PEER-REVIEWED REQUIRED: THE ROLE OF BIBLIOGRAPHIC

REQUIREMENTS IN THE UNDERGRADUATE

RESEARCH ASSIGNMENT

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DEDICATION

To my late mother, Nancy Hale, who taught me that education and the pursuit of knowledge is not a chore but an adventure.

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ABSTRACT

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This study explored what impact requiring the use of peer-reviewed articles for an undergraduate research assignment had on the makeup of students' bibliographies and how they integrated their information sources. Utilizing a nonequivalent control group design, unit essays were collected from two sections of the same undergraduate political science course at a public university in Texas. The experimental group was required to use a minimum number of peer-reviewed sources while the control group was not. A sample of 44 documents was collected. The collected essays underwent citation analysis and content analysis to investigate potential differences in bibliographic behavior and how students engage with their sources within the body of their essays. The citation analysis revealed that the students who were required to include peer-reviewed sources did cite significantly more peer-reviewed articles than the control group. They also referred to their peer-reviewed sources more frequently in the body of their essays than the students in the control group referred to their peer-reviewed sources. The content analysis, however, revealed that synthesis of and engagement with outside information sources was similarly infrequent and homogeneous in both groups, which suggests deeper information literacy challenges faced by the students.

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CHAPTER I

INTRODUCTION

Consider the phrase, "a sea of information." The phrase alludes to a seemingly endless abundance of information that is, now, at our fingertips — an abundant sea of information that everyone must, at some level, learn to navigate. One would describe the ability to navigate this sea of information as information literacy that, in 1989, the American Library Association's Presidential Committee on Information Literacy defined as the ability to recognize information needs and to locate, evaluate, and use information. This set of abilities, information literacy, is an important facet of undergraduate education, and it is now codified as such by organizations like the Association of American Colleges & Universities [AAC&U] (2007a), which lists information literacy as an essential learning outcome for post-secondary students.

This study investigated the efficacy of one particular technique proposed to help undergraduate students learn to navigate this expanse of information: explicitly requiring undergraduate students to use peer-reviewed articles for their research. Is this an effective method of supporting students' information literacy? The reason for the initial, aquatic metaphor is that it can be used to frame the differing approaches to bibliographic requirements. The two approaches could be likened to the choice to teach someone to swim in an ocean or a pool. Bibliographic requirements provide boundaries. They provide a structure within the body of information that clearly indicate where the credible

waters of peer-reviewed sources are that students must tread to practice their research skills. The absence of boundaries opens the learner up to waters that might prove more treacherous than other sources, but it also provides an opportunity for learners to govern themselves accordingly in a marketplace of information that they will most likely encounter outside the walls of the academy. The primary question, therefore, is whether one of these approaches is truly more effective at helping the student to navigate and use information, but one may also venture to wonder what these two methods say about the instructor/librarian who uses them. By assessing the written work of two groups of students – one group that was required to use peer-reviewed articles and one that was not – this experiment aims to revisit earlier advocates of bibliographic requirements by retesting their conclusions and extending their questions to address deeper concerns about students' information literacy.

Research Questions and Hypotheses

The study is framed by two overarching research questions: one guided a citation analysis portion of the research and the other guided a content analysis portion of the research. The first research question asks: Does explicitly requiring the use of peer-reviewed sources impact the bibliographies and citation behavior of students? The second research question asks: How do students in both groups (those with the requirement and those without) utilize the information sources within their essays? The answers to these two questions are guided by six hypotheses. One through four relate to the first research question whereas five and six relate to the second research question.

H_1. Students who received the bibliographic requirement to use peer-reviewed sources will cite all of their individual sources less frequently within the body of their essays than those without the requirement.

H_2. Students who received the bibliographic requirement to use peer-reviewed sources will cite their peer-reviewed sources less frequently within the body of their essays than those without the requirement.

H_3. Students who received the bibliographic requirement to use peer-reviewed sources will cite fewer sources overall than those without the requirement.

H_4. Students who received the bibliographic requirement to use peer-reviewed sources will cite the same percentage of peer-reviewed sources as those without the requirement.

H_5. Students who received the bibliographic requirement to use peer-reviewed sources will directly quote their outside information sources more frequently than those without the requirement.

H_6. Students who received the bibliographic requirement to use peer-reviewed sources will attempt to synthesize their outside information sources less frequently than those without the requirement.

Overview

The review of literature found in Chapter II introduces precursors to this experiment who investigated and highlighted the benefits of requiring students to use peer-reviewed sources. This chapter gives special attention to the ways research and assessment methods shape and situate conceptions of information literacy. More

specifically, the review of literature will trace how new assessment methods help to unfurl different concerns about students' information literacy skills that were left unaddressed by earlier authors. Last, this chapter will present an examination of how shifting theories and instructional approaches in information literacy accentuate the need to revisit and update earlier tests of bibliographic requirements. These shifts in theory also pose questions about what these differing approaches to bibliographic requirements say about the role and priorities of the academic librarian.

Chapter III describes, in detail, the methodological approach in this study. Informed by the literature reviewed in Chapter II, this study used a two-part process to assess indicators of information literacy in students' citation behaviors and the body of their essays. In all, 44 essays were collected and analyzed from two sections of the same undergraduate course – one section that was required to use peer-reviewed sources and one that was not. This section will describe the development of a citation analysis checklist which categorized sources as peer-reviewed or not and counted the frequency of in-text citations. It will also describe the creation of a codebook that was used to code in-text references for synthesis, engagement, and additional writing behaviors.

Chapter IV reports the results of six hypothesis tests and uncovers significant differences between the two groups' inclusion and use of peer-reviewed sources. In addition to the two-sample hypothesis tests, numerical observations offered in this chapter describe themes of synthesis, engagement, and writing behavior that were strikingly similar across both groups.

Chapter V interprets each of the findings by situating the results in the broader discussion examined in the literature review. This section describes instances in which this experiment reaffirms the findings of earlier studies and, in some cases, casts doubt on or contradicts previous research. This chapter also provides suggestions for future research and discusses the limitations of the study.

Rationale

Mandating that students use peer-reviewed sources appears to remain a common practice in higher education (Head & Eisenberg, 2010). Furthermore, library and information science researchers who initially tested and advocated for these requirements have had their claims relatively unchecked for over a decade (Davis, 2002; Davis, 2003; Baberino, 2004; Robinson & Schlegl, 2005). In that time, scholars have offered new conceptions of information literacy, and they have raised new concerns about students' ability to digest and integrate information sources into their papers. The analyses presented in this study provide a much-needed update to a practice that is still utilized. This study's results provide reassurance that, in this experiment, the bibliographic requirement remained useful for affecting the bibliographies and citation behaviors of the students, but it also casts serious doubts about the practice's ability to address more contemporary information literacy concerns. Last, the decision to complement traditional citation analysis with a content analysis is an attempt at a more holistic, authentic assessment of information literacy. This study, therefore, provides insight into the advantages and challenges of this kind of mixed-method approach.

CHAPTER II

REVIEW OF LITERATURE

The following review of literature predominantly traces information literacy research from the last two decades. First, this chapter will review early advocates for the practice of mandating peer-reviewed articles. These authors primarily wrote at the turn of the century, and their assessment methods and possible reasons for focusing on students' bibliographies as an indicator of information literacy will be explored. This chapter will then review more recent literature, with a particular focus on how new methods of information literacy assessment raised questions about students' synthesis and use of information sources rather than the quality of their bibliographies. Last, this chapter will explore the shift seen in these two areas of research, focusing not on their differences in methodology but on underlying shifts in theory and practice. This examination of both earlier voices and more recent voices helps to situate the two-part structure of this study. This study builds off both groups' findings and methods to construct research questions and assessments that can address both concerns about students' bibliographies and their use and synthesis of information sources.

Recommending Bibliographic Requirements

Head and Eisenberg's (2010) content analysis of 190 undergraduate research assignment guidelines provides a glimpse into the parameters and expectations faculty members place on their students and their students' research. Beyond guiding basic

requirements for formatting, Head and Eisenberg observe that a noticeable percentage of assignment guides mandate which information sources students may use. Specifically, 35% and 22% of analyzed guidelines required the use of a library's print collection or scholarly databases, respectively. While, in comparison, popular websites, Wikipedia, and search engines (such as Google or Yahoo!) were among the most frequently prohibited information sources. This dichotomy of required and prohibited information sources that Head and Eisenberg observe in research guides points to a larger history of privileging and mandating peer-reviewed sources within undergraduate instruction. In this review of literature, that history will begin with research between 2002 and 2006 that promoted the benefits of requiring peer-reviewed articles.

For some librarians and researchers writing at the turn of the century, they viewed students' declining use of peer-reviewed sources in their research assignments as alarming. A citation analysis by Davis (2002) found students citing popular internet sources, magazines, and newspapers more frequently while scholarly print materials (journals and books) either remained the same or declined in their share of student citations. Davis called this trend "a possible crisis in undergraduate scholarship…" and recommends that faculty members require students to use a minimum number of peer-reviewed articles (2002, p. 59). A later article by Davis (2003) reported that the mandates they suggested were effective in improving the quality of student bibliographies. For Davis, this improvement meant increasing the number of scholarly articles and books while limiting the number of popular internet sources. Baberino (2004) undertook an analysis of undergraduates' research behaviors around the same time, and, citing a

concern for the apparent decline in use of "traditional" library collections, concluded with the same recommendation to impose a minimum requirement of sanctioned, scholarly information sources. Like Davis, it appears that Baberino's recommendation to mandate peer-reviewed articles, in part, stems from a desire to maintain the use and importance of library collections while deterring the use of those popular websites that Head and Eisenberg observed were so frequently prohibited.

Following the conclusions of Davis, Robinson and Schlegl (2004) set up an experiment to provide even more evidence for the recommended mandate's effectiveness. Robinson and Schlegl (2004) analyzed bibliographies from students enrolled in an undergraduate political science course; they compared bibliographies from students in a control group, a group that received library instruction, and a group that received library instruction and a mandate to use peer-reviewed sources. Not surprisingly, the bibliographies from the group in which students were required to use scholarly sources had the highest percentage of scholarly citations. Robinson and Schlegl (2005) go on to interpret their findings to suggest that, while internet-research is not, itself, detrimental to student research, imposing bibliographic restrictions sets clear guidelines for students about what types of sources they are expected to use within their research assignments. While Robinson and Schlegl's study identified bibliographic mandates *and* library instruction as the recipe for bibliographic success, Davis (2003) found the requirement alone to be effective. Elsewhere in the literature, researchers have found library instruction's effect on improving the size or quality of bibliographies inconclusive when not aided by the mandates recommended in these earlier studies (Howard, Nicholas,

Hayes, & Appelt, 2015; Rosenblatt, 2010; Conway, 2015). Furthermore, Knight's (2006) analysis of annotated bibliographies found that instructors simply encouraging students to use peer-reviewed sources had no effect in curbing the use of popular internet sources. What these studies suggest is that, bibliographic mandates have proven more effective in altering the content of students' bibliographies than library instruction.

Beyond sharing similar recommendations and concerns for the quality of student bibliographies, these authors also share common assessment methods that evaluate students' information literacy based on their bibliographies. Walsh's (2009) analysis of information literacy research found that the most common form of information literacy assessment of student work (also known as authentic assessment) was an evaluation of bibliographies. Walsh's findings suggested that, for many information professionals and library scholars, student bibliographies are used as a "…proxy for skills that cover key parts of the information literacy whole" (p. 22).

One reason for this reliance on citation analysis may be, as Hovde (2000) suggested that it is unobtrusive, objective, and easy to execute for librarians pressured to demonstrate quantifiable measures of their effectiveness. Furthermore, this concern and focus on bibliographies is understandable from a library and information science perspective. Students' bibliographies clearly relate to outcomes set forth by the Association of College & Research Libraries' (ACRL) *Information Literacy Competency Standards for Higher Education* (hereafter simply referred to as the *Standards*); outcomes two and five define the information literate student as one who can navigate libraries and databases to find and cite quality information and can use proper citation to

provide necessary attribution (2000). Even in its 2015 reiteration, the ACRL's *Framework for Information Literacy for Higher Education* (hereafter simply referred to as the *Framework*), the quality of bibliographies remains a codified outcome found in the call for students to provide proper attribution, recognize authoritative information sources, and utilize effective search strategies to navigate library databases. In turn, bibliographic-centered library instruction makes student bibliographies important indicators for the effectiveness of library instruction. This fact is demonstrated in a number of previous studies that use the quality of bibliographies as an indicator to assess the effectiveness of library instruction (Snavley & Cooper, 1997, p. 10; Hovde, 2000, Wang, 2006; Mery, Newby, & Peng, 2012; Clark & Chinburg, 2010; Lantz, Insua, & Armstrong, 2016).

While authors like Davis, Baberino, and Robinson and Schlegl seemed, in part, motivated to advocate for mandates based on a desire to maintain the pride of place of library collections, writers have also offered other motives for the practice. French (2004), for example, explained that this choice to require scholarly sources may be motivated by faculty members' desire that students use authoritative sources, utilize online databases, or that students become accustomed to seeing authoritative and scholarly communication to identify that which is not.

Given their focus on citation analysis, library-collection-use, and bibliographic outcomes, it would make sense that the applications and recommendations that emerge from the authors mentioned above would also be bibliographic in nature. Situating oneself with a bibliographic-centered lens, in which information literacy is predominantly

evaluated by citation analysis and motivated by bibliographic student outcomes, allows

one to better understand why authors such as Robinson and Schlegl provided reasonable

recommendations that relate directly to conditioning and altering the content of students'

bibliographies.

Rethinking Citation Analysis

Admittedly, information literacy is an elusive construct with no one assessment

method universally used or accepted by information literacy scholars. Abdullah's (2010)

review of research in information literacy, for example, characterized the field as divided

between perception-based approaches and authentic assessment methods. Perceptive

approaches rely on students' self-report of behaviors or familiarity with concepts,

whereas authentic approaches evaluate students' work or behaviors directly. Even beyond

this divide, researchers in this field use a diversity of assessment methods. Walsh (2009)

recorded at least 10 distinct methods that range from information retrieval simulations to

multiple-choice tests. While a full review of information literacy assessment methods is

outside the scope of this study, what is important is that new approaches in authentic

assessment began to shed light on aspects of information literacy that were left

unexamined in the bibliographic approach described in the previous section.

Synthesis Rubrics

In 2006, Scharf et al. developed a multivariate information literacy rubric to

analyze the content of student research portfolios. The rubric's evaluation was based on

four information-use variables: proper citation, independent research, appropriateness of

sources, and integration of sources. What they uncovered was that, while proper citation

and appropriate source selection were two of the variables with the highest overall scores, more abstract, higher-order indicators of information literacy (such as integration) were the lowest.

This phenomenon was later observed by Rosenblatt (2010) who conducted a citation analysis and rubricked assessment of student papers. Rosenblatt's original study called for a citation analysis to evaluate the effectiveness of library instruction. However, when this approach uncovered that the library instruction had no significant impact on the content of students' bibliographies, they turned toward the text of the essays. They proposed a second phase of analysis that used a rubric to evaluate students' synthesis of information sources within their essays. Adapting the Association of American Colleges and Universities' [AAC&U] (2007b) VALUE Rubric for information literacy, this method delivered a single score for each paper's synthesis of information sources. In the end, Rosenblatt would conclude from both phases that, while the undergraduate students in the study were able to locate and access the necessary information sources, they "…provided little or no evidence that they derived any benefits from the literature they were required to consult" (2010, p. 60). In Rosenblatt's sample of papers, only 50% received scores that indicated they were integrating sources into their papers.

Rosenblatt's observation of how students in the sample struggled with synthesis largely influenced this study's focus on synthesis as an indicator of higher-order information literacy dispositions. Based off Torraco's (2005) definition, the following working definition of synthesis was used for the purposes of this study: "Synthesis integrates existing ideas with new ideas to create a new formulation of the topic or

issue…synthesis is not a data dump. It is a creative activity…" that integrates outside information into one's own argument or understanding to add something new to the conversation (p. 362).

Like Rosenblatt, Carlozzi (2018) made use of a rubric to analyze students' synthesis of sources. Carlozzi scored students based on individual in-text references to sources as opposed to the paper as a whole. Each paper's final score was based on the student's highest-scoring integration of a source. What Carlozzi uncovered was similar to Rosenblatt's concerns: students were able to find the necessary material but were unable to synthesize the material. More specifically, the average synthesis score for the students in the study was 0.57 on a 3-point scale, and 52.7% of the students scored a zero because of the complete lack of synthesis. Given that students were graded on their best attempt at integration, this means, for over half of the students, their best attempt was no clear synthesis at all. Possibly more problematic, in terms of this paper's topic, is that Carlozzi uncovered no significant difference between the synthesis scores of scholarly sources and non-scholarly sources, suggesting the students struggled with synthesis regardless of format. Similarly, Luetkenhaus, Borrelli, and Johnson (2015) uncovered, through a rubricked analysis, that students performed the best in the domains of proper citation and source quantity while performing the worst in domains such as argument building.

Holliday et al. (2015) implemented an adapted AAC&U information literacy VALUE rubric to assess information literacy skills from approximately 900 student papers. Holliday et al.'s (2015) findings reaffirmed the narrative that students struggled to synthesize information effectively. While Holiday et al.'s study did not specifically test

the role of bibliographic requirements, the authors claimed that their results led them to discourage faculty members from mandating the number and type of sources students must use for their research. Holiday et al. explained why:

> We suspect that these checklists and quotas encouraged students to find sources without thinking about their relevance. In our own instruction, we began to emphasize the strength of the evidence provided by the information in sources, rather than the types of 'good' or 'bad' sources, and we encouraged instructors to do the same. (p. 182)

In-Text Citation Analysis

Even citation analysis that moves beyond the bibliography and evaluates in-text citations began uncovering blind spots in assessments of bibliographies alone. Drawing on the Citation Project's (2018) collection and coding of thousands of student papers and bibliographies, Jamieson (2013) raised concerns about the frequency with which students refer to their sources. Jamieson's analysis found that students rarely referred to an outside information source more than once within their essays. Jamieson (2016) also observed that this was especially true for peer-reviewed sources that, while adequately represented in bibliographies, were used less frequently in the text than non-scholarly sources. This finding is confirmed by Carlozzi (2018), who observed that students in their study rarely used sources more than once, and they tended to use in-class readings significantly more than their outside research. The frequency of in-text citations was not considered by Robinson and Schlegl (2004). In fact, Robinson & Schlegl's experiment only collected

bibliographies, which means their test of the bibliographic requirement was unable to assess how often students used the sources they cited.

While Jamieson did not assess synthesis directly like Rosenblatt or Carlozzi, indicators from their citation analysis were interpreted as signs of poor information source integration. Citing Kennedy (1985), Jamieson suggested that low frequencies of in-text references mean that students are not engaging with the information sources or incorporating them into their argument; they are simply trying to "check off the box" of including the obligatory in-text citation.

By comparing students' in-text references to the original information source, Jamieson's (2013) extended citation analysis also uncovered that 94% of in-text citations were built off only one or two sentences of text within the original source. This means that students primarily used methods such as directly quoting, paraphrasing, or patchwriting from a few lines rather than integrating broader portions of text or ideas from their sources. These tendencies were seen as negative indicators of synthesis and source integration. Howard, Serviss, and Rodrigue (2010), also contributors to the Citation Project's body of research, specifically analyzed students' methods of introducing information — direct quotations, patchwriting, paraphrasing, or summarization. Following the same line of reasoning in Jamieson's interpretation, directly quoting or patchwriting from a few lines within a source was viewed as less-than-ideal forms of source integration, and these methods were used frequently within the papers they analyzed.

Content Analysis

Qualitative and content analysis approaches to assess student work have also broadened the vision of information literacy research. Like Jamieson, Hyytinen, Löfstrom, and Lindblom-Ylänn's (2017) qualitative analysis identified problems in paraphrasing (e.g., patchwriting, unincorporated references)[1] as some of the most common themes in their sample of student papers. A qualitative approach adopted by Kanter (2006) to investigate students' engagement with their research drew upon the field of rhetoric to identify linguistic markers of students' engagement. This method further defined ways in which students interacted with their sources by reacting to, challenging, or comparing them. What these more qualitative approaches highlight is the range of variables potentially left unexplored when deductively looking for evidence of information literacy via methods like rubrics. While scores from Rosenblatt (2010) or Carlozzi's (2018) rubrics can measure successful synthesis, they are unable to explain *how* students were synthesizing or integrating their sources. Bali and Ramadan (2007) attempted to address this shortfall of the rubric method by developing a deconstructed rubric. In Bali and Ramadan's (2007) study of online discussions, they measure engagement by coding for 22 binary variables that can then be analyzed separately or in aggregate as an index for engagement.

More recent attempts to balance and extend the breadth of information literacy research is evident in mixed-method approaches. Gammons and Inge (2017), for

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[1] For these authors, patchwriting was understood as citing text while only altering a few words from the original text, and unincorporated references were ones that students inserted without much explication or were disguised as their own conclusion (2017).

example, experimented with comprehensive mixed-method assessments of information literacy that made use of citation analysis, rubrics, and qualitative coding practices to paint a more accurate and balanced picture of students' information literacy. Ludovico and Wittig (2015) similarly balanced their analysis of synthesis with an evaluation of the accuracy of citations. It is this very mixed-method approach that is adopted in this study. As Neuendorf (2017) pointed out, one of the advantages to content analyses is their ability to identify layers of variables that can either be universal, adopted from past research, emergent, or medium-specific. Unlike rubric or citation analysis approaches, this content analysis approach provides space for a more exhaustive list of pertinent variables which, as these varied methods discussed in this chapter demonstrate, is necessary to provide a more complete assessment of a complex skillset like information literacy.

The presence of these methods, and the concerns they raise, highlight how many variables and questions are left unaddressed by the pure citation analysis employed by Robinson and Schlegl. These new findings and extensions of authentic information literacy assessment, therefore, reopen the case of bibliographic requirements that was seemingly shut when citation analyses provided such promising results of the practice's effectiveness.

Beyond the Bibliography

Apart from previously addressed critiques of citation analyses to provide a comprehensive assessment of students' information literacy skills, literature in the field of library and information science also provided critiques of the pedagogical practices

and theory that seem to be at the heart of the bibliographic-centered model of information literacy. It is more than just assessment methods that have shifted; definitions of information literacy and what the priorities of information literacy instruction are have also evolved. A hint of this change is even seen in Rosenblatt's (2010) study, which concludes with the question: "Shouldn't we, as instruction librarians, be concerned about students' abilities to use the information they have discovered" (p. 60)? For Rosenblatt, this new way of thinking about the priorities of the instruction librarian directly related to their pedagogy, and they reported spending more time in instruction sessions modeling integration of information sources rather than typical information retrieval skills (2010). This is a noticeable departure from the concerns of authors like Davis and Baberino who wanted to prioritize the use of library collections and databases. Margolin and Hayden (2015) also adopted similar instruction priorities and reported their success and method in developing an online information literacy toolkit that balanced bibliographic instruction with modules that included rhetorical use, integration of sources, and the process of developing research questions. Margolin and Hayden explained the reasoning for this approach:

> We see students struggle with all aspects of research, both mechanical and
> the higher-order critical thinking. However, our most important goals are
> the skills students develop in the research process, regardless of the final
> product, and the experience of students as both information seekers *and*
> content creators. It is these interconnected experiences that will benefit

students after graduation in the workplace, as global citizens, and in terms

of "'lifelong learning.' (pp. 610-611)

Margolin and Hayden's call to raise up students that are "content creators" likely echoes

the evolving definition of information literacy set out in the ACRL's successor to the

Standards (2000), the *Framework* (2015). One of the dispositions listed in the

Framework says that "learners who are developing their information literate

abilities…see themselves as contributors to the information marketplace rather than only

consumers of it" (p. 6).

Indeed, the 2015 publication of the *Framework* is a pivotal point in which the

questions of librarians like Rosenblatt — questions about whether aspects of information

literacy beyond bibliographic skills are given their rightful attention — are officially

recognized and codified in this reiteration by the ACRL. The *Framework* introduces an

important new concept that was absent in the earlier *Standards* — the concept of

metaliteracy which requires more than just the affective performance of a set of discrete

bibliographic skills. Citing Mackey and Jacobson (2014), the ACRL explains that

metaliteracy expands the definition of information literacy to include how the student

participates in the information ecosystem and how he is aware of his own thought

processes and information use behaviors. More than simply introducing metaliteracy as a

new concept, the ACRL claims "[the] *Framework* depends on these core ideas of

metaliteracy, with special focus on metacognition" (p. 3). The *Framework* goes on to

describe the new definition offered:

Because this *Framework* envisions information literacy as extending the

arc of learning throughout students' academic careers and as converging

with other academic and social learning goals, an expanded definition of

information literacy is offered here to emphasize dynamism, flexibility,

individual growth, and community learning: Information literacy is the set

of integrated abilities encompassing the reflective discovery of

information, the understanding of how information is produced and

valued, and the use of information in creating new knowledge and

participating ethically in communities of learning. (p.3)

Authors like Rosenblatt (2010), Scharf et al. (2006), Luetkenhaus, Borrelli, and Johnson

(2015) initially raised questions about the priorities of information literacy once they

uncovered that moving beyond the bibliography revealed challenges in higher-order skills

such as synthesis. They seem to have their concerns reflected in this new interpretation of

information literacy offered in the *Framework*.

Admittedly, the approaches proposed by Rosenblatt (2010) and Margolin and

Hayden (2015) are not entirely new. Khohl and Wilson (1986) advocated for instruction

sessions that shifted the focus to "[begin] with the student's research question rather than

the library tool" (p. 210). It is in more recent years, however, that this conception of

information literacy seems to manifest itself in successful instruction models that relax

the traditional bibliographic focus. For example, Deitering and Gronemyer (2011) report

on their success using blogs (as opposed to a traditional emphasis on scholarly sources) to

help teach synthesis. These shifting goals and practices are also seen in Ludovico and

Wittig's (2015) report the preliminary stages of a longitudinal study of first-year students' essays in which both librarians and composition faculty were cooperating on the project. For this project, Ludovico and Wittig explain that the faculty's instructional concern was less about bibliographic skills and more about students' use and understanding of their sources. Ludovico and Wittig's study and instruction sessions, therefore, evaluated how students were using sources as opposed to whether they were citing the right sources correctly (p. 33). Other examples of new content and synthesis-oriented instruction models can be found in McClure, Cooke, and Carlin (2011); Downs and Wardle (2007); and Darowski, Patson, and Helder (2017).

Furthermore, thanks to Bizup's (2008) typology of information, some libraries are beginning to propose a different framework by which information is defined not by its format but by the way the student uses the information. According to Bizup, information can be classified by whether it is used for background, exhibits, argument, or methods. The difference between exhibit sources and argument sources is of particular interest to this study. When students use sources as exhibits, they use them as pieces of evidence to affirm their position. On the other hand, sources used argumentatively are characterized by an exchange between the student and information source — the student can affirm, refute, compare, or react to the source. In this typology, information sources are completely conceptualized by a kind of relative ontology in which information is defined by students' engagement with it. Libraries such as Portland State University (2017), Indiana University, Bloomington (2018), and the University of Texas (Grace, 2015) are

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teaching and promoting this approach, which acts against the peer-reviewed/popular

source dichotomy observed by Head and Eisenberg (2010).

The Role of the Librarian

For Ludovico and Wittig (2015), these new methods of assessment and instruction

they were experimenting with – approaches that place rhetorical use of sources at the

center – necessarily beg a much larger question about the role of academic librarians and

the nature of the profession. Ludovico and Wittig asked whose role it is to teach students

about meaningful integration of information sources into their research. Is this the role of

the classroom instructor or do librarians share some of the responsibility? Should

librarians even concern themselves about anything beyond the students' bibliographies,

or are the studies of authors like Rosenblatt and Carlozzi simply meddling in the concerns

of English and composition faculty? Bowles-Terry and Donovan (2016) take up the

argument that librarians have a much deeper well of expertise to offer students, but that

this is rarely tapped into because of the limited amount of time librarians have to interact

with students. Is it the case, then, that librarians' influence on anything other than

bibliographic behaviors is a practical limit, or is it also a theoretical limit imposed

(possibly self-imposed) on librarianship? These challenges of where to draw the line

between librarian and composition instructor are not new, and Fister (1993) and Norgaard

(2003), for example, contend that, if a librarian neglects to teach how to use information,

the librarian does not effectively support to goals of the composition instructor.

In exploring what bibliographic requirements reflect about the nature of

librarianship, there is one final school of thought that must be mentioned — critical

information literacy theory. Quoting Accardi, Drabinski, and Kumbier (2010), Downey (2016) defined critical information literacy as

> '…a library instruction praxis that promotes critical engagement with
> information sources, considers students collaborators in knowledge
> production practices (and creators in their own right), recognizes the
> affective dimensions of research, and (in some cases) has liberatory aims.'
> In addition, it must take into account the complex power relationships that
> undergird all of information, including its creation, presentation, storage,
> retrieval, and accessibility. (pp. 41-42)

While still closely aligned with the ACRL *Framework*'s (2015) understanding of information literacy, critical information literacy, as explained above, emphasizes a recognition of the role power structures play in information creation, organization, and retrieval. This additional theoretical lens is offered here, in addition to the earlier understanding of information literacy offered by the ACRL's *Framework*, to propose yet another question beyond efficacy. While likely unable to resolve the questions here, a critical information literacy interpretation of bibliographic mandates raises a challenge about how the mandates relate to librarians' own exercise of power within the information marketplace.

The challenge is best framed by a lesson offered by librarian and critical information literacy theorist, David Patterson. Citing an account from Casson (2002), Patterson (2009) provided the example of catalogs excavated from the earliest known library in the ancient city of Nippur. What is learned from this artifact is that this early

ancestor of our modern libraries was wedded to the functions of that community's temple. In short, the catalog held there was designed to collect and provide efficient access to "sanctified" texts — those texts approved for use by the priestly class. The challenge for modern librarians to draw from this is: how much different are our current academic libraries from the library at Nippur? As Patterson explained, "…the tablets of Nippur indicate librarianship's central contradictions: sharing and holding; aiding and hindering; furthering research and, by designating certain information as privileged, obstructing it." (2009, p. 350). This reflection on librarianship – the ways in which librarians have the power to perpetuate free access to information or obstruct it – is an important idea to keep in mind if the ACRL *Framework* is to be taken seriously in its call to reflexively "…examine [our] own information privilege" (ACRL, 2015, p. 6).

As a pedagogical application of critical theory more broadly, critical information literacy intersects with conversations surrounding bibliographic requirements because of its ability to extend the conversation beyond whether or not these practices are effective pedagogically to what these practices say about the profession. As Downey (2016) suggested, these practices might be both ineffective and oppressive because they privilege (or as Patterson might say, "sanctify") certain forms of information thus disallowing appropriate space for students to deeply evaluate the political nature of *all* information. The motivation to uphold our own professions' information power – the library collection – was a clearly stated motive behind Davis and Baberino's recommendation for mandating peer-reviewed sources. What, then, can be said about these bibliographic mandates if they are viewed through the theoretical lenses offered by

the *Framework's* self-reflective metaliteracy and critical information literacy theorists' liberative mission for librarians?

In short, what the literature demonstrates is that moving beyond the bibliography opens up new questions about the accuracy of information literacy assessments, which information literacy outcomes are most important, how to design information literacy instruction, and even the role of librarians.

With these voices and questions documented in the literature, it is important to revisit Robinson and Schlegl's 2004 study and investigate the role that mandating scholarly sources has in an undergraduate student's research assignment. This investigation, however, will be revisited with the knowledge and understanding garnered from the review of literature above. By adding a content analysis to the traditional citation analysis employed by Robinson and Schlegl, this study hopes to provide an update to their previous investigation that will more adequately speak to the more recent concerns that go beyond the bibliography. To provide a more relevant answer to the central question of whether bibliographic requirements are an efficacious pedagogical tactic, the assessment and point of view must be updated to reflect the more than a decade's worth of developments and evolutions in the body of information literacy literature.

CHAPTER III

METHODOLOGY

Research Questions and Hypotheses

To investigate how requiring students to use peer-reviewed sources influenced their written product, the study used two phases: a citation analysis and a content analysis of students' information-use and synthesis of outside sources. The two major research questions each guide the two different forms of analysis utilized in this study.

First Research Question and Hypotheses

The first research question directed the citation analysis portion of the study. Its goal is to revisit the initial questions of Robinson and Schlegl (2004) regarding the impact that requiring the use of peer-reviewed articles has on students' bibliographies. Specifically, hypotheses three and four directly retest their findings (although this study hypothesizes different outcomes than these earlier researchers). Hypotheses one and two were not directly tested by Robinson and Schlegl, but, given the observations of Jamieson (2013) and Carlozzi (2018) about low in-text citation frequencies, they were added as useful extensions to their original findings.

The first research question asks: Does explicitly requiring the use of peer-reviewed sources impact the bibliographies and citation behavior of students? This question is further refined by the following hypotheses:

H_1. Students who received the bibliographic requirement to use peer-reviewed sources will cite all of their individual sources less frequently within the body of their essays than those without the requirement.

H_2. Students who received the bibliographic requirement to use peer-reviewed sources will cite their peer-reviewed sources less frequently within the body of their essays than those without the requirement.

H_3. Students who received the bibliographic requirement to use peer-reviewed sources will cite fewer sources overall than those without the requirement.

H_4. Students who received the bibliographic requirement to use peer-reviewed sources will cite the same percentage of peer-reviewed sources as those without the requirement.

Second Research Question and Hypotheses

The second question directed the content analysis phase of the study. This question is framed by hypotheses about two variables: the frequency of direct quotations and students' synthesis of individual sources, which were highlighted in Jamieson (2013) and Carlozzi (2018), respectively. The phrasing of the question also allows for an inductive process – described as emergent variable identification by Neuendorf (2017) – by which additional variables may be added before coding that can help answer the overarching question in the second phase of the study.

The second research question asks: How do students in both groups (those with the requirement and those without) utilize the information sources within their essays?

H5. Students who received the bibliographic requirement to use peer-reviewed sources will directly quote their outside information sources more frequently than those without the requirement.

H6. Students who received the bibliographic requirement to use peer-reviewed sources will attempt to synthesize their outside information sources less frequently than those without the requirement.

Data Collection

Setting Description

The study examined unit essays completed by students enrolled in the same professor's online sections of an undergraduate political science course at a public university in Texas. The course sections are referred to as Section 50 and Section 51 within this report.

Before the semester, the Department Chair provided approval for the altered syllabi and assignment instructions for Sections 50 and 51. While the two sections, taught by the same professor, would remain the same in design, structure, and pace, Section 50 had its bibliographic requirements relaxed. Outside of this experiment, it was the instructor's custom to require their undergraduate students to complete research assignments with the mandate to have at least 2-3 peer-reviewed articles. For the experiment, the instructor modified Section 50's assignment instructions and syllabus to remove the mandate for peer-reviewed articles. Students, instead, were provided a more

open-ended and vague expectation to make use of "appropriate sources." This allowed for Section 50 to serve as a control group to which Section 51 could be compared. The modification can be seen in Appendix D, which contains the pertinent portion of both sections' syllabus.

In addition to the mandate, students in both sections received similar in-class messages about outside research. The instructor encouraged students to make use of the academic library and the subject librarian if they needed assistance. The instructor also recommended JSTOR and Academic Search Complete as ideal databases for searching. While students received similar in-class messages and recommendations about finding information for their articles, ultimately one group of students was given the restrictive mandate to find a certain kind of source, thus limiting their freedom to interpret and use sources they deemed appropriate.

By the time of data collection, each section had an equal number of students enrolled – 40 students enrolled in p 50 and 40 students enrolled in Section 51. During the course, students were expected to complete two of four unit essays. Each unit essay had its own set of prompts and due dates. Students were expected to decide which two essays they would complete and then decide on a prompt for that unit. To remain as consistent as possible, this study only analyzed papers from one unit. Essays were collected from Unit Three. The rationale behind this decision was that units one and four had the greatest risk of skewing results. Unit One may capture poor first attempts or early submissions of particularly engaged students, and Unit Four may capture hurried papers at the end of the semester. Units Two and Three, it was reasoned, would allow for a better snapshot in the

middle of the semester. Unit Three was selected because, next to Unit Four, it contained the most submissions. Overall, 45 essays were submitted for Unit Three. The Unit Three essays asked students to write about one of three topics: political socialization [Topic 1], biases in news reporting [Topic 2], or the role of the internet in political campaigning [Topic 3]. Excerpts of the prompts can be found in Appendix E. Despite the different topics, the sample remained fairly homogenous, with the majority of students writing their essays in response to Topic 3. Furthermore, while the topics were different, the parameters and expectations about finding outside research remained the same between the topics. A complete breakdown of essays submitted is found in Table 1.

Table 1
Total Documents Submitted

	Section 50	Section 51
Topic 1	4	2
Topic 2	4	5
Topic 3	16	13
Total	24	20

*The total number of papers submitted was 45, but one student in Section 51 opted out of the study, reducing the sample size to 44.

The course targeted for this study is the first course in a required, 6-credit hour sequence of government/political science courses within the core curriculum. While unable to control for all the confounding variables possible in the educational setting, this study, building off of Rosenblatt (2010) and Carlozzi (2018), relied on the control of available instructional variables (such as professor, syllabus, and assignments) and the assumption of similarity between students represented in two sections of a required undergraduate course.

Human Subjects Protection Procedures

      Confidentiality. To protect the confidentiality of students' work, the course's graduate assistant was used to collect the essays and de-identify them before being transferred to the principal investigator. The graduate assistant, along with the course instructor, already had access to the essays, but, since the course instructor graded the unit essays, it was important that the graduate assistant collect and de-identify the essays on behalf of the principal investigator. This way, the principal investigator and additional rater only had access to anonymized essays and bibliographies, and the instructor had no way of knowing who participated in the study and who did not.

      Recruitment and IRB approval. The collection procedures employed a passive consent (or "opt out") process that was approved and classified as non-exempt by the Intuitional Review Board (see Appendix H). This passive consent option made it possible for no personal information to be collected along with participants' essays. Before students began writing their essays, the instructor posted an IRB-approved recruitment notice on both course sections' Blackboard page as an announcement; an email to student's institutional email accounts was automatically generated in addition to the post on their learning platform. The notice can be found as Appendix F. The notice contained a hyperlink as well as PDF attachment of the full study description and passive consent form (see Appendix G). Students who did not wish to volunteer their essays were directed to follow the link where they could submit their name via a form hosted on PsychData. This would act as notice that they did not provide their consent, and their essays were not collected as part of this study. All other students' consent was assumed,

and their essays were collected. The link remained active and available so that students could opt-out of the study at any time.

The graduate assistant was provided the names of the students who submitted opt-out forms. This allowed the graduate assistant to remove the students' essays before de-identifying and transferring the remaining volunteered essays. Of the 80 students enrolled in the course, only two elected to opt out. Of those two, only one submitted a unit three essay. Therefore, 44 of the total 45 Unit Three essays were collected to make up the sample used in this study. The data collection was also delayed until all grading of the unit three essays was complete. This allowed the principal investigator and instructor to reassure students further that their grades and standing would not be affected by their participation in the study. De-identified essays were then transferred from the graduate assistant to the principal investigator by using both individuals' cloud-based, institutional Microsoft OneDrive accounts. A shared folder was created with access provided only to the graduate assistant and principal investigator's password-protected accounts. Files were then uploaded into this file and separated into subfiles for their respective course sections. The principal investigator then renamed each anonymous document with a unique paper identification number for the purposes of the study.

Data Analysis

Citation Analysis

For the citation analysis, each outside information source cited in the bibliographies was viewed as a unit of investigation. Each entry was assigned its own unique identification number in the same way each essay was assigned a document

identification number. A citation analysis checklist was developed to categorize each

entry as either a peer-reviewed/scholarly source (coded as a 1) or not (coded as a 0). This

portion of the checklist adapted definitions and parameters used by Robinson and Schlegl

(2004) and Rosenblatt (2010). The second variable measured by the citation analysis

checklist was the number of times the source was referred to in the body of the essay. For

this variable, the definition for what constituted an in-text reference was adapted from a

coding glossary compiled by Jamieson and Howard (2011) and provided under an

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US). The full citation analysis checklist is included as Appendix A.

     Measurements of the accuracy of citation are intentionally missing from the

citation analysis checklist. The rationale behind this decision was primarily theoretical.

While a citation analysis phase was still used for this study to test Robinson and Schlegl's

2004 conclusions, the addition of the second phase – a non-bibliography-centered content

analysis – demonstrates a theoretical move that is consistent with the latter body of

research reviewed in Chapter II. While the count, type, and in-text citation frequency of

bibliographic entries were still included in the analysis, any further bibliographic-centric

measures were left out in an attempt to not overpower the second phase of analysis and to

permit a focus on source integration.

     Before coding the bibliographies, the citation analysis checklist was normed and

checked for reliability using a second, outside rater. An outside librarian was approved by

the TWU IRB to serve as the second rater for the purposes of inter-rater reliability tests.

The complete sample of documents was randomized to collect a 10% subsample of

documents for the inter-rater reliability test. As Neuendorf (2017) pointed out, there is no universal standard for the size or sampling method of reliability subsamples, but it is still observed that 10% to 20% appears to be a commonly used range. Five randomly selected papers (just over 10% of the total 44-document sample) were coded separately by the principal investigator and the additional rater. Holsti's (1969) method for calculating agreement between two coders was used to calculate percent agreement for each variable according to the following formula:

$$PA_O = 2A/(n_A + n_B)$$

For the number of times a source is referenced within the text of the essay, the first coder coded 25 instances whereas the second coder coded 24 instances. Of those, they agreed on 21 codes. Following the above formula for crude agreement, the number of times the coders agreed (21) is doubled then divided by the sum of codes applied by each individual coder (the sum of 25 and 24). This yields an 85.7% agreement. For the variable of whether a source is peer-reviewed/scholarly or not, each coder coded 15 cases. They agreed 15 times, rendering 100% agreement. Stemler's (2004) rule of thumb for crude or percent agreement was used as a benchmark in which the range of 75% to 100% is deemed an acceptable PA_O value. With the citation analysis checklist rendering acceptable percentages of agreement, the remaining bibliographies were coded by the principal investigator.

In all, 142 outside information sources were coded. 25 of the 142 were coded but then set apart from the dataset because they were required sources. The essay prompts provide some outside information that students were already expected to use in addition

to their outside research. While still coded in the phase one process, they were then removed from the dataset and no longer a part of future analysis. The rationale for this was that the true scope of this study was to investigate what sources students were finding and using as additional research to incorporate into their essays, not information already given to them in the assignment or class material. Given the research questions at hand and what is already known from Carlozzi's (2018) findings that suggest student use in-class readings more than outside research, it seemed reasonable to not include these 25 sources for further analysis. This decision left a remainder of 117 sources in the sample.

Content Analysis

For the second phase of the study, a quantitative content analysis was conducted on the body of the essays. The content analysis was primarily concerned with examining the synthesis of in-text citations and how students were integrating outside information sources. For the content analysis, this study relied heavily upon the procedures outlined and discussed in Neuendorf's second edition of *The Content Analysis Guidebook* (2017).

The content analysis codebook was modeled off definitions and codes found in Jamieson and Howard (2011), Rosenblatt (2010), Carlozzi (2018), the AAC&U (2007b), and Kanter (2006). Several layers of variables were included. The medium-specific variables available for coding were the number of in-text citations, the absence of a bibliography page, and missing bibliographic entries. Variables identified from previous research are those that relate specifically to hypotheses five and six – direct quotations and synthesis. The codebook used dictionary-like entries for each variable that outlined in detail what could be considered a direct quotation or attempted synthesis. Direct

quotations were coded if they appeared alongside an in-text reference already identified

in phase one. The total number of direct quotations was recorded for each paper.

  Based on the narrative described in the literature review concerning the rarity of

fully-synthesized sources, synthesis was treated as a binary variable in the coding

process. Attempted synthesis was coded as a 1 and defined as an instance in which the

information from a source is used with some clear interpretation or connection by the

student. The codebook pointed to occasions when the author usually used the information

source to create something new or to add to new conclusions. A failed attempt (or no

attempt) at synthesis (coded as a 0) was defined as an instance in which there was no

clear attempt on the part of the student to synthesize or integrate the information from the

outside source. The codebook further defined it by instances in which the author simply

quotes or uses the outside source as evidence or a "stand-in" for the student's own claims

or words. No analysis nor new conclusions were created by the author in using these

sources. These references appeared in isolation or were abrupt with little or no

discernable connection.

  An example of an instance in which a reference was coded with a 1 for synthesis

(meaning synthesis was attempted) by both coders in the inter-rater reliability test was

found in document number 5104:

  However, an article about online campaigning from the Netherlands state

  that 'software such as social media dashboards bring the websphere to the

  fingertips of campaign managers,' meaning that a campaign manager is

  able to fine-tune their candidate's campaign and perform damage control

almost instantaneously (Vergeer 14). For example, when it comes out that

a candidate was previously arrested as a teen, it is much quicker for said

candidate to come out with a statement on Twitter or Facebook than it is to

put together a big press conference.

The above segment from the sample serves as a useful example of the characteristics of

references coded as a 1 for synthesis. The references in this case were not used in

isolation, and the student made a clear attempt to connect the information to his or her

thesis. It was clear why the outside information was referenced thanks to the further

interpretation and conversation the student built around the reference in her or his own

words. On the other hand, in document 5108, both coders applied a 0 for synthesis to the

following reference that comes at the end of a paragraph:

For future elections I believe that the internet will continues to be used and

that more of the public will be reached. 'The evidence so far indicates that

new ICTs may be increasing the divide between a largely passive

membership and new set of hyper-activist elites' (Gibson, 186).

No further explanation is provided even though new information about the divisive nature

of information communication technology is introduced in the reference that was not

discussed anywhere else in the essay. No connection or interpretation of the new

information was attempted, and it is not entirely clear how this new information supports

the student's claim in the previous sentence. This instance was not unlike many of the

other instances in this sample that were coded with a 0 for synthesis.

Last, the codebook's final variables were constructed from an emergent process. While Neuendorf (2017) described this method of variable identification as one that temporarily betrays the hypothetico-deductive rigor of quantitative content analysis, it is nonetheless a sometimes useful step by which the researcher immerses her or himself in the raw data. This process was done to identify any remaining variables for the content analysis. The principal investigator read all papers three times. While reading the document, the principal investigator kept notes of themes that seemed to recur in the sample or stand out because of their rarity. This process led to the identification of six additional variables. Out of these six variables, two related to features of writing more broadly – unsupported statements and opinion statements. Unsupported statements were defined as any statement in which a fact or exhibit was presented but the author provided no citation or reference to corroborate or support the statement. This was a theme that emerged frequently from the inductive variable-identification process, and, given its clear relation to information literacy, was added as a code that could be applied throughout a students' essay (not just at the point of in-text citations). For example, during the inter-rater reliability test, both coders coded the following as an unsupported statement found in document 5108:

> Recently, facebook came up with a way to categorize individuals into political groups based on the persons facebook activity. If you are categorized into one of these groups, facebook only shows you information such as events or new articles for that political group.

While it might be common knowledge that social media sites like Facebook make use of recommender systems to curate content, this claim about Facebook categorizing users by political party and catering content accordingly would be well-served by a citation to indicate where this student learned that information. The students' use of "recently" seems to suggest this is new behavior on the part of the social media giant that would have been reported, and, if so, that report should have been referred to here to support the student's claim.

The second variable in this class was the theme of personal opinions, which also emerged frequently in the data. This was defined as any sentence in which the student clearly states her or his own personal opinion. These sentences had to be in the subjunctive tense (e.g. must, should, ought) or signaled by the phrases "I think" or "I believe." This theme was coded because it provided an additional layer to our understanding of engagement. While the connection to information literacy is not as clear, this assertion of one's opinion does demonstrate the introduction and use of an information source – the student herself. Often, its departure from the "academic third-person" coupled with its frequency in a given essay is what made this variable stand out in the inductive variable-identification process. Again, document 5007 provides two clear examples of this code that were agreed upon by both coders in the inter-rater reliability process: "I believe this age category is mainly concentrating in the education and their future careers. I personally think blogging and live chat sessions can be effective." Kanter's (2006) definitions for linguistic markers of engagement were referred to for refining the definitions for the aforementioned writing behavior variables.

Out of the six emergent variables, four were identified as behaviors that co-occurred with synthesized references, and they helped to provide more explanatory power to the variable of synthesis. These variables acted as categories to describe *how* the source was synthesized or integrated, rather than a binary indication that it was synthesized. The four categories were interpretation/explanation, reacting, scrutinizing source, and acknowledging scholarly exchange. These four variables were referred to as engagement categories and could only be coded to in-text references that received a 1 for synthesis. Again, Kanter's (2006) rhetorical definitions for writing engagement proved useful in fine-tuning the definitions for these variables.

The interpreting/explaining category was coded when the student provided some further explication of the information cited from the source. This came in the form of explaining how the source relates to or supports the argument, explaining or breaking down the information cited, or the student providing his or her own interpretation of the information. An example of this kind of synthesis was found in document 5009 when the student writes:

> Socioeconomic status is linked heavily to having the access to higher
> education, as well as access to the ability to afford to pay more in
> taxes…If someone is unable to pay more taxes because of their income,
> they have a higher tendency to avoid voting for someone that would want
> to raise the tax brackets.

The students' additional explication of the source helps to connect the information cited to the larger point the student was attempting to make in her or his essay. In this way, the

information cited did not stand on its own but was situated within the essay by the students' own words and interpretation.

The code for reacting was applied when students provided a response to outside information. This was seen as the students' own response to the information such as affirming the information, refuting it, judging it, extending it, or asking follow-up questions of the information. It situates the student in conversation with the information source. An example of this code can be found in document 5102 when the student writes:

> In 'Rethinking Youth Political Socialization,' Gordon and Taft say that we
> need to 'encourage youth to participate in explicitly less critical or
> dissident forms of political activity than those practiced by most of the
> youth activists we study.' While this is true, it can be much easier to
> participate in things that are much more public and hear about such as
> marches and protests.

In this instance, the student enters into conversation with the authors by affirming their conclusion while providing her or his own take on the issue. The student participates by positing the counterpoint that critical or dissident political activity might be more alluring to young people because of its high-profile, public coverage.

The code for scrutinizing a source was applied whenever a student critically analyzed an outside source's currency, authority, accuracy, or purpose/bias. Both coders in the inter-rater reliability process agreed that the following was an example of this category of engagement in document 5104: "According to research I found, television is 'still the most important source of campaign news' (Vergeer 10). However, as this study

was done in 2012, it is evident that a lot has changed since then." In this instance, the author casts doubt on the information offered by the outside source because of its less-than-ideal currency.

Last, the code for acknowledging scholarly exchange was applied to instances in which a student writes about outside information sources in a way that recognizes "...source authors as people" who are engaged in ongoing scholarly communication (Kanter, 2006, p. 279). This type of engagement could be coded when the student drew comparisons between two outside information sources or how two outside sources might affirm or contradict one another — thus drawing the reader's attention to the scholarly exchange going on between outside sources. Whereas the reacting category might be seen as the student entering into the conversation with sources, this code is applied to instances in which the student highlights the conversation that happens in scholarship between outside information sources. An example of this is seen in document 5002 when the student writes:

> After being encouraged by the executives of these companies, he 'made up
> his mind' to raise two tariffs, but only after their talks (Ball). This
> challenges the Post's arguments because it demonstrates the president was
> not acting without thought and without purpose.

In this instance, the student creates space within her or his essays for a debate to occur between two outside information sources, demonstrating how one provides an opposing viewpoint to the other.

The codes for each variable were annotated within the documents using Microsoft Word, and aggregate records of each paper's codes were recorded on a record sheet before being entered in SPSS. The final codebook, complete with full definitions of all variables, is included as Appendix C, and the accompanying record sheet is included as Appendix B.

Once the variables were identified and the codebook established, an inter-rater reliability test was conducted before coding commenced. The same outside rater from the first phase served as the additional rater for the second phase. Another 10% subsample was collected using a method of sampling that Neuendorf (2009) describes as a "rich range" subsample. In this process, the subsample documents are identified by their ability to provide ample "testing-grounds" for most (if not all) of the variables. This is an important process for ensuring that all variables in the codebook (including the rare variables) are given an opportunity to be tested for inter-rater reliability. Given what is known from previous research about synthesis success rates, for example, one could reasonably expect that a simple random subsample might deliver documents with very little opportunities to code for synthesized texts. Therefore, the subsample was collected purposively, and documents were selected according to their suspected ability to provide enough opportunities for all vital variables to be coded and tested.

The results from the variables' inter-rater reliability tests following Holsti's (1969) method are shown in Table 2. Again, following Stemler's (2004) suggested benchmark, no single variable had a less than 75% agreement. The aggregate

Table 2
Phase 2 Inter–Rater Reliability Results

	Synthesis	Direct Quote	No Bibliography Entry	Personal Opinion	Unsupported Statement	Engagement Categories
Coder A Count	18	13	5	12	15	8
Coder B Count	18	14	5	11	23	9
Agreement Count	17	13	5	11	15	8
PAo	94.44%	96.30%	100.00%	95.65%	78.95%	94.12%

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score of all variables is 93.24%. The weakest variable in terms of agreement was unsupported statements ($PA_O = 78.95\%$) in which Coder B applied the code to the text more frequently than Coder A. In all, the inter-rater agreement tests yielded promising results concerning the reliability and objectivity of the definitions set forth in the codebook. No second test or revisions seemed necessary given the percent agreements, and the remaining documents in the full sample were coded by the principal investigator.

Statistical Procedures

Statistically comparing the means of dependent variables for both Section 50 and 51 was necessary to properly answer the hypotheses for both research questions. IBM's statistical software, SPSS, was used for the statistical analyses described in this study. Each of the six hypotheses ask questions about a different dependent variable, and only one of the six variables could be measured by using raw numerical data collected from the content or citation analysis. The remaining five would require an additional transformation (mostly in the form of an average or proportion) before analysis could begin. This was notably the case for Hypotheses One, Two, Five, and Six which ask about the frequency of all sources' in-text citations, the frequency of peer-reviewed sources' in-text citations, the frequency of direct quotations, and the synthesis scores, respectively. Averages were needed because these frequencies were measured at the reference level, whereas the hypotheses ask questions at the document level. The true subject of the study is not individual references but the individual documents/students. Therefore, reference-based measures were averaged for each paper to provide a single measure of these dependent variables for the paper rather than the sources. Table 3

describes the dependent variables used for analysis and the necessary transformations

from raw data that were made.

Table 3
Dependent Variables

	Raw Data	Transformation Made	Dependent Variable for Analysis
Hypothesis 1	Frequency of in-text citations per information source	In-text citations for each paper were divided by paper's total number of information sources	Average in-text citation frequency per paper
Hypothesis 2	Frequency of in-text citations per peer-reviewed source	In-text citations for each paper's peer-reviewed sources were divided by the paper's total number of peer-reviewed sources	Average in-text citation frequency of peer-reviewed sources per paper
Hypothesis 3	Total sources cited per bibliography	None required	Total sources cited per bibliography
Hypothesis 4	Number of peer-reviewed and non-peer-reviewed sources per paper	Number of peer-reviewed sources for each paper was divided by paper's total number of sources	Percentage of a paper's bibliography that consists of peer-reviewed sources
Hypothesis 5	Frequency of direct quotes per paper	Number of direct quotations was divided by paper's total number of in-text references	Percent of in-text references that are direct quotes
Hypothesis 6	Classification of synthesis per in-text reference	Total synthesis count was divided by number of in-text references	Average synthesis score per paper

Given the small sample size, normality and outliers would be the first concern for analysis of the variables mentioned above. Not surprisingly, none of the variables demonstrated a normal distribution. To confirm this, a Kolmogrov-Smirnov test for normality was run on each of the 6 variables, with each reporting a statistically significant result ($p < .05$) which means that the null hypothesis of normality was rejected. Furthermore, analysis of graphical representations such as histograms and box-plots revealed little normality and multiple outliers, respectively. Therefore, it was decided that the most conservative approach was to analyze these variables non-parametrically using the Mann Whitney U two-sample test. With the Mann Whitney U, however, it should be noted that some information is lost in that the ranks of the variable results are what are tested as opposed to the raw data. Even still, in the face of abnormal data from a limited sample size, the Mann Whitney U still allowed the hypotheses to be answered by indicating the presence of significant difference between the two groups' distributions.

For additional data collected in the content analysis – the variables beyond those questioned by the deductive hypotheses – simple descriptive statistics were used to provide numerical observations about themes that emerge from the data and inform the second research question. Questions about correlations were also analyzed. For instance, was there any correlation between a paper's average synthesis score and its percentage of scholarly sources? All these correlative questions would have been appropriately investigated using a Spearman's rank-order correlation that is best suited for abnormally distributed data. However, this test was not employed because graphical representations

of the correlations (scatter plots) as well as measures of co-occurrences did not display the prerequisite monotonic pattern. In all, six additional relationships were observed using scatter plots, co-occurrence counts, and measures of overlap using Jaccard's Index to investigate possible correlations: average synthesis score and number of sources, average synthesis score and percentage of scholarly sources, average synthesis score and number of unsupported statements, average synthesis score and number of opinion statements, average synthesis score and percent of direct quotations, and number of unsupported statements and opinion statements. None of the six displayed a monotonic relationship, and, therefore, the Spearman's rank-order correlation was not warranted nor viable for this study. All additional numerical observations remained at the descriptive level, which would allow the results to provide helpful descriptions about writing or information-use behaviors while stopping short of correlative or inferential statistics.

CHAPTER IV

RESULTS

Phase One: Citation Analysis

Descriptives

From the 44 essays collected, 142 outside information sources were coded. As explained in Chapter III, however, only 117 of those outside sources were selected for analysis because the 25 set aside were already given by the assignment and therefore not a part of the additional sources students were expected to research. The mean, median, and standard deviation for the number of sources found in each group are given below:

Table 4
Descriptives: Total Number of Sources

	N	Mean	Median	Standard Deviation
Section 50	24	2.79	2.50	1.285
Section 51	20	2.50	2.00	1.539

What is immediately telling about the descriptives for the count of sources is how closely the sampled documents conformed to the minimum requirement of 2-3 sources. A strikingly small portion of the sample seemed to venture past three sources. This is seen well in the histograms of the total number of sources for each section in Figure 1 and Figure 2.
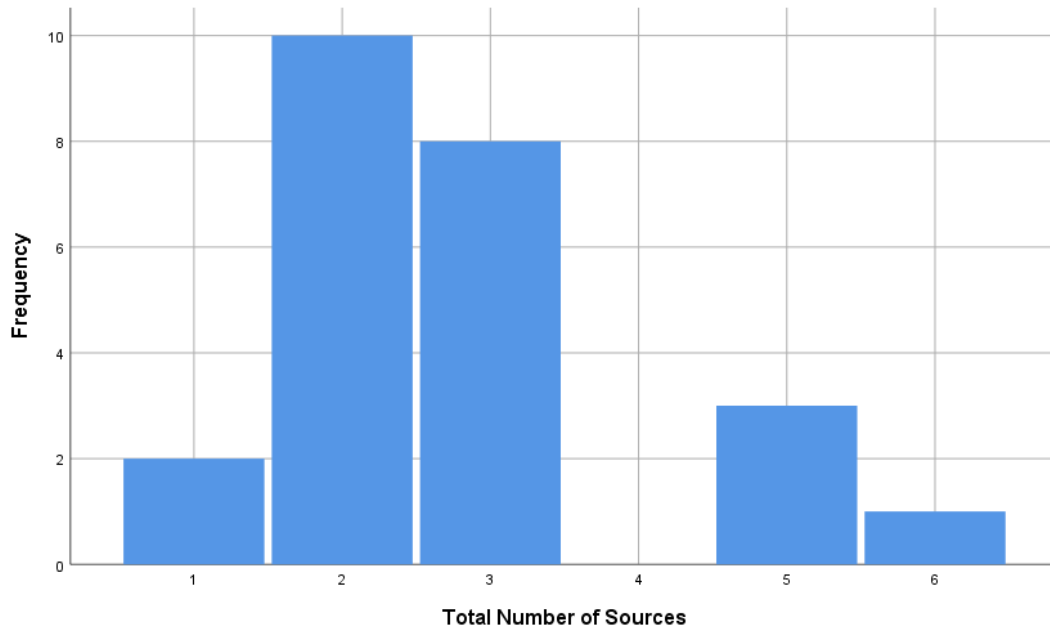
Figure 1: Histogram of total number of sources for Section 50
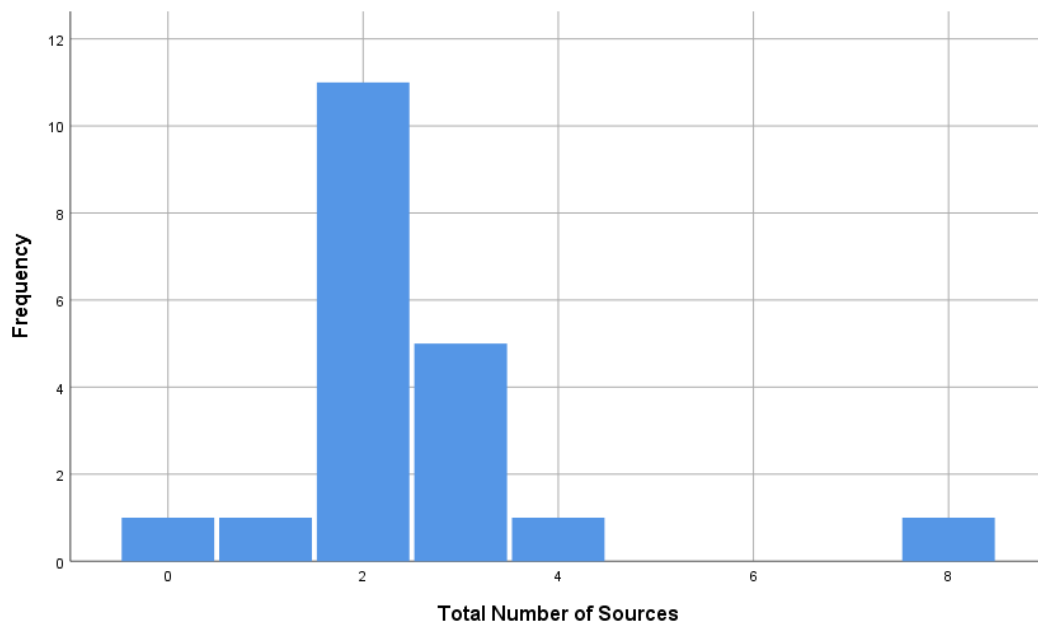
Figure 2: Histogram of total number of sources for Section 51

The second variable of interest in the citation analysis was the category a source fell into: peer-reviewed or not. In all, 76 of the 117 information sources were marked as peer-reviewed with 39 from Section 50 and 37 from Section 51. As described in Chapter III these counts were then divided by the total number of sources in each paper to provide a percentage that describes what share of a paper's bibliography is made up of peer-reviewed sources. For Section 50, the mean percentage of scholarly sources per paper was 56% and the mean for Section 51 was 75%.

The third variable of interest in the citation analysis was the frequency with which a source was cited. There were, in all, 129 in-text references – 60 in Section 50 and 69 in Section 51. Since a paper would have multiple information sources, an average frequency of in-text citation was found by dividing the paper's total in-text citations by the total number of information sources. This average would more accurately describe the frequency with which a student tended to cite an individual information source. For Section 50, the mean of all its papers' in-text frequency averages was 0.91. For Section 51, the mean of all its papers' in-text frequency averages was 1.22. At first glance, what both means point to is the fact that the students in the sample tended to refer to an individual source only once within the text. This tendency can be seen graphically in the histograms for the average in-text citation frequencies of both sections shown in Figure 3 and Figure 4. This variable was further subdivided by peer-reviewed and not peer-reviewed. The same frequency was rendered for peer-reviewed articles only. The mean frequency with which papers in Section 50 referred to their peer-reviewed sources only was 0.75 while it was 1.31 for Section 51.
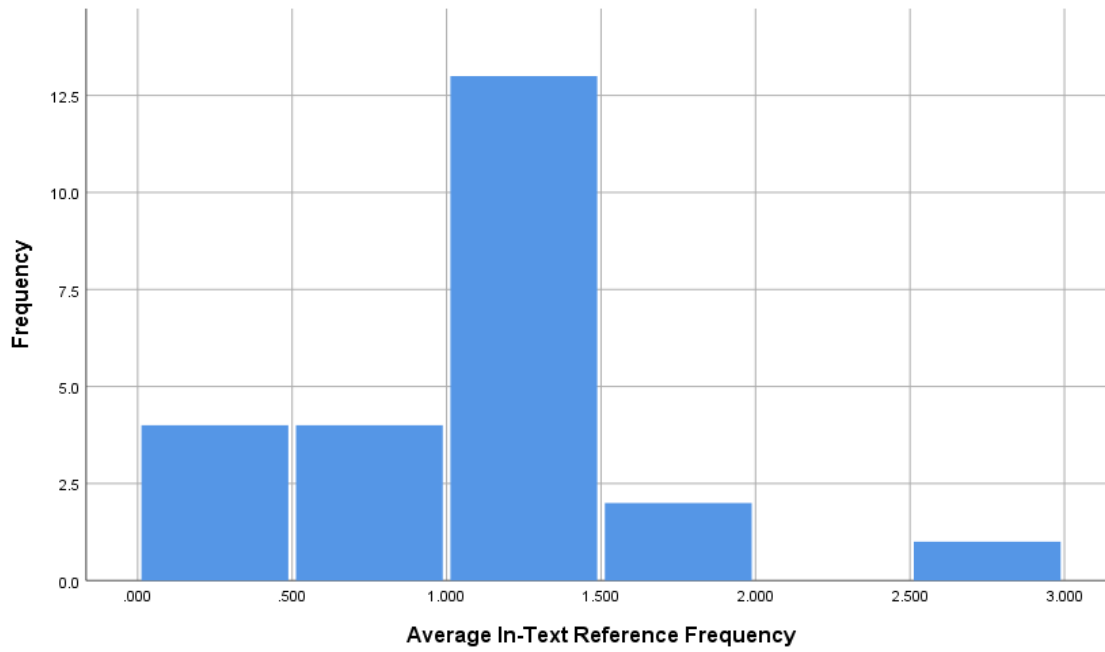
Figure 3: Histogram of average in-text reference frequency for Section 50
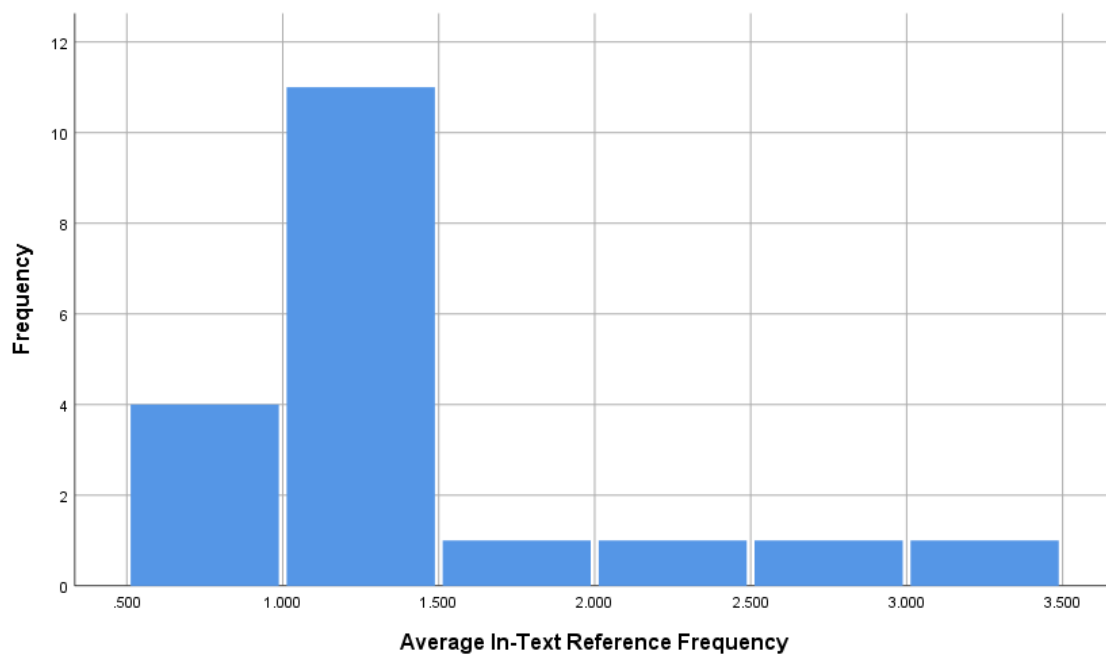
Figure 4: Histogram of average in-text reference frequency for Section 51

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Hypothesis Testing

There were four hypotheses associated with the citation analysis. The rank distributions of each dependent variable were analyzed for statistical difference (i.e., a two-tail test) using the Mann Whitney U test which provides an alternative to two-sample *t*-tests in the face of small, abnormally distributed samples. Below are four sections restating the hypothesis and reporting the results of the respective Mann Whitney U test.

Hypothesis 1. Students who received the bibliographic requirement to use peer-reviewed sources will cite their individual sources less frequently within the body of their essays than those without the requirement.

Using SPSS, a Mann Whitney U test was run to test the null hypothesis that the distribution of a paper's average in-text citation frequency is the same across the two course sections. Here, it should be noted that the null hypothesis does not match the original hypothesis. The Mann Whitney U is a two-tailed test so the restated alternative hypothesis is more accurately worded: Students who received the bibliographic requirement to use peer-reviewed sources and students without the requirement will differ in the frequency with which they cite their individual sources in their essays.

The total sample size differed for this test. One case had to be excluded because the paper lacked a bibliography therefore the full citation analysis was not able to proceed for that case. The test was run at the 95% confidence interval, and the results are reported below in Table 5.

Table 5
Hypothesis 1 Mann Whitney U Results

Section 50 N	Section 51 N	Section 50 Mean Rank	Section 51 Mean Rank	Test Statistic	Asymptotic Significance
24	19	20.04	24.47	275.00	0.217

The resulting asymptotic significance from the Mann Whitney U was greater than the set significance level ($\alpha = 0.05$), so the decision is to retain the null hypothesis and to conclude that there is no statistical difference between the two groups' distribution for average in-text citation frequency.

Hypothesis 2. Students who received the bibliographic requirement to use peer-reviewed sources will cite their peer-reviewed sources less frequently within the body of their essays than those without the requirement.

As with the first hypothesis, this hypothesis will again need to be restated to correspond to the null hypothesis tested in the Mann Whitney U. For the test procedures used, the alternative hypothesis is more accurately stated: Students who received the bibliographic requirement to use peer-reviewed sources and those without the requirement will differ in the frequency with which they cite peer-reviewed sources in their essays.

The sample size tested for this dependent variable will again differ from the total sample size. The question here is about the frequency with which students cited their peer-reviewed sources; this necessarily means that we were not concerned with the in-text citation frequencies of those students who did not use any peer-reviewed sources. In fact, citation analysis revealed that there were five (or 20.83%) papers that included zero

peer-reviewed sources from Section 50 and 2 (or 10%) papers that included zero peer-reviewed sources from Section 51. The test was run at the 95% confidence interval, and the results are reported below in Table 6.

Table 6
Hypothesis 2 Mann Whitney U Results

Section 50 N	Section 51 N	Section 50 Mean Rank	Section 51 Mean Rank	Test Statistic	Asymptotic Significance
19	18	15.00	23.22	247.00	0.013

The resulting asymptotic significance for this dependent variable ($p = 0.013$) was less than the significance level ($\alpha = 0.05$) which means that the decision is to reject the null hypothesis and to accept the alternative hypothesis that there is a difference in the two groups' distributions for the average in-text citation frequency of peer-reviewed sources. While the nature of the Mann Whitney U is two-tailed, when presented with a significant difference, the mean ranks can reveal the direction of the difference. With a mean rank of 15 for Section 50 and a mean rank of 23.33 for Section 51, the difference is that Section 51 had higher-ranking results and tended to cite their peer-reviewed sources more frequently. The ranked distributions of these two groups, and their difference, can be seen graphically in Figure 5.
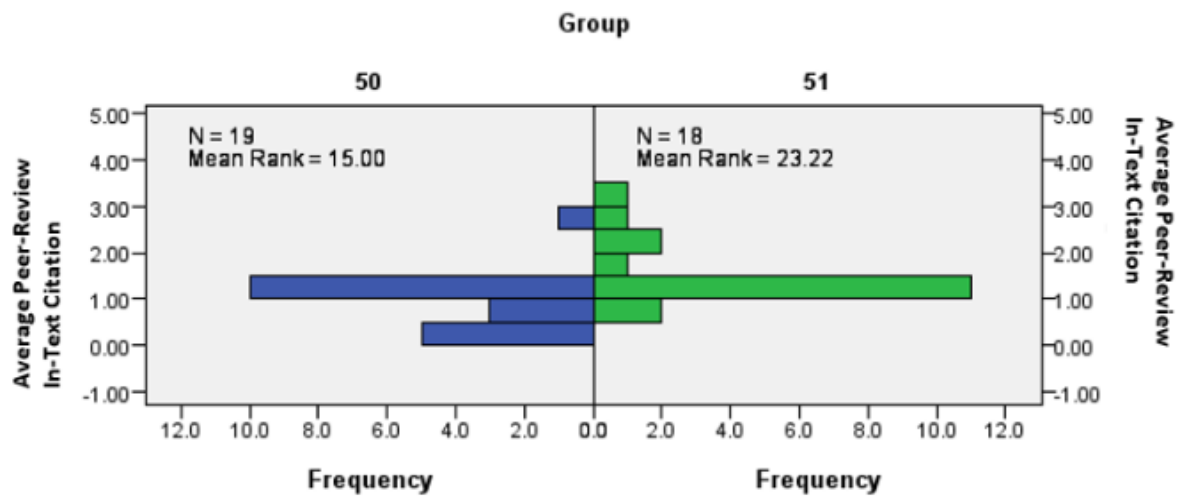
Figure 5: Distributions and rank of average peer-reviewed in-text citations

The originally-stated hypothesis expected that students who received the bibliographic requirement would use their peer-reviewed sources less frequently than their peers who did not receive the requirement. The results from this test conclude the opposite – students in Section 51, who received the requirement to use peer-reviewed sources, referred to their peer-reviewed sources in their essays more than their peers in Section 50.

Hypothesis 3. Students who received the bibliographic requirement to use peer-reviewed sources will cite fewer sources overall than those without the requirement.

The Mann Whitney U test for this hypothesis was run at the 95% confidence interval to test the null hypothesis that both groups' distributions are the same for the total number of sources cited by each essay. In all, 43 documents were included in this test with one case excluded because of the absence of a bibliography. The results are displayed in Table 7.

Table 7

Hypothesis 3 Mann Whitney U Results

Section 50 N	Section 51 N	Section 50 Mean Rank	Section 51 Mean Rank	Test Statistic	Asymptotic Significance
24	19	23.08	20.63	202.00	0.492

With an asymptotic significance less than the set significance level ($\alpha = 0.05$), the decision is to retain the null hypothesis that the distribution of the total number of sources is the same across both groups.

Hypothesis 4. Students who received the bibliographic requirement to use peer-reviewed sources will cite the same percentage of peer-reviewed sources as those without the requirement.

For this hypothesis, its original wording adopts the stance of the null hypothesis that there is no statistical difference between the two group's inclusions of peer-reviewed sources. This hypothesis is what is directly tested by the Mann Whitney U. As described earlier in this chapter, the mean percentage of scholarly sources per paper did differ between the two groups with an average 56% of Section 50 papers made up of peer-reviewed sources versus an average of 75% of Section 51 papers made up of peer-reviewed sources. The Mann Whitney U test, however will clarify whether these two groups' overall distributions are statistically different from one another. Again, the case with a missing bibliography was excluded, leaving a total sample of 43 documents across both groups. The results of the test are represented in Table 8.

Table 8

Hypothesis 4 Mann Whitney U Results

Section 50 N	Section 51 N	Section 50 Mean Rank	Section 51 Mean Rank	Test Statistic	Asymptotic Significance
24	19	18.60	26.29	309.50	0.038

The results of this test reveal that there is a statistically significant difference in the distributions, and the decision is to reject the null hypothesis that the distributions of the percentage of scholarly sources per paper are the same across both groups. These differing distributions can be seen in Figure 6.
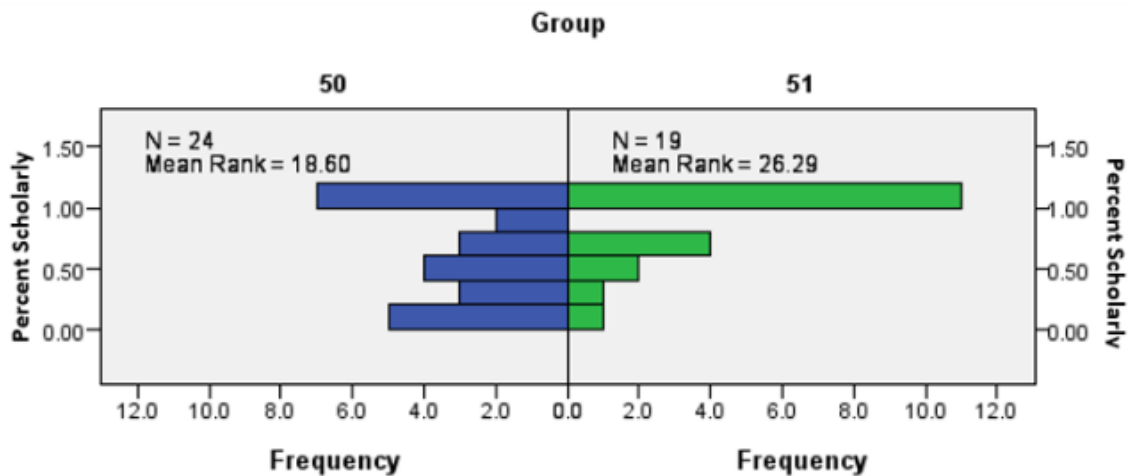
Figure 6: Distributions and rank for percent scholarly

As for the direction of the difference, with a mean rank of 18.60 for Section 50 and a mean rank of 26.29 in Section 51, the difference is that papers collected in Section 51 contained a greater share of peer-reviewed sources than those in Section 50. The graphical representation in Figure 6 illustrates well the high frequency of papers in Section 51 (the section which received the bibliographic requirement) that contained

bibliographies consisting of 100% peer-reviewed articles. Section 50's second-most prominent modal class, by comparison, fell at 0% peer-reviewed. This test confirms that the average percentages for groups 50 and 51 – 56% peer-reviewed and 75% peer-reviewed, respectively – does represent a significant difference between the two groups.

<div align="center">**Phase Two: Content Analysis**</div>

Descriptives

The primary job of the content analysis was to measure successful synthesis of students' references to the outside sources they found. Of the 44 essays collected, 122 in-text references to outside sources were coded. Since some information sources were referred to in the essays more than once and others not at all, the sum of a source's synthesis scores for each of its in-text references was averaged to provide each of the outside information sources with an average synthesis success rate (ranging from 0 to 1). For those sources that were not referenced at all, they were excluded from the record of average synthesis score. The descriptives for both group's average synthesis score per information source is listed in Table 9.

Table 9
Average Synthesis Descriptives

	Missing N	Valid N	Mean	Median	Standard Deviation
Section 50	8	52	0.32	0.00	0.45
Section 51	18	44	0.36	0.00	0.45
Total	26	96			

At first glance, the descriptives for this variable tell a story of the rarity of outside information sources that were successfully integrated or synthesized within the text. For both groups, the means reveal that less than half of the references coded per paper were synthesized within the essays. The counts for this variable are best described using a crosstab table (see Table 10).

Table 10
Crosstab of Synthesis

	No Synthesis (0)	Attempted Synthesis (1)	Total
Section 50	41	19	60
Section 51	40	22	62
Total	81	41	122

While a formal non-parametric test for significant difference between the two groups will be carried out, initial analysis from the descriptives reveal striking homogeneity between the two groups. For the most part, the theme appears to be that, for every attempt at synthesizing an outside information source, there are two instances in which there was no discernable attempt.

To test the variable of synthesis at the appropriate subject level – the individual papers – the variable above was averaged for each paper to deliver a single indicator of a papers' synthesis. For Section 50, the average score per paper was 0.30, and for Section 51 the mean was similar at 0.29.

The second dependent variable that was initially identified based on past research was the frequency of direct quotations. Of the 122 references, directly quoting a source was used as a method to refer to a source 60 times across both groups – 26 times in

papers from Section 50 and 34 times in papers from Section 51. Like most of the other variables in this study, a transformation was required to move this variable from the level of individual reference to the level of interest – the individual essay that is the true subject of the study. Therefore, the dependent variable in question is the percentage of a paper's in-text references that were also direct quotations. This acts as a proportion, which, at the essay level, allows one to observe the degree to which a student relies on direct quotation as a method to introduce outside information. For papers in Section 50, the mean was 13.56% and for students in Section 51, the mean was 10.29%.

The following sections will report on the Mann Whitney U tests of both of these dependent variables across Sections 50 and 51. Additional descriptive statistics and numerical observations from the inductive portion of the content analysis will conclude this chapter.

Hypothesis Testing

Hypothesis 5. Students who received the bibliographic requirement to use peer-reviewed sources will directly quote their outside information sources more frequently than those without the requirement.

The Mann Whitney U test, which is reported below in Table 11, tested the null hypothesis that there is no difference in the distribution of papers' direct quotation percentage across Sections 50 and 51. Three cases were excluded from Section 50 because of the absence of any in-text references.

Table 11
Hypothesis 5 Mann Whitney U Results

Section 50 N	Section 51 N	Section 50 Mean Rank	Section 51 Mean Rank	Test Statistic	Asymptotic Significance
21	20	20.29	21.75	225.00	0.682

With the asymptotic significance greater than the significance level ($\alpha = 0.05$), the results were not statistically significant.

Hypothesis 6. Students who received the bibliographic requirement to use peer-reviewed sources will attempt to synthesize their outside information sources less frequently than those without the requirement.

Restated appropriately for the Mann Whitney U, the following results test whether there is any difference in the distribution of papers' average synthesis scores across Sections 50 and 51. Four cases were excluded from this test because of their lack of any in-text references or, in one case, the lack of a bibliography. The results are reported in Table 12.

Table 12
Hypothesis 6 Mann Whitney U Results

Section 50 N	Section 51 N	Section 50 Mean Rank	Section 51 Mean Rank	Test Statistic	Asymptotic Significance
21	19	19.74	21.34	215.00	0.647

The reported asymptotic significance was greater than the set significance level ($\alpha = 0.05$), therefore, the decision is to retain the null hypothesis and reject the alternative that there is a difference between the two groups' distributions for this variable.

While not an originally-stated hypothesis, to be thorough in answering this line of questions about synthesis, it seemed necessary to also test any possible difference that may exist between the two groups' synthesis of peer-reviewed sources alone. To do so, both samples' information sources were then subdivided into peer-reviewed and non-peer-reviewed. Then, only the synthesis scores of a paper's peer-reviewed sources were used to provide each paper with the average synthesis score of peer-reviewed sources alone. Following the same Mann Whitney U procedures, the resulting asymptotic significance level was 0.176 indicating that there was also no difference between the two groups' synthesis of peer-reviewed sources. The mean synthesis score of peer-reviewed sources alone in Section 50 was 0.20, 0.10 points lower than the mean synthesis when all sources were included. For Section 51 the synthesis score of peer-reviewed sources alone was 0.30 which was only slightly less the mean of 0.33 when all sources were considered. The non-parametric test of difference in distribution was also run on the average synthesis scores for all in-text references and compared between peer-reviewed and non-peer-reviewed sources. The Mann Whitney U returned an asymptotic significance ($\alpha = 0.180$) which indicated no significant difference between students' synthesis of peer-reviewed sources and non-peer-reviewed sources.

Additional Numerical Observations

While the content analysis proposed two deductive hypotheses based on previous research, the question was framed intentionally to allow for a more inductive approach that could draw observations from the data. This kind of analysis is observational rather than inferential or correlational. What follows is a report of numerical observations

collected from the remaining portions of the content analysis that were coded based on an inductive variable identification process.

Engagement categories. In addition to marking whether synthesis was attempted or not on a given in-text reference, the essays were coded to indicate *how* students were synthesizing and integrating these sources. This additional information provides more explanatory power by describing how the students interacted with sources when, in those roughly 30% of instances, synthesis was attempted. There were 41 instances (across both groups) in which an outside information source was coded as a 1 for synthesis. The crosstab in Table 13 reports the frequency with which a certain engagement category was coded for a synthesized information source. The four categories were interpretation/explanation (INTR), reacting (REAC), scrutinizing source (SSCU), and acknowledging scholarly exchange (SCEX). While these categories were not mutually exclusive, only two instances were coded with more than one category of engagement. One case was coded with both the INTR code and the SCEX code, and the other was coded with both the INTR code and the SSCU code.

Table 13
Crosstab of Codes Applied for Engagement Categories

	INTR	REAC	SSCU	SCEX	Total
Section 50	14	3	0	3	20
Section 51	16	4	2	1	23
Total	30	7	2	4	43*

*This total represents the total of codes applied, not the total number of references coded, which would be 41. The discrepancy is due to two cases which received two codes.

In short, the categories for engagement labelled REAC, SSCU, and SCEX were

relatively rare, INTR was the most frequent method by which students engaged with their

information sources. There also appeared to be no discernable co-occurrence between

these categories and whether a referenced source was peer-reviewed or not. The

following crosstab demonstrates this:

Table 14
Crosstab of Engagement Categories by Section and by Source Type

	INTR	REAC	SSCU	SCEX	Total
Section 50 Peer-Reviewed	6	1	0	1	8
Section 51 Peer-Reviewed	12	3	1	1	17
Section 50 Not Peer-Reviewed	8	2	0	1	11
Section 51 Not Peer-Reviewed	4	1	1	1	7
Total	30	7	2	4	43

As demonstrated in Table 14, both course sections' instances of engagement seemed to

remain relatively proportional, and there was no significant co-occurrence that seemed to

stick out from the data. One may notice in Table 14 that more than 100% more codes

were applied to Section 51 peer-reviewed sources than Section 51 non-peer-reviewed

sources. On the other hand, Section 50 non-peer-reviewed sources had only 3 more codes

applied than Section 50 peer-reviewed sources. While this difference was noted, it was

not interpreted as a significant co-occurrence seeing as how it still aligns with what is

known about the proportion of peer-reviewed sources in these sections. Section 51's average paper cited 75% peer-reviewed sources, whereas Section 50's proportion was roughly 50%. The difference in frequencies of codes applied in Table 14, then, are what should be expected given the proportions. The overarching story is the homogenous approach to engagement that seemed to be taken by students who did attempt to synthesize and integrate their sources. For both sections, non-interpretation/explanation categories were postures rarely adopted by students to engage their outside information sources.

Writing behaviors. Two other variables were identified in the emergent variable-identification process – unsupported statements (USUP) and personal opinion statements (OPIN). Unlike the engagement categories, synthesis variable, or count of direct quotations, these codes were not bound to in-text references but could be coded throughout the paper. A third, medium-specific variable is also included in this section – no bibliography entry (NENT). This third variable was coded for instances in which students provided an in-text reference for a source that was not included in their bibliography. The following crosstab reports the frequency of these codes across all papers for both Sections 50 and 51 (see Table 15).

Table 15
Crosstab of Writing Behavior Codes

	USUP	OPIN	NENT	Total
Section 50	37	21	13	71
Section 51	37	20	2	59
Total	74	41	25	130

Noticeably, the instances of unsupported statements and opinion statements appeared with relatively similar frequency in both course sections. The code that did not appear as similarly across both groups was NENT (no bibliography entry). However, in comparing the percentage of papers from each section that received these codes at least once, the share for the code NENT becomes slightly more similar, suggesting that some papers in Section 50 received this code multiple times, thus skewing the count. In fact, the percentage of papers that received the NENT code at least once was 25% for Section 50, only slightly higher than Section 51's 11%. This comparison of percentages is displayed in Figure 7.
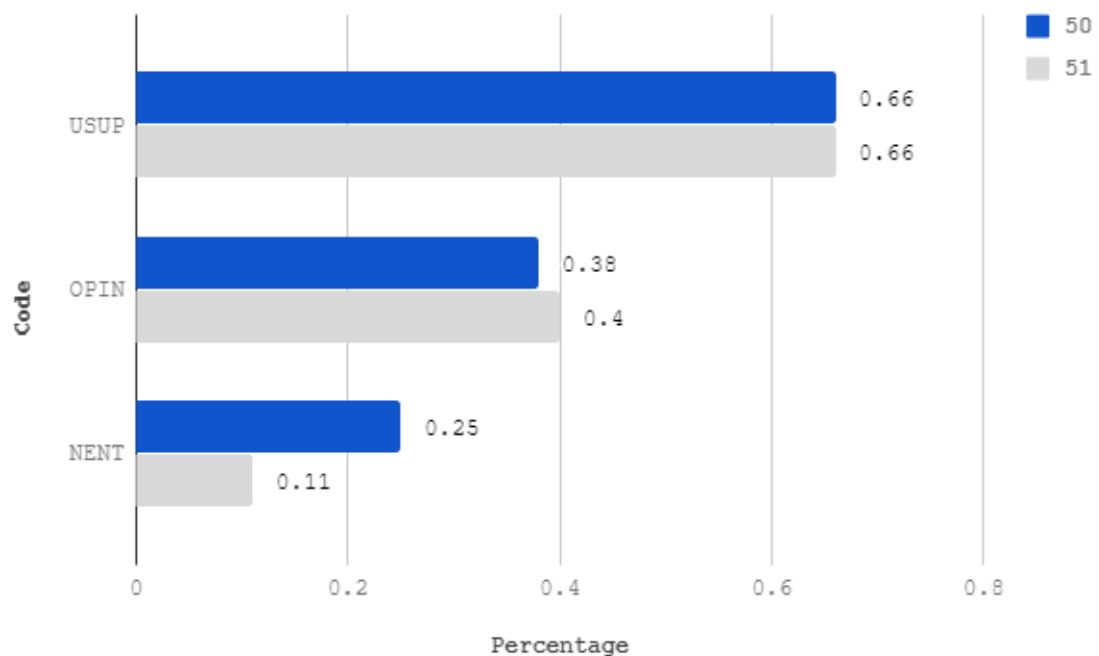

Figure 7: Percentage of papers that received additional codes

An examination of Figure 7 reveals the common occurrence of unsupported statements within students' essays for both sections. A majority 66% of students in both sections had an unsupported statement at least once in their essay, with a maximum of seven instances in a single paper reported for both sections.

As described in Chapter III, co-occurrence counts, scatter plots, and Jaccard's Index were used to discern any possible monotonic relationship between variables so as to indicate whether further correlational tests were warranted or viable. In all, there was no such discernable relationship. The most related co-occurrences were between direct quotations and synthesis, unsupported statements and opinion statements, and unsupported statements and direct quotes. Direct quotations and synthesis co-occurred 23 times, which represents a 22% overlap. Unsupported statements and opinion statements co-occurred 29 times, which represents a 25% overlap. Unsupported statements and direct quotes co-occurred 30 times, which represents a 23% overlap. These observations did not provide strong enough evidence of a monotonic relationship that would be required for formal tests of correlations.

Summary of Results

This study called for a two-part analysis of students' citations and the content of their papers. The study analyzed 44 documents in all, 24 from the control group, course Section 50, and 20 from the experimental group, course Section 51, which received the bibliographic requirement to use peer-reviewed sources. Descriptive statistics found that, in all, students cited 117 outside information sources. The average number of sources per paper was 2.79 for Section 50 and 2.50 for Section 51. Of those 117 sources, 76 were

peer-reviewed. In Section 50, the average bibliography was made up of 56% peer-reviewed articles whereas the average Section 51 bibliography was 75% peer-reviewed sources. 129 in-text references to outside information sources were counted in the papers. 60 of those references were found in Section 50 and 69 in Section 51. On average, Section 50 students referred to an outside information source 0.91 times, and Section 51 students referred to an outside source 1.22 times.

The content analysis also coded these references for synthesis. Overall, only 41 in-text references to outside information sources were coded as having attempted synthesis. The average synthesis score for Section 50 papers was 0.32 and, for Section 51, the average score was 0.36. The number of times students relied on direct quotations was also counted. Of all the in-text references, direct quotation of outside material was used 60 times – 26 times in Section 50 papers and 34 times in Section 51 papers.

The citation analysis revealed statistically significant differences between Sections 50 and 51 regarding the percentage of peer-reviewed articles in their bibliographies and the frequency with which they referred to those peer-reviewed articles in the text of their essays. In both cases, students from Section 51 cited a greater proportion of peer-reviewed sources in their bibliographies, and they referred to those peer-reviewed sources more frequently in their essays than their peers in Section 50. The analysis, however, revealed no significant difference in the total number of sources cited nor the frequency of in-text references for all sources (peer-reviewed and not).

The content analysis revealed no significant difference between the two sections' synthesis of outside information sources nor their reliance on direct quotations.

Furthermore, additional coding revealed common themes that describe how the students in the study were writing about and using their information sources. Of the 41 instances that synthesis was attempted, the preferred method of integrating or engaging with the outside information source was to interpret or explain the information. Other ways of engaging with a source – such as reacting to it, scrutinizing it, or placing it within the scholarly exchange – were noticeably less common methods. Other writing behaviors, such as unsupported statements and opinion statements, were also coded. The presence of unsupported statements was noticeably common across both sections. For both Sections 50 and 51, this code appeared in 66% of papers. Opinion statements were the next most frequently occurring with it appearing in 38% of Section 50 papers and 40% of Section 51 papers. Instances in which students referred to a source but failed to provide an entry in their bibliography occurred 13 times in Section 50 papers while only occurring 2 times in Section 51 papers. Last, among these variables from the content analysis, examination of co-occurrence revealed no discernable relationship among them that would merit further correlational analysis.

CHAPTER V

DISCUSSION

This study arose as an attempt to revisit earlier research that recommended

mandating peer-reviewed sources to improve students' bibliographies and written

research (Davis, 2002; Davis, 2003; Robinson & Schlegl, 2005; Baberino, 2004). The

study's two-part design aimed to, in the first phase; replicate these citation analyses to

test again whether these mandates truly impact students' citation behaviors. The second

phase aimed to extend these earlier studies by incorporating the theories and methods of

more contemporary information literacy scholars who found that, regardless of

bibliographic skill, students struggle to synthesize and use their sources in a meaningful

way (Rosenblatt, 2010; Carlozzi, 2018; Jamieson, 2010; Hyytinen, H., Löfström, &

Lindblom-Ylänne, 2017). To both replicate and extend earlier research questions about

the impact of mandating peer-reviewed articles for undergraduate students, this study set

out to answer the following questions: Does explicitly requiring the use of peer-reviewed

sources impact the bibliographies and citation behavior of students? How do students in

both groups (those with the requirement and those without) utilize the information

sources within their essays?

Findings

The results of this two-part citation and content analysis for the students enrolled

in the two undergraduate courses studied, describes what sources these two groups of

students included and how they integrated them into their essays when a mandate for peer-reviewed articles was either imposed or loosened. The study provides useful replication of research that is over a decade old, and it updates the conclusions of previous research with new information about how the students in the study are using their sources within their essays. Six initial hypotheses were proposed before data collection:

H$_1$. Students who received the bibliographic requirement to use peer-reviewed sources will cite all of their individual sources less frequently within the body of their essays than those without the requirement.

H$_2$. Students who received the bibliographic requirement to use peer-reviewed sources will cite their peer-reviewed sources less frequently within the body of their essays than those without the requirement.

H$_3$. Students who received the bibliographic requirement to use peer-reviewed sources will cite fewer sources overall than those without the requirement.

H$_4$. Students who received the bibliographic requirement to use peer-reviewed sources will cite the same percentage of peer-reviewed sources as those without the requirement.

H$_5$. Students who received the bibliographic requirement to use peer-reviewed sources will directly quote their outside information sources more frequently than those without the requirement.

H$_6$. Students who received the bibliographic requirement to use peer-reviewed sources will attempt to synthesize their outside information sources less frequently than those without the requirement.

In addition to testing these six hypotheses, the inductive variable identification process utilized for the content analysis allowed for a richer description of how students integrated outside information sources by categorizing engagement into four categories – interpreting/explaining, reacting, scrutinizing, and acknowledging scholarly exchange. Students' writing was further described by coding for unsupported statements, opinion statements, and when students failed to provide a bibliographic entry for a source they cited. The citation analysis reaffirmed the findings and suggestions of Robinson and Schlegl (2004, 2005) by uncovering a significant difference in the citation behavior of students who received the bibliographic requirement versus those that did not. The content analysis, however, revealed relatively homogeneous results that cast doubt on the bibliographic requirements' ability to serve as a relevant tool to support renewed, contemporary information literacy goals.

In-Text Citation Frequency

The findings in this study echo Jamieson (2013) and Carlozzi's (2018) concern about the low frequency with which the students referred to the sources in their essays. The average frequency was around once – 0.9 and 1.2 for Sections 50 and 51, respectively. When only measuring frequency of in-text references for peer-reviewed sources, however, the mandate showed some promise. Students in Section 51 (the course section required to use peer-reviewed sources) referred to their peer-reviewed sources

significantly more than their peers in Section 50 referred to their peer-reviewed sources. The average peer-reviewed in-text citation frequency was 0.15 less than the combined average. The average peer-reviewed in-text frequency for Section 51, on the other hand, was a 0.11 increase over its combined average.

What this suggests is that the bibliographic requirement was successful in improving the experimental group's use of peer-reviewed sources while students without the requirement seemed to become even more lackadaisical in their use of peer-reviewed sources than they were with all their sources combined. Both means still provide little comfort in that they still suggest that, on average, the students used their sources (peer-reviewed or otherwise) only once. While there was a significant difference in both groups' in-text citation frequency of peer-reviewed sources, the improvement found in Section 51 does not dismiss the concerning infrequency with which students utilize and integrate outside information into their research.

Number and Type of Sources

Hypotheses three and four were directed at retesting the suggestions that the mandate to use peer-reviewed sources will increase the number of sources cited and will improve the bibliographies by increasing the proportion of peer-reviewed sources cited. There was no significant difference in the number of sources that either group cited, but it was notable that both groups' means (2.79 for Section 50 and 2.50 for Section 51) remained closely aligned with the minimum of two to three sources set by the instructor. These results also reaffirm Robinson and Schlegl's (2004) findings that the bibliographic requirement was not effective at improving the overall number of citations.

Contrary to the initial hypothesis in this study, the experiment corroborates the conclusions of Davis (2003) and Robinson and Schlegl (2004) in that students who received the requirement to use peer-reviewed sources did cite a significantly greater proportion of peer-reviewed sources. While the difference was significant, it is worth noting that, even without the explicit mandate, the average bibliography for students in Section 50 was made up of 56% peer-reviewed articles, compared to the 75% in Section 51. What the percentage from Section 50 demonstrates is that, most of the time, students not given explicit mandates to do so still deemed peer-reviewed sources to be the most appropriate format for their information needs. The control group's 56% composition of peer-reviewed sources might reflect messages that students have already received about the expectations of college-level research outside of this experiment in other classes, high school, or even from library instruction. This is a question left unanswered from this study's results. On closer examination, these numbers are not far from the results of Robinson and Schlegl (2005), who reported a 14% difference between the control group and the group with the bibliographic requirement. With a 19% difference between the two groups' means, this experiment received arguably more promising results for those who promote the use of bibliographic requirements to increase the use of peer-reviewed articles. This promise is extended by the fact that students in this experiment not only cited more peer-reviewed sources in their bibliographies when they were required to do so, but they also used them more in their essays than their peers without the requirement. In this instance, the benefit of the requirement was two-fold, and not detrimental to the bibliographic outcomes as initially hypothesized.

Direct Quotations

While this study found the usage of direct quotes to be a common occurrence, the data do not seem to warrant much alarm. 50% of Section 50 papers used direct quotes at least once, and 65% of papers in Section 51 used the method at least once. When analyzing the proportional use of this method (the number of times it was used in a paper divided by the number of in-text references), the numbers begin to look less drastic. On average, only 10.29% of in-text references in Section 50 were introduced using direct quotations. This was found to be similar to the results in Section 51, which had a mean of 13.56%. If direct quotations are considered an indicator of low-level compositional skills or synthesis, then the bibliographic requirement, on this front, appeared to affect little to no difference on students' integration of their sources. While not the intended outcome of the inclusion of this variable, its presence in this experiment did cast doubt on the variable's validity as an indicator of synthesis. Notably, when variables from the content analysis were analyzed for co-occurrence, there were no significant monotonic relationships — this includes the relationship between number of direct quotations and synthesis score. If the use of direct quotes were a valid, negative indicator of students' higher-order rhetorical and information-use skills, one might expect a co-occurrence in this sample to emerge between direct quotations and scores of 0 for synthesis. This was not the case, and, in fact, a number of synthesized references were directly quoted themselves. So, while this variable was included because of its previous use as an indicator of compositional skill, it neither proved to differ significantly among the tested groups nor did it prove to be a very useful or valid indicator.

Synthesis

First and foremost, comparisons of the two groups' distributions of average synthesis score revealed no significant difference between the two groups. What this suggests is that, while the bibliographic requirement did alter aspects of students' bibliographic behavior, its influence stopped there. The results do contradict what was originally hypothesized that the bibliographic requirement would be detrimental to students' synthesis. This was also not the case. The results corroborate the findings of Rosenblatt (2010) and Carlozzi (2018), who were alarmed by the rarity with which students synthesized or integrated their sources. The results from this experiment were very near Carlozzi's results, which found that over half of the sources were not synthesized at all. The results from this study were slightly more severe with 68.3% of Section 50 references and 64.5% of Section 51 references showing no signs of synthesis.

Ultimately, this experiment adds to Rosenblatt and Carlozzi's observations of their students. This affirms that the problem of synthesis was not unique to their students, but it is now documented as a problem for the students involved in this study. Without, yet, any widespread analysis of students' writing and synthesis skills, localized studies like this one add to a collection of librarians, instructors, and researchers' voices that are raising concerns about their college students' abilities to properly integrate and synthesize outside information. In short, this study observed that both groups of students struggled to synthesize and use their sources in a meaningful way. Yes, the students with the bibliographic requirement did use their peer-reviewed sources more, but, when it

came to them synthesizing and incorporating those sources into their research, they were no better off than their counterparts.

Authors like Davis and Robinson and Schlegl contained their analysis to student bibliographies, and they appeared pleased with the effectiveness of the bibliographic mandate's ability to maintain library collections' pride of place in student research. So, while this study's citation analysis results certainly support their findings, the results concerning synthesis call into question the practice's overall relevance in supporting contemporary information literacy goals. A recognition of more recent conceptions of information literacy and librarianship should force one to question whether these results still demonstrate much value in mandating peer-reviewed sources.

Is poorly-synthesized research dressed-up with academic-looking bibliographies a pleasing enough result for the practice to stick around? With a broad and rich definition of information literacy offered by the *Framework*, it would be hard to suggest that it is good enough that students' research look like academic material without having any of the substance. While bibliographic skills are still essential elements to information literacy, the alarming lack of synthesis and diversity of engagement are much more pressing concerns if librarians and instructors are to rise to the ACRL's challenge to train active "…contributors to the information marketplace" (2015, p. 6).

Furthermore, students in Section 50, who used significantly less peer-reviewed sources, still struggled to synthesize their arguably more accessible information sources. In fact, the findings revealed that, when testing the synthesis of peer-reviewed references versus non-peer-reviewed synthesis, there was no significant difference. This means that

students in both groups were no more successful synthesizing non-scholarly sources than they were synthesizing academic, peer-reviewed sources. This fact echoes French (2004) and MacMillan and Rosenblatt's (2015) concern that the challenges in synthesis may indicate more foundational issues in students' reading level regardless of format. If this is the case, then imposing peer-reviewed mandates may be a foolhardy move that ignores the need for more foundational information literacy and developmental reading intervention. If this is true, it may suggest that librarians and instructors need to meet students where they are; working from non-academic, popular sources to address more basal concerns. These results concerning synthesis should challenge practitioners to question whether bibliographic mandates are simply a distraction from the deeper difficulties students are facing as they conduct research and write with outside information sources.

If altering the composition of students' bibliographies has no discernable effect on the written research that students produce, advocates of this practice should be asked *why* they are defending these mandates. Patterson (2009), for example, may suggest that advocating for these kinds of bibliographic mandates in the face of little evidence that they improve overall student scholarship may be yet another example of how academic librarians risk mirroring their ancient and ritualistic ancestors at the library of Nippur. Like the ancient library which collected and sanctified texts, in the face of these results, to suggest that the mandate is still worthwhile could be interpreted as doing so for the sake of maintaining the power of the collection rather than the benefit of the student –

ensuring the use of library-approved sources rather than focusing on the deeper academic needs of students.

Additional Observations

      Engagement categories. With the inclusion of engagement categories, the infrequent instances of synthesis were classified to better describe how students integrated their sources. This step revealed a homogenous approach. Out of the four categories, interpreting/explaining a source was the most frequent. Less frequently did students react to information, scrutinize it, or write about a scholarly exchange happening between information sources. Here, Bizup's (2008) BEAM typology might prove useful in interpreting the results. Students frequently integrated outside information and facts by explaining how these sources fit their conclusions or served as evidence. This type of engagement is characteristic of Bizup's exhibit category by which information is merely integrated as a piece of evidence. The remaining three types of engagement – in which students face the source directly to insert themselves in dialog with it – were less common and more closely aligned with the argumentative approach described by Bizup. As with Bizup's BEAM, this is not a value judgement on which approach is better, but, if one follows the lead of the ACRL's *Framework* (2015), then the information literate student should be an active participant, inserting herself in the ongoing scholarly communication. The observations from this study, therefore, suggest that, while there was some success in properly synthesizing sources, deeper analysis of the ways these students wrote about their sources reveals a concerning lack of variety and dialog in those instances of engagement.

Writing behaviors. This study's inclusion of additional, emergent variables related to writing behavior provided another useful insight into how students were approaching their research. Unsupported statements appeared frequently in the data — occurring at least once in 66% of papers in both Sections 50 and 51. The presence of an unsupported statement could be understood as a failure to recognize an information need or when the inclusion of citations is necessary, both of which are essential skills for information literacy (ACRL, 2015). While this study was primarily focused on synthesis as an indicator of information literacy, this emergent variable illuminated another facet of information literacy that may have been deficient in the sampled papers and not fully assessed by the deductive measurement methods. In a way, this acted as a diagnostics test of the assessment method's ability to properly assess the many components of information literacy, and this adds to the realization of just how challenging authentic assessment can be when dealing with such a broad, multilayered skillset like information literacy.

The inductive method, however, was able to highlight the frequent occurrence of unsupported statements, and this added to the study's understanding of another way, beyond synthesis, that students in the sample displayed an alarming information literacy deficiency. Like the infrequency of synthesis, the frequency of unsupported statements indicated a failure on the part of the student to know when and how to incorporate outside information into her/his essay. This observation was troublesome because it suggests that, while synthesis was the primary aim of this study, these students' information-use challenges did not stop there. With over 60% of documents in this sample containing an

unsupported statement, students' identification of information-needs and when to support claims with reputable evidence may be just as pressing as their inability to synthesize sources. Just as Rosenblatt's 2010 observations called attention to their students' difficulty in synthesis, this observation suggests a possible need for more investigations into students' identification of information-needs.

The same could be said of the presence of in-text citations that lacked bibliographic entries. While less frequent than unsupported statements, they did occur and, again, indicate a clear failure to practice the proper attribution skills outlined in the *Framework*. While the citation analysis in this study did not include measures of proper citation format and application, the presence of bibliographic missteps (like missing bibliographic entries for in-text citations) might suggest that this was a mistake and that the breadth of the assessment limited the ability to assess particular information literacy facets with depth.

Last, opinion statements emerged from the content analysis with some frequency — occurring in 38% and 40% of papers in Sections 50 and 51, respectively. While this linguistic marker did not appear to differ between the two groups, its lack of co-occurrence with synthesis does cast some doubt on Kanter's (2006) use of the variable as a valid indicator for engagement. It is possible that this linguistic marker indicated the students' engagement with their research topics as Kanter suggested, but it did not prove to be an effective indicator or the students' engagement with their information sources in this study.

The observed homogeneity across both groups' writing behavior variables provides an insight into the reach that the bibliographic requirement had in this experiment. It seems as though, once analysis passed from the first phase (citation analysis) to the second phase (content analysis), the differences between the two groups ceased. In fact, the overarching observation from the content analysis was the striking similarity between the two groups on all fronts. What this ultimately suggests is that bibliographic requirements had very little power to penetrate and positively affect the sampled students' writing and information-use as a whole. Instead, the picture painted by this study's results is one in which the practice is a tool confined to its ability to increase students' inclusion of 19% more peer-reviewed articles and to increase the frequency with which the students referred to those sources in their essays. On all other fronts — synthesis, engagement, and writing behaviors — the bibliographic requirement seemed unable to affect any improvement (or cause any harm) within the sample of student essays. Furthermore, the additional findings regarding synthesis and the presence of unsupported statements reaffirms the concerns of Rosenblatt (2010) and Carlozzi (2018) that there are more pressing challenges in students' ability to properly use sources and develop strong written research.

Significance

The purpose of this study was to replicate and extend earlier quasi-experimental research that analyzed differences in student outcomes between groups that received bibliographic requirements to use peer-reviewed research versus those that did not. It replicated previous research in that it revisited the same questions about the effectiveness

of the requirement to significantly increase students' citation and use of peer-reviewed

articles. It extended previous research by adding a new component – content analysis –

that examined the essays themselves to determine if that difference carries over into in

the way students integrate sources and engage in their written research. The significance

of the study is three-fold:

- Much of the experimental research that has analyzed the implementation of

  these bibliographic requirements is now over a decade old. Replication is an

  important part of our scientific process and testing these questions again (in a

  new era with a new sample of undergraduate students) helps to determine

  whether the initial conclusions remain true in this instance.

- The initial recommendations for peer-reviewed mandates stopped short at the

  bibliographies. This study extends the vision of earlier experiments by

  analyzing how students in this sample synthesized the sources they found.

  This extension adds to a body of literature in information literacy research that

  focuses on students' ability to synthesize sources rather than concerns about

  them finding or citing the right type and number of sources. This new iteration

  of the earlier experiments, therefore, updates the initial conclusions to address

  whether the bibliographic requirement had any impact on addressing newer

  priorities about the sampled students' information source synthesis and

  integration.

- A deeper analysis of the content of the students' essays adds to localized

  observations of how some students integrate outside information sources into

their written work. These observations serve as a kind of diagnostics test, providing observational data about other challenges the students in this sample faced in their written research assignments and that may merit closer examination in future research.

Limitations

Although the quasi-experimental design of this study limits its ability to generalize its conclusions outside the population of students enrolled in the courses targeted for this study, its results do affirm the findings of previous studies which, employing a similar quasi-experimental and purposive sampling design, were also unable to generalize beyond their given population (Robinson & Schlegl, 2004; Rosenblatt, 2010; Carlozzi, 2018). While unable to transfer the conclusions directly to other populations, there is some reassurance in the fact that this study rendered similar observations about the effect of the bibliographic requirement and the students' synthesis and writing behaviors as studies, which took place in noticeably different locations, contexts, and times. While still limited, this growing body of localized, quasi-experimental results seems to point to common themes in undergraduate research and writing that are not necessarily specific to one university or even one particular decade.

The other limitation to this study, which was already alluded to in the last section's discussion of additional writing behaviors, is that the two forms of assessment are, by no means, a perfect assessment of information literacy. As discussed in the review of literature, information literacy is a complex, multifaceted concept with a history of diverse assessment methods. So, while limited in its ability to possibly address every skill

and disposition associated with information literacy, this two-part assessment model was able to balance a temptation to either focus assessment entirely on bibliographies and citation behavior or entirely on information source integration. In so doing, the study was able to provide results about both the students' bibliographic behaviors and their use of information sources — both essential aspects of information literacy in the *Framework* (2015). The tradeoff, however, is that some aspects of bibliographic skills (such as proper citation format) and information-use (such as hearing directly from the students about how they decided to use certain sources) were too far beyond the time and scope limitations of this assessment. In this assessment model that aimed for breadth, it seems as though depth was naturally sacrificed in the process.

Finally, like its predecessors, Robinson and Schlegl (2004), Rosenblatt (2010), and Carlozzi (2018), this study relied on the assumption of general homogeneity among students enrolled in different sections of the same course. The educational setting, unlike a laboratory, does not lend itself to complete control of confounding variables. With more resources and time, additional obtrusive measures of data collection, such as comprehensive surveys, could attempt to collect background information on the students – information about past experiences with research or the library and data on their educational achievement and history. This would have allowed for statistical control of confounding variables. These obtrusive data collection measures, however, were not possible, and this does leave some serious questions as to whether another variable besides the bibliographic requirement was to blame for the between-group differences observed.

Future Research

The previous section closes with an allusion to the first recommendation for future research — a replication of this experiment with the addition of a comprehensive survey to collect and control for potential confounding variables. This, coupled with larger sampling, would allow for more definitive conclusions about the effectiveness of bibliographic requirements.

The observations and results from the content analysis also left several questions looming about students' synthesis and integration of their sources. While the content analysis revealed that the students in the sample struggled to synthesize the sources and that they rarely ventured to use their information sources in more argumentative ways, it does not answer *why* students were struggling with synthesis. Maybe it is, as French (2004) and MacMillian and Rosenblatt (2015) suggested, that students simply struggle to read college-level sources and, therefore, struggle to synthesize it. Whatever the case may be, the observations from this study seem to affirm the concerns of other researchers and librarians referenced in this study, and it simply adds to the red flags about undergraduate students' poor integration of outside information sources. The next, most productive question may not be whether students struggle with synthesis, but how librarians can support students and instruction faculty to improve students' synthesis of sources.

Last, what was learned from this study is that the papers analyzed did increase their use of peer-reviewed sources when required to do so, but no additional, significant differences emerged. While French (2004) offers some reasons why faculty members

might impose these mandates, additional research would be helpful to learn from faculty members themselves why they impose (or do not impose) mandates for peer-reviewed articles. For academic librarians, knowing the reason why faculty members include such parameters might help them to inform their decisions about recommending the practice. What differences are instructors hoping to see from imposing these kinds of mandates? For example, concerned about the requirements being a distraction from the more important skills of synthesis, Holliday et al. (2015) reported that they began recommending to instruction faculty that they suspend such mandates. While not an outrageous assumption, this nonetheless assumes that instructors have the same information literacy priorities in mind when imposing these mandates. Knowing what motivates instructors' imposition of these requirements may help librarians to enter more productive dialogs with instructors about realistic expectations of the practice's capabilities to support their instructional goals.

Last, the discovery of the how often students included unsupported statements in their essays adds an additional concern to the already-stated worries about synthesis. 66% of students in this sample included an unsupported statement at least once in their essay. These statements reflect a failure to recognize an information need and when it is necessary to support ones' research with outside information sources and reliable evidence. While not the focus of this study, this observation warrants additional investigations. It may be productive to investigate how students understand their information needs and how they decide what warrants outside evidence. While the issue of how students synthesize information is still pressing, the presence of unsupported

statements in this sample seems to suggest that students' information-use challenges go even deeper than synthesis.

Final Reflection: Learning to Swim in a Sea of Information

Reconsider the allegory of learning to swim. How did the 44 undergraduate students included in this study perform in the waters of their research? 24 of them were thrown into the sea with few clear boundaries. They waded into the surf with whatever instruction they received previously and some suggestions from their instructor, but, ultimately, it was up to them to decide where they went, and which parts of the water were ideal. The other 20 were set in a pool with clearly-defined boundaries. They knew where to go to get into the water, and the pool's boundaries ensured that, at the very least, they would swim in reliable waters — not out in the open ocean of the internet where authority and reliability are not so clear. The walls of the proprietary library databases kept them safe as they practiced their swimming.

In this experiment, however, what we learned was that not even the confines of the peer-reviewed mandate were able to help students keep their heads above the water of information. While students with the mandate to use peer-reviewed sources were finding information where we expected them to, it did not help them use their information any better than their peers without the requirement. If the goal was to teach the students to swim, that is, to effectively and meaningfully use information, they struggled to do so irrespective of the requirements imposed on them about where they may seek information.

With this in mind, the primary question that lingers is, "Why bother?" Certainly, in this case, to say that the bibliographic requirement improved the overall quality of students' written research would be an outlandish claim given the results. If anything, all the requirement seemed to do was dress-up students' poorly-synthesized research into more scholarly-looking research with bibliographies chalked full of peer-reviewed sources. Why force students to find and cite sources if they do not engage and use the information in a meaningful way? Is it, as Patterson (2009) suggested in the comparison to the ancient library at Nippur, that it is a mechanism of academia and librarianship's own information power structure? Is it a practice that simply privileges products of academia's own labor – ritualistically molding students' bibliographies after our own image?

If, however, the substance of students' research is a priority, bibliographic requirements might just be an ineffective distraction from more pressing pedagogical concerns – fairly limited vestiges of a former citation obsession. In keeping with the allegory, this may mean that librarians and instructors need to suspend their own expectations about what parts of the expanse of information students should be allowed to tread in, so that they can jump in and save students that are simply trying to stay afloat in a sea of information. The central questions posed by this allegory and worth taking to heart are: Do these mandates reflect an instructor's fixation about *where* students are allowed to swim, and do they risk clouding the more alarming fact that the students cannot swim?

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APPENDIX A

Citation Analysis Checklist

Citation Analysis Instructions and Checklists

Each essay's bibliographic entries will have an entry on the record sheet, ordered in the way they appear in the students' bibliography. Each bibliographic entry will be described using the following criteria:

Scholarly/Peer-Reviewed   (Robinson & Schlegl, 2004) (Rosenblatt, 2010)
- A journal article (either print or electronic) will be classified as peer-reviewed or scholarly if it is determined as such using *Ulrich's Periodical Directory* **or** is determined as such using an academic database (such as EBSCO, JSTOR, or an institutional universal discovery such as Primo Ex Libris).

- A book is considered to be scholarly if its *WorldCat* record shows that the text includes reference list or bibliography.

- All other materials (such as websites) will be deemed scholarly if it meets the following criteria

    - The item was a reprint of an article or source that would classify as scholarly following the above criteria **OR**

    - The URL domain name ends with .gov or .edu **AND**

    - The author can be easily determined **AND**

    - A bibliography or reference list was made available in the text of the item.

Number of Times Cited within Text (Jamieson & Howard, 2011)
This count refers to the number of individual instances in which the student directly cites the bibliographic entry within his or her essay. It should be thought of as a "signpost" embedded in one text and pointing to another. The signpost can come in one or more of the following forms:
a.   A signal phrase: Lincoln charges the living to continue the fight waged by the dead.

b.   A parenthetical citation: The living must continue the fight waged by the dead (Lincoln).

c.   A footnote or endnote: The living must continue the fight waged by the dead[2]

NOTES
*This citation analysis is not concerned with proper formatting of sources.
* If a paper is missing a reference page or bibliography altogether, this fact is not recorded in the citation analysis phase. Only present bibliographic entries will be coded for the purposes of this phase. Missing bibliographies will be noted in phase two.
* This phase is only concerned with analyzing present entries in a bibliography. If the rater notices that a paper has an in-text reference with no associated reference in the bibliography, this fact will not be recorded in the citation analysis phase. It will be noted in phase two.
* Sources that are already given in the assignment topics will be coded with an **REQ** marked in the rater's notes. This will allow for these sources to be bracketed out later in analysis.

APPENDIX B

Content Analysis Record Sheet

PAPER ID: _____

Missing Bibliography: YES ▢   NO

CODES FOR PAPER AS A WHOLE

Code	Total Count for Paper
Total number of **Annotated References** (in-text citations)	
How many **Annotated References** (in-text citations) are **Direct Quotes**:	
Total number of **No Bibliographic Entry**:	
Opinion [OPIN]	
Unsupported Statement [USUP]	

CODES FOR ANNOTATED REFERENCES

Annotation	Bib. Entry ID	Synthesis Attempted? (1 or 0)	Codes Applied

APPENDIX C

Codebook

Needed Definitions:
1. The term **reference** or, more specifically, **annotated reference** refers to an in-text citation that, in phase one of the analysis has already been counted and identified. By phase two, these references should already be annotated in the body of the document with an annotation number and the bibliographic entry ID to which the in-text reference refers.
   a. Only annotated references from phase one will be analyzed for synthesis/engagement during phase two

Part 1 : Codes Applied to Paper as a Whole

Codes are in red followed by their abbreviations in **[brackets]** and their definitions below.

Direct Quote [DIRQ] is defined as a reference that is:
1. copied exactly **and** marked as quotation (either by using quotation marks or by block indenting).
1. If a word or punctuation is miscopied, the passage should still be marked as a direct quote.
2. If square brackets or ellipses have been used to indicate additions or deletions, the passage should still be marked as a direct quote.

- The coding sheet will simply ask for the total number of direct quotes present in the paper
- ONLY **Annotated References** will be analyzed and coded for DIRQ!

 *NOTE: there may be some cases in which a student directly quotes from a reference but does not include proper quotation marks or block indenting to indicate as such. If a sentence seems like a direct quote, the coder should check for this by reviewing the original source. Searching a keyword or phrase from the reference using a browser's find function will aid in this process. If it **is a direct quote** but not quoted or indented, still code as **DIRQ**.

Missing Bibliography [NBIB] is noted when a paper has no attached reference page or bibliography. This should only be coded once per paper and should be coded in a blank space on the last page of the essay.

No Bibliographic Entry [NENT] is noted when a paper contains an in-text citation that does not have a corresponding entry in the bibliography. This does not have to be an annotated reference. It can be any in-text citation that doesn't have an entry in the bibliography.

- This should be any in-text citation (not just annotated references) that comes in one of the following forms:[1]
  - A Signal Phrase. Ex: Lincoln charges the living to continue the fight waged by the dead.
  - A Parenthetical Citation. Ex: The living must continue the fight waged by the dead (Lincoln).
  - A Footnote or Endnote. Ex: The living must continue the fight waged by the dead.[2]

- Do note code sources for NENT if the paper is also coded as NBIB.

Unsupported Statement [USUP] is defined as a statement (usually one to two sentences) in which a fact or exhibit is presented but the author provides no citation or reference to corroborate or support the statement.

1. This does not include statements that could be considered common knowledge either to the general public or within the context of the essays (a college-level political science course).
2. While not exclusively the case, these statements may come in the form of broad, debatable generalizations, or in the form of statistics that do not receive any cited evidence to support the claim.
3. Before coding a claim as USUP, double-check that the claim isn't supported later on in the narrative of the text. For example, some claims are made at the beginning of a paragraph or paper (similar to a thesis statement), but authors later go on to corroborate or support that claim by a narrative of supported evidence.
4. In general, this code is applied to statements where students state something as fact that really should have been supported by outside evidence and a citation.

Personal Opinion [OPIN] is defined as any sentence or clause in which the
student clearly states her or his own personal opinion. These phrases must be in
the subjunctive tense and signaled by the words or phrases: *should, must, I believe, I think*.

The coding unit for OPIN is any sentence that appears in the paper (it does not have to be an annotated reference)

Part 2: <u>Synthesis/Engagement</u>

> Codes are in red followed by their abbreviations in **[brackets]** and their definitions below.
>
> The <u>coding unit</u> for each of these is a single **annotated reference**. Each annotated reference in a paper will undergo the following analysis steps and be coded accordingly.
>
> **STEP 1: Determine Synthesis Attempt**
>
> **Synthesis Attempted? [YES (1) or NO (0)]**
> This is a binary, nominal variable. Either synthesis an outside information source was clearly and discernibly attempted (1), or it was not (0).
>
> **YES (1)** is applied to an annotated reference when the information from a sources is used with some clear interpretation or analysis by the student. There is a clear or at least clear *attempt* on the part of the author to make a connection between the reference and the author's overall argument or with the source and other information sources. When authors attempt synthesis, the author usually uses the source information to create something new or to add to new conclusions. In short, a reference given a 1 for this step will also likely have at least one code applied to it in Step 2.
>
> - If a reference receives a 1, proceed to Step 2
>
> **NO (0)** is applied to an annotated reference when there is no clear attempt on the part of the student to synthesize or integrate the information from the outside source. This will often come in the form of the author simply quoting or using the outside source as evidence or a "stand-in" for a student's own claims or words. In some cases, the author may simply use the conclusion or words of the outside source as his or her own. No analysis or new conclusions or created by the author in using these unsynthesized sources. These references might also appear in isolation or appear abrupt with little or no discernable connection. They may feel like pieces of evidence or a quote simple "thrown" or "sprinkled" into the paper.
>
> - If a reference receives a 0, do not proceed to Step 2
>
> **STEP 2: Type of Engagement**

An annotated reference that received a 1 in Step 1 can receive one or more of the following codes:

Explanation/Interpretation [INTR]: is coded when a student provided some further explication of the information cited from the source. This can come in the form of explaining how the source relates or supports the argument, explaining or breaking down the information cited, or even provided his or her own interpretation of the information referenced.

Reacting [REAC]: is coded when a student responds to an argument or piece of information cited. This type of engagement can best be characterized as the author seemingly entering a conversation with the outside source's author by either affirming their statement, judging the statement, refuting the statement, or even asking follow-up questions of the statement.

Scrutinizing Source [SSCU] is coded when the student critical analyzes the claims of an outside information source they have referenced in an annotated reference. This can be:
1. Questioning the currency. The author points out the date of the publication as a way of acknowledging that it's claim might no longer be current
2. Questioning the authority. The author points out that the source is not reliable or unknown and acknowledges that this should cast doubt on the claims made.
3. Questioning the accuracy. The author points out the methods in which the source comes to its conclusion (e.g. problematic sampling).
4. Questioning the purpose. The author cast doubt about the objectivity of the source's author. The author acknowledges that there may be inherent bias in the source which should cast doubt on its claims.

Acknowledging Scholarly Exchange [SCEX] is coded when a student writes about outside information sources in such a way that recognize "...source authors as people" (Kanter, 2006, p. 279). This is usually seen by using signal phrases that name the authors and introduce the reference not as a mere "faceless" piece of information but as one that comes from an author, a person, and introduces it in a way that acknowledges the ongoing scholarly exchange of which this reference is a part.

This form of engagement identifies conversations among information, and can also come in the form of a student comparing one source to another by way of drawing similarities between the reference in question to another source's argument or by pointing out how the reference casts doubt or complicates another source's argument

APPENDIX D

Syllabi Excerpts

Assignment Description from Section 50 Syllabus

Unit Essays
(pick 2 out of 4, you may skip this activity in two units)--Choose wisely!
The unit essay is the primary assessment of your learning in this course. Reading the material and taking an open book tests does not fully demonstrate your command of the information. For this reason, the majority of your grade will be based on your written work. The deadline for each essay is the end of the unit for which it was assigned (see calendar for details). Late work is not accepted in this course. Once the deadline passes, the grade will be recorded as a zero. It is suggested that you identify which essay you want to work on at the start of each unit and consistently progress toward a final draft. ==As a standing requirement for all coursework, your assignment must utilize 2-3 appropriate sources. Each source is to be properly cited in the body of your text and on a works cited page using formal MLA citation format.== All course readings are expected to have been examined prior to submitting the unit essay. There is a list of essay topics within each unit, please pick one from the list provided. Each prompt can be download (in MS Word format) at any time, so feel free to plan ahead to determine which essays you wish to complete during the semester. All assignments must be submitted to the Turn It In drop box when completed. The essays and discussions do not need to be in the same unit, although typically you may prefer them to be. Doing more essays than required will not earn you extra credit.

Assignment Description from Section 51 Syllabus

Unit Essays
(pick 2 out of 4, you may skip this activity in two units)--Choose wisely!
The unit essay is the primary assessment of your learning in this course. Reading the material and taking an open book tests does not fully demonstrate your command of the information. For this reason, the majority of your grade will be based on your written work. The deadline for each essay is the end of the unit for which it was assigned (see calendar for details). Late work is not accepted in this course. Once the deadline passes, the grade will be recorded as a zero. It is suggested that you identify which essay you want to work on at the start of each unit and consistently progress toward a final draft. ==As a standing requirement for all coursework, your assignment must utilize 2-3 peer-reviewed articles. Each source is to be properly cited in the body of your text and on a works cited page using formal MLA citation format.== All course readings are expected to have been examined prior to submitting the unit essay. There is a list of essay topics within each unit, please pick one from the list provided. Each prompt can be download (in MS Word format) at any time, so feel free to plan ahead to determine which essays you wish to complete during the semester. All assignments must be submitted to the Turn It In drop box when completed. The essays and discussions do not need to be in the same unit, although typically you may prefer them to be. Doing more essays than required will not earn you extra credit.

APPENDIX E

Essay Prompts

Essay Topic: Socialization and Opinion

Guidelines:

Be sure to follow all formatting guidelines provided in the syllabus. Your final work product must have a cover page with a word count, an essay that is 3-4 pages in length and a works cited page. <u>The minimum writing requirement expectation is two full pages in your own words (excluding citations)</u>. If the minimum expectations are not met, the assignment will be marked incomplete. Be sure to provide a proper citation in MLA or APA format for all works consulted on a separate works cited page.

Essay Prompt: Conduct research into the process and agents of "political socialization." Utilize a minimum of 2-3 sources.

Essay Topic: Print Media Analysis

Guidelines:

Be sure to follow all formatting guidelines provided in the syllabus. Your final work product must have a cover page with a word count, an essay that is 3-4 pages in length and a works cited page. <u>The minimum writing requirement expectation is two full pages in your own words (excluding citations)</u>. If the minimum expectations are not met, the assignment will be marked incomplete. Be sure to provide a proper citation in MLA or APA format for all works consulted on a separate works cited page.

Identify articles as they relate to the specific unit we are covering in the course. Then carefully identify and research how the central theme in the article relates to the course and how it demonstrates an ideological "spin" found in the media. This is commonly referred to as bias identification.

Essay Topic: Politics and the Internet

PBS NOW Documentary Video: "Ron Paul and Internet Politics"

Video Stream: http://www.pbs.org/now/shows/350/video.html

Guidelines:

Be sure to follow all formatting guidelines provided in the syllabus. Your final work product must have a cover page with a word count, an essay that is 3-4 pages in length and a works cited page. <u>The minimum writing requirement expectation is two full pages in your own words (excluding citations)</u>. If the minimum expectations are not met, the assignment will be marked incomplete. Be sure to provide a proper citation in MLA or APA format for all works consulted on a separate works cited page.

Prompt: As the use of the Internet and other electronic mediums have become more widespread, political candidates have begun using Web sites, social media, e-mail, blogs, podcasts, and other forms of electronic media to convey their campaign messages to an even broader sector of the population in an effort to reach voters. The video will provide a primer on how technology will play a role in the campaign process. With additional research, you can analyze how this new medium has and will continue to impact the outcome of elections.

APPENDIX F

Recruitment Script

Dear students,

Your section of GOV 2013 has been targeted for a study conducted by fellow Texas Woman's University student, Trenton Hale, for his thesis in library science. This study will examine the role that bibliographic requirements have on student research essays.

The study will collect and analyze the unit essays that you have completed and that have already been graded. You will not be asked to complete anything else for this study, and your essays will be made anonymous, and your grade will not be shared with the investigator. Please see the attachment for complete details about this study.

Unless you elect to opt-out of this study, your anonymous essays will be provided for use in the study. If you wish **not to participate,** you can opt-out at any time by completing the online form below:

https://www.psychdata.com/s.asp?SID=181134

Our graduate assistant will remove the names from volunteered essays and will not provide any essays of students who have decided to opt-out. I will have no way of knowing whether you decide to participate or not, and your participation will not, in any way, affect your grade in this class or your standing at Texas Woman's University.

Sincerely,

This study has been approved by Texas Woman's University's Institutional Review Board [protocol #20042]. You are under no obligation to participate, and you may opt-out at any time. No direct benefit will be gained from participation in the study.

APPENDIX G

Passive Consent Form

TEXAS WOMAN'S UNIVERSITY

STUDY DESCRIPTION

TITLE: Peer-Reviewed Required: The Role of Bibliographic Requirements in the Undergraduate Research Assignment

PRINCIPAL INVESTIGATOR: Trenton Hale | thale3@twu.edu
ADVISOR: Carol Perryman, PhD | cperryman@twu.edu

EXPLANATION & PURPOSE OF RESEARCH

You are being asked to participate in a research study for Trenton Hale's thesis with Texas Woman's University. The purpose of the study is to understand how requiring undergraduate students to use scholarly/peer-reviewed articles for an assignment affects their information competency, and will further explore how students are using information sources in their written work. You have been asked to participate in this study because you recently completed a research essay for GOV 2013 that required you to use scholarly and/or college-level information sources.

DESCRIPTION OF PROCEDURES

As a participant in this study, you are being asked to allow your essay to be used and analyzed in the study. Participation in this study consists of not objecting to allow the researcher to analyze your already completed and graded unit essays. This signed objection form will indicate that you have <u>not</u> agreed for your unit essays to be used in the study. Your essay will already have been read and graded by your instructor, and the instructor will not be a part of the study nor the analysis of the essay. Your participation or non-participation in the study will not influence your grade or standing in the course. The graduate assistant for your course will remove all personal identifier (such as names) from volunteered essays before providing them to the investigator. Your instructor will have no knowledge of who agreed or decided to opt-out of the study. The investigator will only have access to and collect completely anonymous essays, and there will be no way for your name to be associated with the essay once collected for the study. For this reason, students will not receive individual feedback on the essays as a result of the study. In presentation of the results of this study, some quotes may be pulled from the text of participant essays to provide examples of themes that emerged in analysis. The textual examples will be anonymous.

POTENTIAL RISKS

There are no serious, foreseen risks to participating in this study. Confidentiality will be protected to the extent that is allowed by law. As all personal identifiers will be removed from your work products. Only the names of those who elect to opt-out will be collected via this form so as to remove your essay from the collection of essays for the study. No record of participants' names or other personal identifiers will be maintained or collected in this study. All electronic documents or copies will be encrypted in a password-

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protected cloud-based storage accessible only to the researcher and the thesis advisors. All data gathered for this study will be destroyed within 5 years after the study is finished. The results of the study will be reported in a graduate thesis and, possibly, scholarly publications. No personal identifiers will be published in any format of the study's report. There is a potential risk of loss of confidentiality in all email, downloading, electronic internet transactions.

PARTICIPATION & BENEFITS

Your involvement in this study is completely voluntary and you may opt-out from the study at any time. While no direct benefit to research participants is expected as a result of this study, the study hopes to benefit and inform teaching methods at the undergraduate level.

QUESTIONS REGARDING THE STUDY

Print a copy of this consent form to keep with your records. If you have any questions about the research study you should ask the researchers; their contact information is at the top of this form. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs (940-898-3378 or via e-mail at IRB@twu.edu). [IRB protocol #20042]

OPT-OUT

If you wish to opt-out of the study — this means that your unit essays will not be included in the study — follow the link below to access the opt-out form. By submitting this online form, your unit essays be collected or used for this study.

https://www.psychdata.com/s.asp?SID=181134

APPENDIX H

Institutional Review Board Exemption Letter

DATE: March 22, 2018

TO: Mr. Trenton Hale
              Library & Information Studies

FROM: Institutional Review Board (IRB) - Denton

Re: *Exemption for Peer-Reviewed Required: The Role of Bibliographic Requirements in the Undergraduate Research Assignment (Protocol #: 20042)*

The above referenced study has been reviewed by the TWU IRB (operating under FWA00000178) and was determined to be exempt from further review.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. Because a signed consent form is not required for exempt studies, the filing of signatures of participants with the TWU IRB is not necessary.

Although your protocol has been exempted from further IRB review and your protocol file has been closed, any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc.   Dr. Ling Hwey Jeng, Library & Information Studies
      Dr. Carol L. Perryman, Library & Information Studies
      Graduate School