducted representativeness analysis to assess the data for potential response bias limitations. Based on the results, this study accepted the assumption that the demographic characteristics were meaningfully similar because the ethnicity variable was significant statistically, and the differences for the age and gender variables were small. However, the error in reporting for the LIR 10 course length variable did not limit the ability to draw conclusions from the representativeness of the LIR 10 format program characteristic and the demographic characteristics findings.
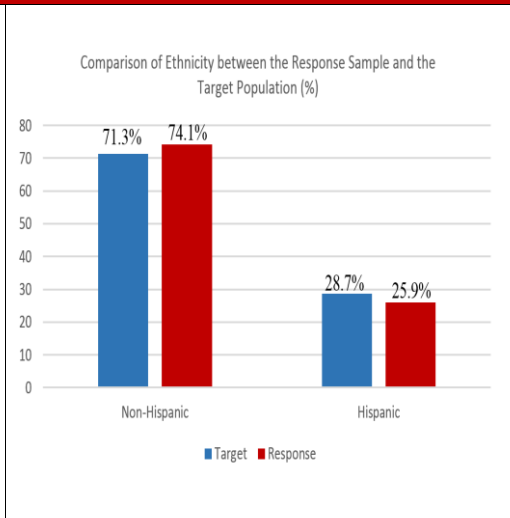
Student Preparedness Issues Surrounding the Problem

The California Community College system's open access mission provides academic opportunities for students who may not otherwise be able to obtain degrees. Many students arrive with a low level of academic preparation and are required to stay in school longer to attain their degrees, increasing the chance they may not meet their educational goals (Astin, 1999; Cabrera, 2014; Kim and Bragg, 2008). Head's (2013) study of freshmen research habits included a sample of the college students. This study found students reported feeling "unprepared to deal with the enormous amount of information they were expected to find and process for college research assignments" (Head, 2013, p. 2).

The college's ethnic demographic is predominately white with a Latino (Hispanic) population that has expanded from "15% to 29%" (SRJC, Office of Institutional Research [OIR], 2013, p. SD 6-7) within the last decade and continues to grow at an ever faster rate. The college has also experienced an increasing number of students enrolling who are underprepared for college-level work. These students lack many of the skills necessary for academic success. This growing demographic of underprepared students required development in reading and writing prior to enrolling in college-level courses. The college's student demographics were similar to national statistics with regard to the increases in enrollment of students underprepared in the critical information evaluation learning behaviors (CCCCO, 2014c). Several studies and reports addressed the role of IL education in developing underprepared students to a level where they are competitive with their peers in the classroom (Finley & Waymire, 2012; Gross & Latham, 2012; Head, 2013; SRJC, 2013a).
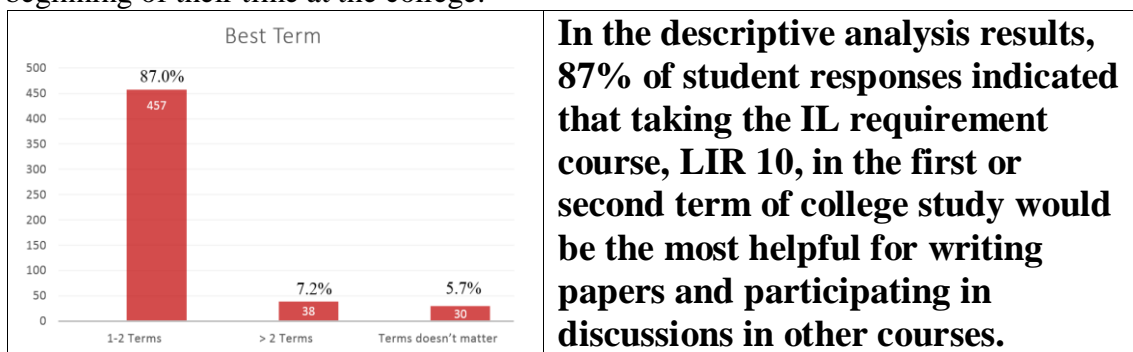
This growth of underprepared students required SRJC to focus its mission more tightly on the development of students (SRJC, 2013e). The college's *Scorecard* data showed that ESL students were not persisting to graduation as often as other ethnic groups (CCCCO, 2014a). These students were found to lack the academic preparation necessary to succeed in courses that require research. Increased pressures for assessment of programs from accrediting bodies (ACCJC, 2014; WASC 2013) spurred the college's interest in assessing the effectiveness of its institutional programs. As community colleges continue to incorporate new methods to meet the needs of underprepared students, studying the effects of the IL requirement can offer data regarding student development.

**Recommendation Based on Research Evidence**

Study findings suggested a need to modify registration practices to ensure students enroll in the IL requirement course in their first or second term. The policy recommendation calls for adjusting enrollment pathways for underprepared students

> 1. **Use the study's learner-centered self-reports to develop a process prioritizing that the IL requirement is completed early in the general education requirement pathway.**
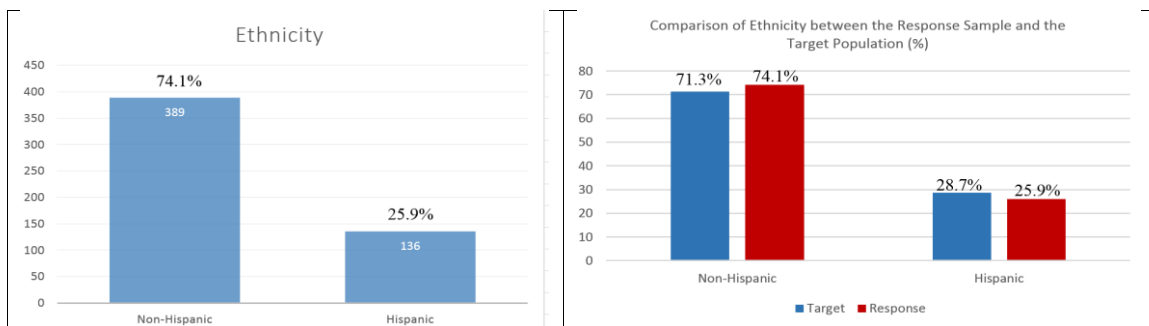
The results of the study and research supported this recommendation and showed the importance of students completing the general education IL requirement at the beginning of their time at the college.

In the descriptive analysis results, 87% of student responses indicated that taking the IL requirement course, LIR 10, in the first or second term of college study would be the most helpful for writing papers and participating in discussions in other courses.

Adjusting practices to ensure students enroll in the IL requirement courses early in their college experience can equip students with the knowledge and skills need to cope with academic research challenges throughout their educational experience at the college. Cho and Mechur Karp (2013) found that students, especially underprepared students, who took academic support courses in the first semester enrolled in classes in subsequent semesters. Frost, Strom, Downey, Schultz, and Holland, (2010), and Schnee (2014) advocated that colleges provide more learning communities to integrate underprepared students' learning by connecting academic services such as library instruction. Kuh and Gonyea's (2015) findings based on self-reported questionnaire responses involving more than 300,000 students showed students' educationally valuable activities included engaging in academically challenging activities requiring critical thinking and having more interaction with instructors. They concluded the library was conducive to positive learning for students, especially underprepared students, and advocated for colleges to acknowledge the valuable role IL plays in developing students' information evaluation skills. Varlejs, Stec, and Kwon (2014) found that limited library resources resulted in students not receiving the IL preparation needed for college success.

Terms Attended — English Course Level — Papers Written
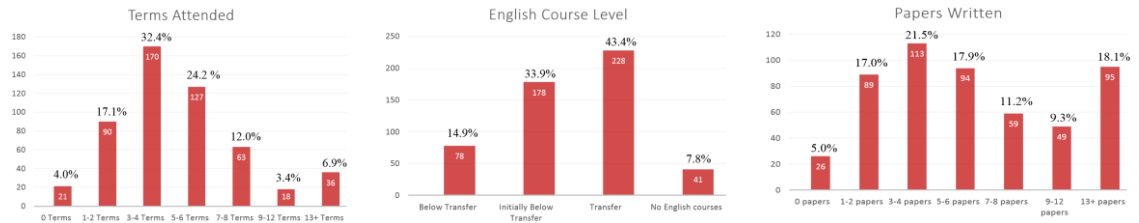
The findings from the study showed that the majority of the students had attended 3–4 terms or more, had taken a transfer level English course, identified with the self-concept that they felt somewhat or super prepared with information evaluation skills before taking LIR 10, and had written 3–4 papers or more. However, even though the students reported that they came feeling somewhat prepared, for the Outcomes measured, the majority identified that LIR 10 positively impacted the frequency of their SRJC Critical Analysis learning gains changes, their ACRL Critical Analysis behavior changes, and their information evaluation confidence for involvement in writing papers and participating in discussions other classes.

Ethnicity — Comparison of Ethnicity between the Response Sample and the Target Population (%)

The study's data analysis showed that more than 25% of the response sample identified as the Latino/ Hispanic ethnicity. This data was significantly representative of the target population invited to participate and the demographics of the college as a whole (SRJC, OIR, 2013).

Roscoe and Tovar (2015) reported that the increasing numbers of underprepared Latino students have unique academic support needs that colleges must address to impact Latino/a community college students' success. Johnston, Partridge, and Hughes (2014) identified challenges that ESL students experience with IL academic expectations of reading and understanding information sources and gave insights into how educators can improve their approaches. Mulvey (2009) highlighted the problem of academically underprepared students having skill levels well below their classmates and the importance of support courses to bridge the gap. In this study higher levels of academic preparation were positively associated with other student characteristics and with information evaluation behavior changes and confidence levels.

IL Requirement Education Delivery Method Issues Surrounding the Problem

In 2002, the college institutionalized general education requirement as its IL education delivery method to address concerns about students who were underprepared to meet academic critical evaluation expectations. The requirement was a 1-unit course, LIR 10, Introduction to Information Literacy. This course met the general education "Area I: Information Literacy Requirement" (SRJC, 2014–15, p. 1) for the local associate degree. The college's IL requirement evolved from events occurring in the larger educational setting. The Academic Senate for California Community Colleges (ASCCC; 1998) resolved that all California community colleges should implement education programs to ensure that graduating students meet IL competencies. To meet accreditation standards, community colleges institutionalized and implemented IL education using different delivery methods including a stand-alone credit course (required or optional), infusing IL into a core research course, integrating library instruction sessions into courses, and self-paced tutorials (Hellenius, 2007). The college was one of only a few California community colleges that implemented a stand-alone course, general education requirement as the delivery method for IL education (Hellenius, 2007; Zachery, 2010).

IL education develops critical information evaluation competencies in students, allowing them to make connections needed for successful involvement in courses that require research for writing. Detmering and Johnson (2011) noted the value of critical thinking in academic courses. Kuh (2008) listed IL as a high impact practice affecting student engagement. Studies by Bowles-Terry's (2012) and Moore, Brewster, Dorroh and Moreau (2001) showed relationships between participation in an IL course and higher pass rates in subsequent composition classes or overall GPA. The California Community Colleges Chancellor's Office (CCCCO; 2011) highlighted the need to equip academically underprepared students early in the education process with college success skills thereby increasing their chances of graduating.
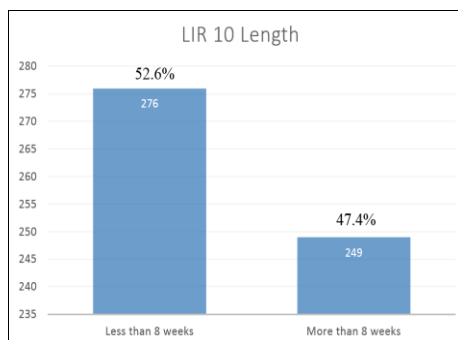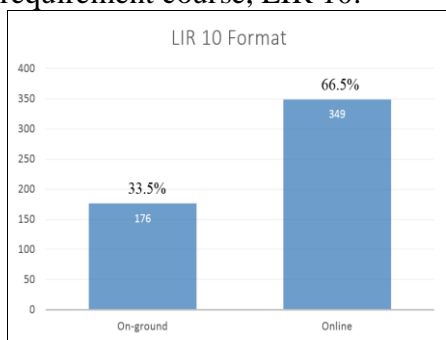
The impact of the IL requirement became important during a time of budget constraints when the college reduced the number of LIR 10 courses offered. This reduction caused a delay for some students to complete degree requirements. The delay raised questions about the efficacy of the general education IL requirement delivery method and if it should be eliminating (SRJC, Academic Senate, 2013; SRJC, Educational Planning & Coordinating Council [EPCC], 2013). Stakeholders discussed enrollment pressures but did not consider the impact of the IL requirement on student development. This underscored the importance of conducting targeted assessment of the impact of the IL requirement course, LIR 10 that could be connected to the institution's broader *Student Survey* (2013d) assessment of IL critical analysis learning gains.

Recommendation Based on Research Evidence

Study findings indicated that the college instituted method of a general education IL requirement course, LIR 10 was equipping students with information evaluation behaviors and research confidence. The policy recommendation calls for continued support of the IL requirement and to provide course offerings that meet student need.

> 2. **Use the study's findings as an indicator that the IL general education requirement course is an effective delivery method that should be supported ensuring that formats and lengths of course offerings meet the needs of all student demographics.**

The results of the study and research supported this recommendation. The self-reported descriptive data showed the majority of students attributed their higher frequencies of information evaluation behaviors and increased confidence levels to IL requirement course, LIR 10.

LIR 10 Format — On-ground 33.5% (176), Online 66.5% (349)

LIR 10 Length — Less than 8 weeks 52.6% (276), More than 8 weeks 47.4% (249)

Assessment of the LIR 10 format and length showed that more online and shorter courses are offed.

The study's cross-tabulation results supported the finding showing that the LIR 10 format and length was positively associated with ethnicity, primary language, and the number of papers students had written. The correlational analyses also showed the LIR 10 format had significant positive relationships with the Inputs variables of the English course level students had achieved, and the self-concept of students' information evaluation preparedness as well as confidence levels. The multiple regression results showed the Environment variable of LIR 10 format was significant in explaining portions of the variability of the frequency of information evaluation behaviors and confidence Outcomes variables. Based on those results, students consider the IL general education requirement to be an effective delivery method and believe that it should be supported by the college.

The literature supports that consideration should be given to policy decisions necessary for continuing the IL requirement. Robertson (2013) used evaluation criteria to keep a community college's general education program relevant for student engagement and removing requirements that no longer met the criteria. The college remains committed to teaching information literacy to its students, suggesting the need for a

reasonable model of targeted assessment. Gurantz's (2015) studied a California community college's registration priorities and student characteristics showing that students could become lost if support courses were not available. Colleges should review policies, funding, and staffing allocations to ensure that they offer sufficient courses in areas with impacted enrollment. Mayer and Bowles-Terry (2013) shared ways that IL instruction can engage students in subject specific research papers and projects. Schroeder and Cahoy (2010) articulated the affective learning and critical thinking competencies that IL students must use in completing research assignments. They advocated that IL affective learning Outcomes should be included in IL standards to have the most impact. Bryan (2014) studied the ACRL standards and demonstrated that IL instruction supported many of the university's critical thinking outcomes. Hicks and Sinkinson (2015) also found a connection between critical thinking and IL. They noted that faculty and librarians should partner to develop pedagogical strategies to maximize student learning. Radcliff and Wong (2015) provided pretest and posttest research to support the role that critical thinking plays in IL by incorporating argument learning outcomes into information evaluation. Hofer Townsend, and Brunetti (2012) observed that librarians can use the concept of learning thresholds to help struggling students integrate IL instruction to encourage engagement with IL skills such as information evaluation needed in other classes. Seeber, K. P. (2015) also supported using IL threshold concepts noting that changes in online searching technologies require students to critically evaluate strategies and information sources like never before.

The study and the literature supports the importance of considering the formats and lengths of course offerings. Cho's (2011) research showed how an online format can have a large impact on student satisfaction. The descriptive results provided insight for making future course offering programmatic decisions that meet the needs of all student demographics. The results indicated students who identified ethnicity as Hispanic showed a preference for LIR 10 courses with longer lengths and the on-ground format. Analysis indicated that the majority of students, 53%, had taken LIR 10 in the shorter length (*6 weeks*) course, and 67% (*n* = 349) of students had taken the *online* format. The findings show that more study is needed to make conclusions regarding the impact of format. The program characteristic measured in the study's survey examined students' reports of the formats and lengths of LIR 10 in which they had participated. The data suggests that even though students reported feeling prepared when they began the LIR 10 course, the course still affected their frequency of information evaluation behaviors and levels of confidence. Wolff, Wood-Kustanowitz, and Ashkenazi (2014) examined how student preparation characteristics and format of delivery had significant effects on completion. Simpson (2013) noted the need for student support because graduation rates can be 20% lower in online classes. Clark and Chinburg (2010) agreed with Lim, Morris, and Kupritz, (2006) that between online and traditional formats no significant differences in learning outcomes were found. Silk, Perrault, Ladenson, and Nazione's (2015) had similar findings in their study of the effectiveness of online and in-person formats.

IL Requirement Assessment Issues Surrounding the Problem

The college needed a targeted assessment process to determine if the goals of its IL education delivery method were being met and if they conformed to the changing needs of the institution and its students. The college supports the IL requirement delivery method but has not specifically assess the student development impact of this method. The competing pressures of demographic shifts, budget restrictions, accreditation standards, and changing government regulations brought the college's attention to the need to examine the relevance of its required general education courses.

Assessment of general education requirements ensures students are learning what the institution has placed as its highest priorities (Andrews, 2012; Robertson, 2013; Siefert, 2011; Sorey et al., 2013). Siefert (2011) introduced the Valid Assessment of Learning in Undergraduate Education (VALUE) as an assessment model of general education learning outcomes including written communication, inquiry, critical thinking, and information literacy. Robertson (2013) noted the importance of using evaluation criteria to keep the community college general education program relevant, thereby increasing student engagement. This study also recommended removing general education courses that no longer met the criteria. The college remains committed to teaching information literacy to its students, suggesting the need for a reasonable model of targeted assessment.

The college's *Institutional Effectiveness Assessment Report* (SRJC, 2013a) cited these high gains for the critical analysis outcomes assessment from the *Student Survey* (SRJC, 2013d) as a benchmark measure of educational effectiveness. The broad assessment of SRJC's (2013b) Critical Analysis *Institutional Learning Outcomes* through its triennial *Student Survey* (2013d) did not differentiate whether the high critical analysis learning gains students reported were attributed to participation in the IL requirement course, LIR 10, or were gained through other means. Despite these IL related gains, the college's shared governance committees responded in 2013 to several years of statewide budget cuts with discussions of eliminating the IL requirement (SRJC, Academic Senate, 2013; SRJC, Education Planning and Coordination Council [EPCC], 2013). These discussions showed the need to conduct targeted assessments specific to the impact of the general education IL requirement course, LIR 10.

The college's assessment gap was compounded by the lack of published literature regarding similar requirements at the community college level. Sorey and DeMarte's (2013) study illustrated the importance of evaluating general education requirements for student development. Gonyea (2005) encouraged triangulating self-reported survey data using multiple data sources. Zachery (2010) reported anecdotal findings that IL education positively influenced student performance on research papers and stressed the need for the development of a quantifiable assessment instrument to determine the extent to which IL affects student development.

Recommendation Based on Research Evidence

Study findings suggested that the I-E-O assessment model in the form of the learner-centered *Information Literacy Requirement Impact Survey* was a successful assessment tool for the IL requirement. The policy recommendation calls for conducting ongoing targeted assessment and comparing it to broader institutional measures.

> **3. Use the *Information Literacy Requirement Impact Survey* to conduct targeted assessment of the IL general education requirement on a 3 year basis and correlate the findings with the college's triennial Student Survey results.**

The results of the study and research supported this recommendation and showed the validity of using a survey of student self-reports as a targeted assessment instrument. The *Information Literacy Requirement Impact Survey* instrument, based on Astin and Antonio's (2012) I-E-O assessment model, was successful in collecting self-reported data specific to the IL requirement program.

The descriptive analysis showed students reported high frequencies of SRJC Critical Analysis learning gains, ACRL Critical Analysis behavior changes, and levels of information evaluation confidence for involvement in writing papers and participating in discussions other classes. The correlation analysis showed the English course variable had a medium positive correlation with the preparedness self-concept variable and a small negative one with the two behavior change Outcomes variables. It would be expected that higher level English course levels require more research papers so students would gain IL preparation. The regression analysis was valid and adequate for measuring students' self-reports of critical information evaluation behavior changes and levels of confidence. Using the I-E-O assessment model can promoting the use of targeted data for decision-making. These data have the potential to more fully inform and demonstrate that the general education IL requirement education delivery method had a positive impact on information evaluation skills, including increased confidence.
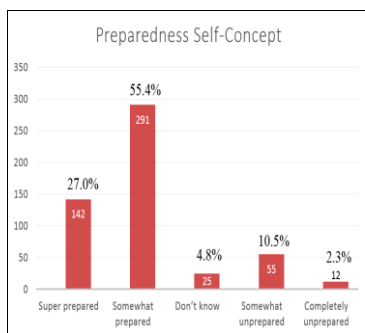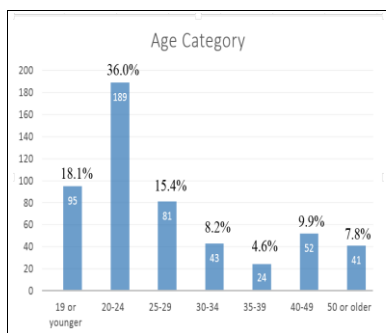

The high preparation levels students reported also affected the amount of variability that multiple regression models were able to explain for the Outcomes variables.

For the information evaluation Outcomes item, the majority of students, 89%, reported they had experienced some level of positive learning gains. Only 11% reported none or don't know/ can't answer. The drawing conclusions item was mixed.

These results indicate the IL requirement had an impact on students' critical analysis learning gains.
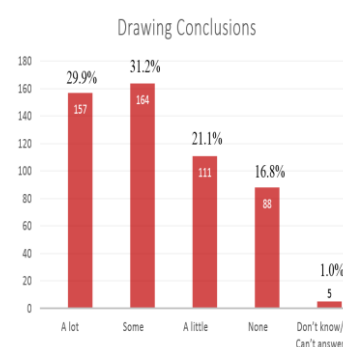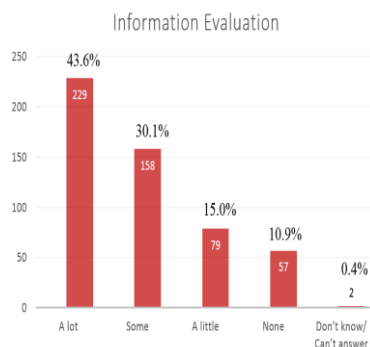
The results on the information evaluation item from the SRJC (2013d) *Student Survey* showed that 85% of the student responses indicated learning gains. The results from the *Information Literacy Requirement Impact Survey* showed 89% of students reported that they had experienced some level of positive learning gains after taking the IL requirement. The similar percentages of students in this comparison indicates that more research should be done to confirm that participation in the IL requirement was the origin of students' gains in critical analysis knowledge and abilities.
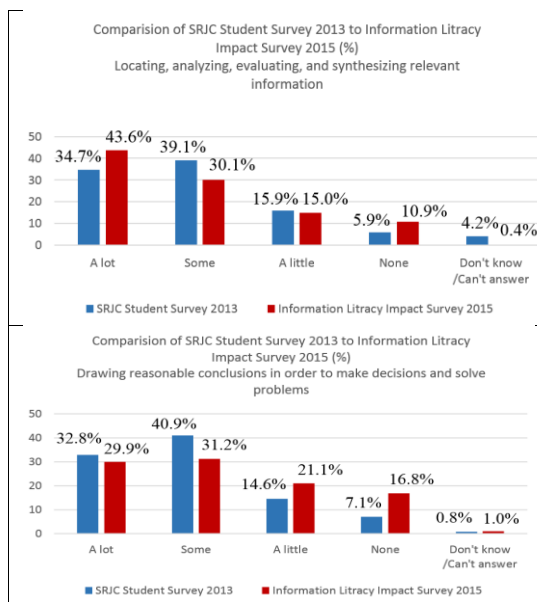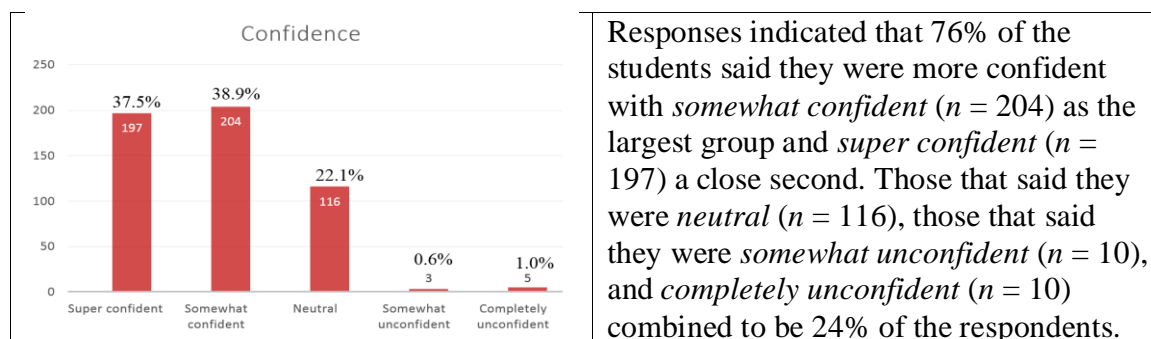

The SRJC Critical Analysis survey items used the exact structure as those on SRJC's (2013d) *Student Survey*. This alignment would be useful in future longitudinal assessments to allow results from the two instruments to be compared. As discussed SRJC's broad *Student Survey* assessment results do not provide data specific to the general education IL requirement. These results show how the study's targeted assessment results could allow for comparison. It is to be noted these results are for illustrative purposes only and cannot be considered valid because the surveys were conducted at different times.

The regression analysis showed a statistically significant relationship among the ethnicity, age category, primary language, preparedness, self-concept, and papers written characteristics of students, the IL requirement course LIR 10 formats, and information evaluation behavior changes (SRJC Critical Analysis and ACRL Critical Analysis).

Even though the students reported that they came to LIR 10 feeling somewhat prepared, descriptive analysis showed the majority reported the IL requirement had a positive impact on their six ACRL (2000) information evaluation behaviors selected from ACRL (2000) *Information Literacy Standard Three* performance indicator outcomes. The discussion outcome was the only one that did not score high. These ACRL information evaluation behaviors included confidence in applying information evaluation criteria, comparing new with prior knowledge to determine contradictions; understanding information through discourse with others, and determining if search query should be revised to improve results.

Even though the students reported that they came to LIR 10 feeling somewhat prepared, the descriptive analysis showed the majority reported the IL requirement had a positive impact on their level of confidence in writing papers or participating in discussions in other courses based on the information evaluation skills learned in LIR 10.

Responses indicated that 76% of the students said they were more confident with *somewhat confident* ($n = 204$) as the largest group and *super confident* ($n = 197$) a close second. Those that said they were *neutral* ($n = 116$), those that said they were *somewhat unconfident* ($n = 10$), and *completely unconfident* ($n = 10$) combined to be 24% of the respondents.

The regression analysis showed a statistically significant relationship among the age category of students, the IL requirement course LIR 10 formats, and information evaluation confidence in other courses.

Recommendations

Recommendations for Practice	Recommendations for Future Research

This study's research and findings have several practical applications for the college. These recommendations for programmatic and policy changes were based on the issues identified in this study including student preparation, the IL requirement as an education delivery method, and general education requirement assessment. The college can apply these recommendations as solutions for its targeted assessment gap problem by using the study's findings to evaluate the effectiveness of its IL requirement

1. Use the study's learner-centered self-reports to develop a process prioritizing that the IL requirement is completed early in the general education requirement pathway.

2. Use the study's findings as an indicator that the IL general education requirement course is an effective delivery method that should be supported ensuring that formats and lengths of course offerings meet the needs of all student demographics.

3. Use the *Information Literacy Requirement Impact Survey* to conduct targeted assessment of the IL general education requirement on a 3 year basis and correlate the findings with the college's triennial Student Survey results.

1. Conducting longitudinal or repeated survey research on the general education IL requirement using the *Information Literacy Requirement Impact Survey* instrument will increase the reliability and validity of this study's results.

2. Given the success of the *Information Literacy Requirement Impact Survey* for gaining targeted assessment data, the college should consider using the Astin and Antonio's (2012) I-E-O assessment model to assess other general education requirements.

3. Additional data collection related to the timing of when in their academic career students took the IL requirement will provide insight into the optimal timing for delivery of IL education via the IL requirement, thereby increasing the requirement's usefulness for students.

4. A case study of a course requiring research could be done comparing students self-reports on information evaluation measures to instructor reports of those same measures and triangulating with the students' grade data.

5. Future research could include using objective data collection methods. An example would be comparing the grade-point-averages of groups of students who took the IL requirement course with those who did not.

6. The college could consider using a standardized IL skills assessment instrument such as a pretest and posttest so assessment results could be obtained immediately after course completion and compared across courses.

7. Qualitative research methods such as interviews or focus groups could provide a rich data set of learner-centered comments that might validate whether or not the IL requirement was meeting students' and the institution's needs.

Conclusion

This quantitative research study and white paper project outlined a local educational problem; the lack of targeted assessment practices at a community college. The study examined relationships between student characteristics, aspects of the general education IL requirement, and subsequent frequency of student use of IL critical information evaluation behaviors, confidence in writing papers, and participation in discussions in other courses. The study summarized the research and associated findings and made recommendations related to future targeted assessment of the impact of the general education IL option for equipping students with the information evaluation knowledge and skill set needed for successful involvement in other courses. The study provided recommendations for future research.

The *Information Literacy Requirement Impact Survey* involved assessment of student self-reports. The study's findings provided supportive data that key stakeholders can use to gauge the effectiveness of the general education IL requirement as an educational delivery method. This study obtained relevant findings supporting the effectiveness of the IL education delivery method using a survey aligned with the learner-centered mission of the college. Because the study was successful, the survey produced an instrument that the college can reapply in subsequent years to see how Outcomes change and how the college can apply changes to the LIR 10 course to help meet ongoing needs.

The study's assessment produced results from three types of data analysis: descriptive, correlation, and multiple regression. The subsequent findings provided data to support a recommendations type project. The descriptive data provided a profile of the students, and the univariate analysis showed that the majority of students reported that the IL requirement had a favorable impact on their information evaluation behaviors and confidence. The cross-tabulation and correlation analyses provided bivariate data that showed all variables in the study had one or more significant relationships with other variables measured, except for gender, and thus this study used them in the regression analysis. The multiple regression provided multivariate data that answered the study's research questions and hypotheses and showed that some student (Inputs) and program (Environment) characteristic variables were significantly related to the Outcomes variables. Results of data analysis justify the identification of the college's assessment gap problem and the need to share and further evaluate the target specific indicators of the program goals and objectives. The overall results revealed that students reported favorably on their IL learning experiences in the IL delivery system.

Astin and Antonio's (2012) I-E-O assessment model framed the study by emphasizing the relationship patterns. It provided the background of the problem showing the preparedness issues surrounding student characteristic Inputs, the IL education delivery methods characteristic of the Environment, and the students' critical analysis behavior and confidence Outcomes that will fill the college's gap in general education assessment practices.

The study results provide informative background of how the data collection and analysis results answered the research questions regarding the relationship between the student characteristics, the IL requirement and students' reported feelings of critical information evaluation development. This study builds upon the SRJC (2013b) *Institutional Learning Outcomes* assessments currently practiced by the college but gives targeted information specific to the IL requirement program that can inform decision makers about the contributions of this specific general education requirement.

The study's results presented data that stakeholders can use as a starting place for an improvement of the college's assessment practices. The study also provided theory-based evidence that the college can use to assess the effectiveness of the general education IL requirement. The findings from this research may encourage social change, especially within the education community. A college that can offer effective information literature education influences societal change by promoting student critical analysis behaviors that impact students' ability to think critically in their other courses, workplace, and civically. Promoting student success and providing higher level skilled workers to compete in a global workforce enhances the potential for positive societal change. If the study's findings are effective in garnering the college's support, individuals and educational organizations could benefit.

This study offers a starting place for educational decision makers to best approach future assessment practices. Stakeholder feedback will be invaluable for assessing this project and informing future research. The education community can be especially resistant to change, and this may prove to be true for the changes in assessment practices recommended by this project. The practices of feedback, process revisions, and success stories, provide opportunities for the college to accept these changes as useful tools. By completing this project study This study placed research into practice by promoting more focused assessment opportunities. These opportunities could contribute to social change by assisting college leadership in helping students obtain the skills they need in a timely manner, succeed academically, and qualify and compete for higher-level jobs within the community.

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Appendix B: Survey Instrument

Information Literacy Requirement Impact Survey

- **Purpose:** This survey explores the impact the Area I Information Literacy requirement (LIR 10) had on how you evaluate the information you need for research in other classes.
- **Anonymous**: No name, email, or IP address will be linked to your answers in any way.
- **Required Time:** The survey takes approximately 5–10 minutes to complete.
- **Inclusion Criteria:** a minimum of 18 years of age and to have successfully completed SRJC's IL requirement course, LIR 10, with a grade of 2.00 or better in Summer 2013, Fall 2013, or Spring 2014.
- **Participation is Voluntary**: You were invited because you successfully completed a LIR 10 class. You may refuse to participate or quit at any time without penalty.
- **How Results Will Be Used:** The results of this study will help the research determine the effectiveness of this general education requirement. The study research will be published in a doctoral study, an education journal, and presented at professional conferences.
- **Format:** You will answer 15 quick multiple-choice items about yourself, your information evaluation behaviors, and confidence after completing LIR 10.
- **Risks:** There are no known risks involved in participating in this study.
- **Benefits:** A benefit from participation is the chance to reflect on learning development and the potential realization of a gain in confidence. Future students may benefit from research on information evaluation. No compensation will be offered.
- **Confidentiality:** The online survey is anonymous and all results will be summarized and stored securely without any identifying information. Data will be kept for a period of at least 5 years, as required by the university.
- **Contact information:** The primary researcher is Phyllis Usina. You may already know me as a Librarian at Santa Rosa Junior College, but this study is separate from that role, as I am conducting the study as a Walden University student. If you have items about the study or the procedures, you may contact her at phyllis.usina@waldenu.edu. If you want to discuss your rights as a participant privately, you can contact Dr. Leilani Endicott at irb@waldenu.edu. Walden University's approval number for this study is 04-23-15-0319952 and it expires on April 22, 2016.

1. ***Where have you taken classes since you completed LIR 10? (Mark all that apply)**

SRJC or another 2-year college
4-year college/university
Private college/university
No college/university

2. **How old were you when you took LIR 10?**

19 or younger
20–24
25–29
30–34
35–39
40–49
50 or older

3. **What is your gender identification?**

Female
Male
Other

4. What is your racial / ethnic background? (Mark all that apply)
American Indian
Asian
Black (African American)
Filipino
Hispanic
Pacific Islander
White
Other

5. Is English your primary language?
Yes
No

6. How many terms had you attended college before you took LIR 10? Please include all terms, semesters, or quarters, at all college ever attended.
0 Terms (just started college)
1–2 Terms (1st year of college)
3–4 Terms (2nd year of college)
5–6 Terms (3rd year of college)
7–8 Terms (4th year of college)
9–12 Terms (5th year of college)
13+ Terms (6th+ year of college)

7. Up to and including the semester you took LIR 10, had you EVER taken any of the following courses? (Mark all that apply)
Any College Skills English courses
Any English as a Second Language (ESL) courses
English 302 or 305
English 100
English 1A
English 5
No English course

8. Before taking LIR 10 how prepared were you to evaluate the information required to write papers or participate in discussions in other courses?
Super prepared
Somewhat prepared
Don't know
Somewhat unprepared
Completely unprepared

9. **How many college research papers, that required you to evaluate information, had you written before you took LIR 10?**
0 papers
1–2 papers
3–4 papers
5–6 papers
7–8 papers
9–12 papers
13+ papers

10. **What format was your LIR 10 class in?**
On-ground (Face-to-face)
Online
Hybrid

11. **What length was your LIR 10 class?**
1 week (Credit by Exam)
6 weeks
9 weeks
12 weeks

12. **To what extent do you think taking LIR 10 contributed to your knowledge, skills, and abilities in the following areas:**

	A lot	Some	A little	None	Don't know/ Can't answer
a. Locating, analyzing, evaluating, and synthesizing relevant information.					
b. Drawing reasonable conclusions in order to make decisions and solve problems.					

13. **How frequently do you do these actions now compared to how often you did them before you took LIR 10?**

Action	A lot more frequently	Somewhat more frequently	No Change	Somewhat Less frequently	A lot less frequently
a. I now determine whether the information satisfies my research need.					
b. I now review my search strategy and incorporate					

additional concepts as necessary.					
c. I now determine whether the information contradicts or verifies information used from other sources.					
d. I now compare information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias.					
e. I now select information that provides evidence for the topic.					
f. I now participate in classroom and other discussions.					

14. After taking LIR 10 what is your level of confidence in writing papers or participating in discussions in other courses based on the information evaluation skills you learned?

Super confident
Somewhat confident
Neutral
Somewhat unconfident
Completely unconfident

15. Which terms do you recommend as the most helpful to take LIR 10?

1–2 Terms (1st year of college study)
3–4 Terms (2nd year of college study)
5–6 Terms (3rd year of college study)
7–8 Terms (4th year of college study)
9–12 Terms (5th year of college study)
13+ Terms (6th+ year of college study)
Term taken does not matter

To submit your answers and close the survey you must use the "Click to Submit" button below.

Thank you for your time!

Your input will be extremely valuable to the research of information literacy education.

Appendix C: Peer Expert Review

I am a student in the Ed.D. Higher Education Leadership program at Walden University. In my doctoral research study titled, *Impact of a California Community College's General Education Information Literacy Requirement*, I will conduct a survey of Santa Rosa Junior College (SRJC) students who successfully completed the general education information literacy requirement. Permission to conduct this research has been conditionally obtained from SRJC pending Walden University Institutional Review Board (IRB) approval.

You have been selected as a peer expert to review the *Information Literacy Requirement Impact Survey* instrument. Your participation is completely voluntary and your identity will not be published. Your assessment is crucial to help establish the content validity of my instrument. Please review the survey items and fill in the form below.

Thank you for your participation. If you have any questions, please contact me. Phyllis Usina

How long did it take you to complete the survey?   Start time: _____ End time: _____

Survey Item	Appropriate level		Easy to understand		Complete		Use the Item in the Survey		ACRL Standard alignment		SRJC outcome alignment		Comments
1.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
2.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
3.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
4.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
5.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
6.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
7.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
8.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
9.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
10.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
11.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
12.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
13.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
14.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
15.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
16.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
17.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
18.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
19.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
20.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Appendix D: Pilot Test Invitation Email

From: Randomly Selected SRJC LIR 10 Instructor Name on behalf of Phyllis Usina
To: [selected students who meet pilot study's eligibility criteria]
Subject: Invitation to pilot test LIR 10 Requirement Survey

Dear LIR 10 Graduate,

You are invited to participate in a pilot study of my doctoral research about the impact of LIR 10 at Santa Rosa Junior College (SRJC). My name is Phyllis and I am conducting this pilot study in my role as a doctoral student at Walden University. My doctoral research is about information evaluation behavior changes and confidence levels of SRJC students who completed LIR 10. I am also a Librarian at Santa Rosa Junior College.

You were invited to participate in this pilot study because you are 18 years of age or older and to have successfully completed SRJC's IL requirement course, LIR 10, with a grade of 2.00 or better during Spring 2015.

In the pilot study I am testing a survey instrument I created to assess information evaluation behavior changes and confidence levels. Your feedback is important and is needed. Your assessment of the pilot survey items will help determine how well SRJC students will understand the survey items.

This pilot survey is short, 10–15 minutes of your time, and has easy to answer multiple choice items. Your participation is completely voluntary and will be anonymous.

To begin the online pilot survey now click on this link: https://www.surveymonkey.com/s/LIR10surveyFeedback.

If you don't have time to take the pilot survey immediately that's okay, it will be available for 48 hours.

Thank you in advance for helping me to learn more about the impact of LIR 10. If you have questions about the study or the procedures, you may contact me at phyllis.usina@waldenu.edu. If you want to discuss your rights as a participant privately, you can contact Dr. Leilani Endicott at irb@waldenu.edu. Walden University's approval number for this study is 04-23-15-0319952 and it expires on April 22, 2016.

Phyllis Usina
Walden University
707-778-2425 – phyllis.usina@waldenu.edu

This project has been reviewed and approved by the Walden University Institutional Review Board and the SRJC Office of Institutional Research.

Note: These additional items appeared under items being tested in the pilot study of the survey instrument.

Easy to Understand?		Comments: if you answered no, please explain. For example, tell what you think was confusing or why you did not understand the objective of the item.	Use the Item in the Survey?	
Yes	No		Yes	No

Appendix E: Prenotification of Invitation to Participate in Upcoming Study

From: SRJC Office of Institutional Research on behalf of Phyllis Usina
To: [selected students]
Subject: LIR 10 Impact Study Begins Next Week

Dear LIR 10 Graduate,
  You are one of the students invited to voice your opinion about the impact of LIR 10 at Santa Rosa Junior College (SRJC) in an online survey to start in one week.
  My name is Phyllis and I am conducting this study in my role as a doctoral student at Walden University. My doctoral study research is about information evaluation behavior changes and confidence levels of SRJC students who successfully completed LIR 10.
  Your feedback is important and is needed. Your views about how you now evaluate information in other courses will help show the impact of the Area I general education requirement that is met by LIR 10.
  You were invited to participate in this study because you are 18 years of age or older and you have successfully completed SRJC's IL requirement course, LIR 10, with a grade of 2.00 or better in Summer 2013, Fall 2013, or Spring 2014.
  This survey is short, 5–10 minutes of your time, and has easy to answer multiple choice items. Your participation is completely voluntary and will be anonymous.
  Next week you will get an email with the link to the survey. The survey will be available for two weeks, from Friday, May, 8, 2015 until Friday, May, 22, 2015.
  If you have questions about the study or the procedures, you may contact me at phyllis.usina@waldenu.edu. If you want to discuss your rights as a participant privately, you can contact Dr. Leilani Endicott at irb@waldenu.edu. Walden University's approval number for this study is 04-23-15-0319952 and it expires on April 22, 2016.
  Thank you in advance for helping me to learn more about the impact of LIR 10.

Phyllis Usina
Walden University
707-778-2425 – phyllis.usina@waldenu.edu

This project has been reviewed and approved by the Walden University Institutional Review Board and the SRJC Office of Institutional Research.

Appendix F: Invitation to Participate in Study

From: SRJC Office of Institutional Research on behalf of Phyllis Usina
To: [selected students]
Subject: LIR 10 Impact Study Starts Today

Dear LIR 10 Graduate,

Remember me? I am Phyllis Usina, the Walden University student doing the doctoral study about LIR 10.

As I emailed last week, you are invited to participate in my doctoral study about the impact of LIR 10 at Santa Rosa Junior College (SRJC).

My doctoral study research is about information evaluation behavior changes and confidence levels of SRJC students who successfully completed LIR 10. I am also a Librarian at Santa Rosa Junior College.

Your views are vital to the study. Only you know how LIR 10 has influenced the way you evaluate information you use for writing papers and participating in class discussions.

You were invited to participate in this study because you are 18 years of age or older and you have successfully completed SRJC's IL requirement course, LIR 10, with a grade of 2.00 or better in Summer 2013, Fall 2013, or Spring 2014.

Participation is completely voluntary. The survey is anonymous and confidential.

Take the online survey now. It is quick, only 5–10 minutes and easy. To begin click on this link: https://www.surveymonkey.com/s/LIR10survey.

If you don't have time to take the survey immediately that's okay, it will be available for two weeks, from Friday, May 8, 2015 until Friday May, 22, 2015.

Thanks for your help. This study is only useful if everyone who gets the survey sends it in. If you have questions about the study or the procedures, you may contact me at phyllis.usina@waldenu.edu. If you want to discuss your rights as a participant privately, you can contact Dr. Leilani Endicott at irb@waldenu.edu. Walden University's approval number for this study is 04-23-15-0319952 and it expires on April 22, 2016.

Phyllis Usina
Walden University
707-778-2425 – phyllis.usina@waldenu.edu

This project has been reviewed and approved by the Walden University Institutional Review Board and the SRJC Office of Institutional Research.

Appendix G: Reminder to Participate in Study

From: SRJC Office of Institutional Research on behalf of Phyllis Usina
To: [selected students]
Subject: LIR 10 Impact Study Ends Friday

Dear LIR 10 Graduate,
Almost two weeks ago I sent an e-mail asking for your views on an online survey about the LIR 10 course you completed in Summer 2013, Fall 2013, or Spring 2014.
My name is Phyllis and I am conducting this study in my role as a doctoral student at Walden University. I am also a Librarian at Santa Rosa Junior College.
A big thanks if you submitted the survey and sorry for the extra email. The survey is anonymous so I can't filter out emails of people who already responded.
If you have not turned in the survey yet, please take 5–10 minutes and do it now by clicking on this link https://www.surveymonkey.com/s/LIR10survey.
I made taking the survey super easy by using multiple-choice type items to get data about your experiences. It will only be available for a few more days, until Friday, May, 22, 2015.
Please help, I need to get as many responses as possible to have enough data to make the study significant. You are the only one who can show if the Area I general education requirement that is met by LIR 10 is working.
If you have questions about the study or the procedures, you may contact me at phyllis.usina@waldenu.edu. If you want to discuss your rights as a participant privately, you can contact Dr. Leilani Endicott at irb@waldenu.edu. Walden University's approval number for this study is 04-23-15-0319952 and it expires on April 22, 2016.
Thanks so much for taking the time out of your day to help with the study.

Phyllis Usina
Walden University
707-778-2425 – phyllis.usina@waldenu.edu

This project has been reviewed and approved by the Walden University Institutional Review Board and the SRJC Office of Institutional Research.

– Deadline Extended
Last call. I have extended the survey deadline to May, 29, 2015 because I did not received enough surveys to have enough data to make the study significant. I really need your help.

Appendix H: Protecting Human Research Participants Training Certificate

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Phyllis Usina** successfully completed the NIH Web-based training course "Protecting Human Research Participants."

Date of completion: 06/21/2013

Certification Number: 1202188

Appendix I: ACRL Information Literacy Standard Three

Association of College and Research Libraries (ACRL) Information Literacy
Competency Standard for Higher Education

Standard Three

The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.

Performance Indicators:

1. The information literate student summarizes the main ideas to be extracted from the information gathered.

   Outcomes Include:

   a. Reads the text and selects main ideas
   b. Restates textual concepts in his/her own words and selects data accurately
   c. Identifies verbatim material that can be then appropriately quoted

2. The information literate student articulates and applies initial criteria for evaluating both the information and its sources.

   Outcomes Include:

   a. Examines and compares information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias
   b. Analyzes the structure and logic of supporting arguments or methods
   c. Recognizes prejudice, deception, or manipulation
   d. Recognizes the cultural, physical, or other context within which the information was created and understands the impact of context on interpreting the information

3. The information literate student synthesizes main ideas to construct new concepts.

   Outcomes Include:

   a. Recognizes interrelationships among concepts and combines them into potentially useful primary statements with supporting evidence
   b. Extends initial synthesis, when possible, at a higher level of abstraction to construct new hypotheses that may require additional information
   c. Utilizes computer and other technologies (e.g. spreadsheets, databases, multimedia, and audio or visual equipment) for studying the interaction of ideas and other phenomena

4. The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.

   Outcomes Include:

   a. Determines whether information satisfies the research or other information need

    b. Uses consciously selected criteria to determine whether the information contradicts or verifies information used from other sources
    c. Draws conclusions based upon information gathered
    d. Tests theories with discipline-appropriate techniques (e.g., simulators, experiments)
    e. Determines probable accuracy by questioning the source of the data, the limitations of the information gathering tools or strategies, and the reasonableness of the conclusions
    f. Integrates new information with previous information or knowledge
    g. Selects information that provides evidence for the topic

5. The information literate student determines whether the new knowledge has an impact on the individual's value system and takes steps to reconcile differences.

Outcomes Include:

    a. Investigates differing viewpoints encountered in the literature
    b. Determines whether to incorporate or reject viewpoints encountered

6. The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners.

Outcomes Include:

    a. Participates in classroom and other discussions
    b. Participates in class-sponsored electronic communication forums designed to encourage discourse on the topic (e.g., email, bulletin boards, chat rooms)
    c. Seeks expert opinion through a variety of mechanisms (e.g., interviews, email, listservs)

7. The information literate student determines whether the initial query should be revised.

Outcomes Include:

    a. Determines if original information need has been satisfied or if additional information is needed
    b. Reviews search strategy and incorporates additional concepts as necessary
    c. Reviews information retrieval sources used and expands to include others as needed

Appendix J: Institutional Learning Outcomes

http://www.santarosa.edu/slo/institutional/

Institutional Learning Outcomes (ILOs)

Through their experiences at Santa Rosa Junior College, students will bring into the college community the following set of skills and values:

4. Critical Analysis

- Locate, analyze, evaluate, and synthesize relevant information

- Draw reasonable conclusions in order to make decisions and solve problems

Appendix K: Information Literacy Requirement Course Outline

COURSE CONTENT
Student Learning Outcomes: Upon completion of the course, students will be able to:

1. Analyze a research need
2. Find information effectively and efficiently by using a variety of search techniques
3. Access needed information in multiple publication formats
4. Evaluate the quality and relevance of information sources
5. Recognize several ethical and legal issues related to the use of information

Objectives:

Upon completion of the course, students will be able to:
 A. Analyze a research question:
 1. Articulate a research need
 2. Determine the scope of a research need
 3. Broaden or narrow a research need to fit the scope of a lower-division undergraduate research
    assignment

 B. Find information effectively and efficiently by using a variety of search techniques:
 1. Identify various types of information sources, such as reference works, popular periodicals, scholarly
    journals, etc.
 2. Choose appropriate sources based upon the research need
 3. Identify major concepts from the research need to be used as keywords
 4. Use basic search techniques, such as keywords, Boolean operators, search limiters, etc.
 5. Use advanced search techniques, such as field searching, truncation, wildcards, etc.
 6. Evaluate search success and modify search strategies accordingly

 C. Access needed information in multiple publication formats:
 1. Use the item record to determine the means of access
 2. Retrieve information from digital sources
 3. Locate print sources in the library

 D. Evaluate the quality and relevance of information sources:
 1. Assess the quality of information sources based upon authority, objectivity, purpose and scope
 2. Determine the importance of the publication date in the context of the research need
 3. Determine the appropriateness of information based upon its relevance to a research need

 E. Identify several ethical and legal issues related to the use of information:
 1. Describe differences between summarizing, quoting, paraphrasing and plagiarizing information
 2. Document sources in accordance with an academic style guide (APA or MLA)
 3. Describe the role of copyright in relationship to sources, including digital media
 4. Identify elements in a bibliographic citation

Topics and Scope

Topics will include:
I. Analysis of a research question
 A. Context of a research need (personal, academic, discipline-specific, course-specific)
 B. Refinement of a research need
 C. Scope of a research need

II. Finding information effectively and efficiently by using a variety of search techniques
 A. Types of information resources (popular, scholarly, primary, secondary, tertiary, etc. both online and in print)
 B. Selection of appropriate resources (reference books, periodicals, monographs, etc., both online and in print)
 C. Keywords and major concepts
 D. Basic search techniques (keywords, Boolean operators, search limits, etc.)
 E. Advanced search techniques (controlled vocabulary, truncation, wildcards, nesting, field searching, phrase searching, etc.)
 F. Modification of search strategies based upon the success of a search (using appropriate tools, altering keywords)

III. Accessing needed information in multiple publication formats
 A. Using the item record to determine means of access
 B. Information retrieval from digital sources
 C. Locating print resources by using Library of Congress call numbers

IV. Evaluating the quality and relevance of information sources
 A. Authority
 B. Objectivity
 C. Scope
 D. Purpose
 E. Currency and context of research need
 F. Relevance

V. Identifying several ethical and legal issues related to the use of information
 A. Summary, quotations, paraphrasing, citing, plagiarism
 B. In-text citations and works cited/reference list
 C. Copyright and online sources
 D. Elements of bibliographic entries

Assignments:

Representative assignments:

1. 1–2 homework assignments to assess the application of skills for each of the learning outcomes (5–10 assignments)
2. 1–2 class exercises tied to each of the learning outcomes (5–10 class exercises)
3. 1 term-long project, such as an annotated bibliography, a research journal or similar indicator of engagement and skill in the research process
4. Quizzes, midterm and/or final exam