

JUST-IN-CASE OR JUST-IN-TIME? AN EXAMINATION OF THE TIMING AND
DURATION OF AN ONLINE EMBEDDED LIBRARIAN IN AN ONLINE ENGLISH
COURSE

By

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To Nathan, Trey, and Arden

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Abstract of Dissertation Presented to the Graduate School
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Students are increasingly participating in online courses. This increased participation in online courses can result in students being more distant from their campuses, thus receiving a different kind of service from their institution. Along with this increase in participation in online courses is the increase in availability of information online. Librarians are actively working to provide services to distance learning students, with the knowledge that these students are expected to produce high quality researched work in college with little to no access of the physical library. This often results in librarians embedding in online courses to improve students' information literacy skills. Librarians have found great success when embedding in online courses, yet often indicate that the time required for such projects is a challenge.

This study focused on the embedment of a librarian in four sections of an online English II course at a community college. The purpose of the study was to examine the timing and duration of the embedded librarian in the course and the impact on students' information literacy skills. The librarian embedded in three sections of the course for a two-week duration, and embedded in one section of the course for a full-semester.

Students' information literacy skills were measured by their performance on two course assignments, a library research assignment and citation analysis of a researched essay. Results indicate that students' information literacy skills were not significantly different regardless of the timing or duration of the embedded librarian. This suggests that librarians can effectively provide embedded librarian services to students in courses for a duration other than the entire semester, which allows librarians to provide embedded services to more courses each semester.

CHAPTER 1 INTRODUCTION

Information is available more readily than ever before and is produced as quickly as someone can post to a website or blog. This increase in the availability of information has changed the role of the librarian from the keeper of knowledge to a provider of user education (Cooke, 2010; Goetsch, 2008; McAdoo, 2012; Mullins, 2012; Wilson, 1994). This transition from the industrial age to the information age requires individuals to possess 'information' or 'knowledge skills' (McAdoo, 2012). The American Library Association (1989) defines this set of needed skills as information literacy and describes an information literate person as one who is "able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (para. 3). Librarians are the key proponents of and experts in information literacy (Saunders, 2009).

Simultaneously, the growth of the Internet has provided opportunities for online courses. Students in the United States have embraced these courses with enrollment growing substantially in the past eight years; over six million students took at least one online course in fall 2010 (Allen & Seaman, 2011). As a result of this influx, schools report challenges in providing student services, including library services, to students in online courses (Instructional Technology Council, 2012). The library is an essential component of an online students' experience in higher education (Cooke, 2004) and information literacy skills are called for by accreditation agencies (Southern Association of Colleges and Schools, 2000; 2011). The instructional services provided by the library can increase students' information literacy skills – skills that are needed in today's information-rich world (Francis, 2012).

Library Instruction

Library instruction is effective in increasing students' use of and selection of quality academic research materials (Hovde, 1999; Hurst & Leonard, 2007) and in increasing students' self-efficacy in using electronic resources (Ren, 2000). These are essential in increasing students' information literacy skills. The Association of College and Research Libraries (ACRL) (2008) recommends that distance education and face-to-face students have equivalent library services. Similarly, the Southern Association of Colleges and Schools (SACS) accrediting agency includes the library and related library provided services, including information literacy instruction, in its list of best practices for online programs (SACS, 2000). Library instruction is also addressed in the accreditation standards, "institution ensures that users have access to regular and timely instruction in the use of the library and other learning/information resources" (SACS, 2011, p. 31).

Library instruction to distance learners often mirrors the types of instruction provided to face-to-face learners. Successful library instruction involves librarians and faculty members collaborating to provide timely, assignment based instruction (Carlock & Anderson, 2007; Tennant & Miyamoto, 2002). Such collaboration results in a partnership between librarians and faculty that ensures that students participate in library instruction that is scaffolded and has direct application to their course assignments (Carlock & Anderson, 2007; Tennant & Miyamoto, 2002). This also results in increased student success and satisfaction (Barratt, Nielsen, Desmet, & Balthazor, 2009; Robinson & Schlegl, 2004; Tennant & Miyamoto, 2002). Collaboration between librarians and faculty members is essential for the success of such library instruction implementations.

Online Embedded Librarians

An online embedded librarian is one way of providing library instruction to students in online courses. An online embedded librarian is a librarian that is enrolled or included in the Learning Management System (LMS) as a co-instructor, assistant instructor, or teacher assistant (Clark & Chinburg, 2010; Figa, Bone & Macpherson, 2009; Markgraf, 2004; Shank & Dewald, 2003; Shumaker & Talley, 2009; York & Vance, 2009). The online embedded librarian can participate in various ways in the course; involvement can include monitoring and responding to discussion board posts and messages in the class and providing assignment or course-specific instruction on how to access and use relevant library resources (Dinwiddie, 2005; Markgraf, 2004). This instruction and communication between the student and librarian within the online course environment differs from a student visiting a library website for information, because the online embedded librarian is aware of the assignments, due dates, and instructional style of the instructor and can provide information and instruction in a proactive manner (Francis, 2012; Markgraf, 2004). This is important, as students are unlikely to leave the LMS environment to find information (York & Vance, 2009) instead relying heavily on course-related readings and their course instructors for research assistance (Head & Eisenberg, 2009). Additionally, students often overestimate their research skills, which makes them less likely to seek out assistance (Gross & Latham, 2007; Kruger & Dunning, 1999). Placing instructional materials on the library website is an ineffective method for providing instruction to online students (Matthew & Schroeder, 2006; Shank & Dewald, 2003; Tumbleson & Burke, 2010), as “the site is bypassed entirely by students or they are unaware of the offerings and paths to locate them” (Tumbleson & Burke, 2010, p. 235). The benefits of online embedded librarians include

increasing students' information literacy skills (Bowler & Street, 2008; Calkins & Kvenild, 2010) and increasing students' awareness and use of the library (Bennett & Simning, 2010; Bozeman & Owens, 2008; Calkins & Kvenild, 2010; Shank & Dewald, 2003).

While librarians praise the success of online embedded librarian projects (Bennett & Simning, 2010; Calkins & Kvenild, 2010; Dewey, 2004; Edwards, Kumar & Ochoa, 2010; Figa, Bone, & Macpherson, 2009; Markgraf, 2004), they also regularly cite the time-intensive nature of such projects as a cause for concern (Bozeman & Owens, 2008; Calkins & Kvenild, 2010; Dewey, 2004; Dugan, 2008; Edwards, 2011; Edwards et al., 2010; Kesselman & Watstein, 2009; Markgraf, 2004; Matthew & Schroeder, 2006; Shank & Dewald, 2003; Shumaker & Talley, 2009; York & Vance, 2009). In order to continue providing formal library instruction to online learners, a less time-intensive model is needed. Matthew and Schroeder (2006) and Calkins and Kvenild (2010) recommend a point-of-need embedded librarian model. An online embedded librarian is most beneficial when embedded in courses that have a research-specific assignment and are embedded during the time in the course that students are working on this research-based assignment (Calkins & Kvenild, 2010; Matthew & Schroeder, 2006). Calkins and Kvenild (2010) recommend a period of two weeks for the embedment. Situating the assignment-focused instruction within the classroom at the point-of-need provides students an opportunity to gain the necessary skills and apply them immediately to complete their assignment in a familiar setting (Leibiger, 2011). This situated, student-centered embedded librarian service is grounded in the education literature on situated cognition (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991). This study will follow the recommendation of Calkins and Kvenild (2010) by embedding

a librarian in an online undergraduate course for two weeks and will examine students' learning from the situated learning experience. The course has multiple assignments that require library research, indirectly or directly, thus the 'best' time to embed in the course is unknown. The librarian will embed in four sections of the course at different times in the semester to better understand the most effective time to embed in the course.

Background and Context

Librarians at Hillsborough Community College (HCC) provide library instruction and reference services for students at each campus. For the 2010-2011 school year, these librarians provided 427 library instruction sessions with 10,006 students attending (unpublished library statistics, 2011). Of the instruction sessions at HCC, only four were provided to students taking online courses. This is problematic because HCC offered 876 courses in the online format (J. Bullian, personal communication, April 17, 2012). All students, regardless of the format or mode of their course, have access to library materials and services using the library webpage, but not all students were able to participate in a formal library instruction session. Currently, only students taking online English courses from the Plant City Campus participate in formalized library instruction for their class provided by the Plant City Campus Librarian who is embedded in their courses for the full semester. The online embedded librarian at the Plant City Campus participates in the online classroom as a co-instructor through the LMS to provide course specific library instruction and research assistance to students. The goal of this embedded librarian is to provide instruction and research support in order to increase students' information literacy skills.

During the fall 2011 term at the Plant City Campus, the online embedded librarian examined the effect of an online embedded librarian on students' perception and utilization of librarian-provided resources. She collected data, surveyed the students, and interviewed the instructor to understand the perceived impact of the embedded librarian in a single online English course. Data indicated that the embedded librarian increased students' awareness and use of the library resources and librarian. Additionally comments from students indicated that the project was favorably received. The instructor for the course asserted that the embedded librarian project resulted in improving students' research skills; in her opinion students produced higher quality and better researched research papers than students in the same course without an embedded librarian. If students are indeed acquiring high quality research and information literacy skills – these skills will benefit students as they progress through their coursework at the college and in future endeavors.

Although the online embedded librarian project at the Plant City Campus in 2011 was deemed successful in improving students' awareness of the library, the goal of the librarian is also to improve students' information literacy skills. In the previous study there was only an examination of student perceptions; an assessment of student learning from the embedded librarian experience was not conducted. The time commitment required for such a project on the part of a librarian is substantial, thus it is essential to examine student learning in a course with an embedded librarian prior to implementing additional embedded librarian projects. Though the librarian would like to offer this service to all of the online courses at the campus, the time consuming nature of the project and the growth of online course offerings make this impossible. The Plant

City Campus library has one full-time and one part-time librarian responsible for providing all library instruction, reference services, and collection development/maintenance services for the campus library. Library instruction is typically provided to 40-50 courses at the Plant City Campus each semester. For the fall 2012 term the campus scheduled 298 courses, 23 of which were offered completely online. The quantity of face-to-face instruction sessions coupled with the additional responsibilities of the librarians make it impossible to provide full-semester online embedded librarian services to each of these 23 online sections.

In the fall 2011 study at the Plant City Campus, it was apparent that students utilized the librarian and library resources during the two weeks they were working on their first essay for the course. This reinforces the findings of Markgraf (2004) that students in a course typically require assistance at similar times in a course. Additionally, it supports the recommendations of Calkins and Kvenild (2010) and Matthew and Schroeder (2006) that the most meaningful method of providing instruction or support to students is to embed a librarian in a course for a short period of time when an assignment requiring library research is completed. This project focused on providing a two-week embedded librarian experience for three sections of an online English course and examined the impact of the timing of the embedded librarian on student information literacy skills. Following the recommendations of Calkins and Kvenild (2010) and Matthew and Schroeder (2006), the timing of the embedment was shortly before or during the completion of assignments that require library research. Additionally, the librarian was embedded in one section of the online course for the full semester to determine if the two-week embedment was as effective as a full-semester embedment.

Project

This project investigated the impact, if any, that the timing of an embedded librarian in an online class had on students' information literacy skills. Due to the time-intensive nature of embedded librarian projects, this librarian explored the provision of a two-week embedded librarian project in an online English II course. This course has multiple assignments that require library research, thus the librarian was interested in determining which period of time is most useful for the embedment of the librarian in the course. To that effect, the librarian embedded in three sections of the course during the time they prepared for assignments that require library research or during the time that they completed assignments that require library research. Additionally, the librarian also embedded in one section of the course for the full semester. Finally, the information literacy skills of students in the sections with a two-week embedded librarian were compared with those in the course with a full-semester embedded librarian. The goal of the librarian was to provide students with instruction that improved their information literacy skills, skills that are demonstrated when students complete assignments that require library research, such as a library research assignment or research paper. The questions for this project were: How does the timing of an embedded librarian in an online English course impact students' learning and application of information literacy skills? What are the differences, if any, in students' information literacy skills with a two-week embedded librarian and a full-semester embedded librarian?

A librarian was embedded in three sections of an online English II course for two weeks at different points during the first five weeks of the term and was embedded in one section of the same course for the entire term. During embedment, the librarian offered a synchronous instruction and an online LibGuide that contained information

and tips for each assignment in the course. She also was available to communicate with students via course messaging and instant message, and moderated a Library Questions discussion board. Course messaging and the Library Questions discussion board were checked twice daily by the librarian Monday through Friday, and one time on Saturday. Instant message was available to students for 11.5 hours each week, with times available Monday through Thursday. When the librarian was unable to provide the scheduled instant message hours for students, she notified students by posting an announcement in the course LMS indicating that she was unavailable. Students in the course with the two-week duration embedment had access to the instructional materials for the full term, but did not have access to the librarian via course message, instant message, or discussion board beyond the two weeks of embedment. The librarian did not monitor the course messaging, instant messaging, or discussion board other than the times that she was embedded in the course. Students were provided with a list of days and times that the librarian was embedded in the course, along with a list of appropriate alternate means of communication with the librarian when she was not embedded in the course (Appendix A). The librarian monitored the alternate means of communication on a daily basis as she does for all students at the college.

Data were collected to examine students' information literacy skills – measured by examining performance on their library research assignment and evaluating the source selection on their critical analysis. A citation analysis was conducted to evaluate the kind and quality of resources used by students for their essay. As Beile (2008) indicates, a citation analysis is a performance-based interpretive measure of information literacy skills. The results from this study will be used to better inform the library

instruction services provided to online students at the Plant City Campus, both improving existing services and expanding services to additional online courses.

Limitations to the study

Researcher Bias

The author performed the duties of both the librarian and researcher for this project. She has worked as a professional librarian since 2001. The author is presently a doctoral candidate in Educational Technology at the University of Florida and librarian at Hillsborough Community College. During this project the researcher designed, implemented, and evaluated a project that implemented the teaching and learning theories from the Educational Technology program and was based in the professional practice of the researcher. The librarian's familiarity with the course and instructor presented an opportunity for the provision of instruction that guides students in the proper direction for the successful completion of their assignments. This familiarity with the course and assignments also presented challenges for the interpretation of data, as the librarian is very aware of the 'best' resources for each assignment. There was a potential for the librarian to harshly judge the resources used by students for the assignments. To compensate for this potential bias, an additional librarian with no familiarity with the course or instructor was included in the analysis of the student bibliographies.

External Validity

This study was designed using the experiences of the librarian-researcher, educational theories, and suggestions from professional literature. The study focused on students in an online English course at the community college level. The project was limited to only one campus, with a single librarian providing the embedded librarian

services to students. Though there are multiple sections of a course that were examined, all sections were the same course taught by the same instructor. These circumstances limit the applicability of findings to differing situations.

Significance of Study

This study provides information that can be used by librarians to begin or improve their online embedded librarian services. The examination of this two-week long embedded librarian project provides valuable information for those librarians interested in implementing a sustainable embedded librarian service. The overall findings support a strategically timed embedded librarian project, which provides support for librarians that want to begin or increase their participation in additional online courses without the worry of increased time devoted to such projects. Additionally, there are few studies that assess student information literacy learning in courses with an online embedded librarian. Instead studies primarily focus on student satisfaction and student use data, while these are important it is also essential to know what, if anything, students are able to learn and apply from the online embedded librarian experiences. This study provides information to address this need.

CHAPTER 2 LITERATURE REVIEW

Introductory Remarks

The widespread availability of the Internet has changed the library. Users no longer have to visit a library in order to access information from the holdings of their library or any other library in the world (Davis & Cohen, 2001). No longer does the librarian sit in the library waiting for students to approach them for assistance; librarians are now actively initiating opportunities to interact with students and faculty (Gandhi, 2003; Shank, & Bell, 2011).

This chapter will trace academic librarians' provision of library services, including instruction, for students from traditional face-to-face support to completely online support. Section one (Academic Library Support) will provide an overview of academic library support and library instruction. Section two (Distance Education) will provide an overview of distance education in the United States, a history of distance library services, and an overview of theories applicable for librarians providing instruction for distance learning students. Section three (Formats of Library Instruction for Distance Learners) will provide a detailed description of the different formats of library instruction for distance learning students. The chapter will conclude with section four (Assessment Methods), which will examine the variety of assessment methods librarians can use.

Academic Library Support

Libraries and librarians support the missions of higher education institutions by providing materials and services that meet the educational and research needs of students, faculty, and staff of the institution (Goetsch, 2009). In the past, this often consisted of collecting materials that supported the mission of the institution and limited

instruction on how to access such materials, but changes in the information landscape has changed the relationship librarians have with faculty and students (Cooke, 2010; Goetsch, 2008; McAdoo, 2012; Mullins, 2012; Wilson, 1994). The transition from the industrial age to the information age requires that students and faculty have 'information' or 'knowledge' skills (McAdoo, 2012), which has impacted the role of the librarian in the institution (Oakleaf, 2010). Librarians are no longer the sole keepers of knowledge; instead they are now information experts and educators (Cooke, 2010; Goetsch, 2008; McAdoo, 2012; Mullins, 2012; Oakleaf, 2010; Saunders, 2009; Wilson, 1994).

This changed role of the librarian, as information experts and educators, has changed the job duties of librarians. Not too long ago librarians sat in their libraries waiting for individuals to come to them for assistance. The assistance primarily required that the librarian locate information for their patron – as they were the keeper of knowledge. Slow changes took place that provided more and more information to the library in high capacity formats, such as CD-ROMs, and in computerized formats, such as the Online Public Access Catalog (OPAC). These changes, along with the increased number of computer terminals in the library, allowed the patron to locate information without having to have a librarian intervene. Though the patron could locate information on their own, it was likely that they required instruction on how to locate the information in addition to instruction to use the technology.

The widespread availability of the Internet has changed libraries more dramatically than any other technological change. Individuals are able to search the Internet from home for information on any topic – and typically will get information

immediately that is related to their search query. Library collections have changed; no longer do librarians purchase materials 'just-in-case', but instead are purchasing them in a 'just-in-time' design (Zenke, 2012). Libraries and librarians are attempting to prove their value to their institution in new ways – no longer is it the size of the collection that is most important, but it is the relationships the library has developed. Likewise, it's no longer primarily about the information that you can provide for the patrons – but instead the education you provide to the patron that allows them to continually conduct information searches independently (Zenke, 2012) which increases their information literacy skills.

The ability for individuals to know when and how to locate information needed are two components of information literacy. The American Library Association (ALA, 1989) defines an information literate individual as one that is “able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ALA, 1989, para. 3). Librarians have dealt with the changing information landscape and are assisting their patrons to gain these needed information literacy skills. Where once librarians focused on teaching students how to use the resources, librarians are now teaching students information literacy skills (Saunders, 2009).

Library Instruction

Librarians can provide instruction to students in a variety of ways (Tumbleson & Burke, 2010), all with the goal of increasing individuals' understanding and use of research resources (VanScoyoc, 2003). While library instruction is beneficial for increasing students' ability to use library resources and locate relevant information, it is also useful for reducing library anxiety. Library anxiety is a phenomenon individuals may

encounter during the research process (Mellon, 1986). This fear is so powerful that it prevents students from beginning or effectively completing the research process.

Students' feelings of inadequacy in using the library or conducting research make them embarrassed, thus they do not ask for assistance. Instead they often flounder and turn in assignments that are poorly researched.

While much instruction is limited to one-shot instructional sessions (Leibiger, 2011), many librarians work closely with instructional faculty to incorporate library instruction in the classroom (Allegri, 1985; Barratt et al., 2009; Ferrer-Vinent & Carello, 2008; Hearn, 2005; McMillen & Fabbi, 2010; Robinson & Schlegl, 2004; Tennant & Miyamoto, 2002). Collaboration between the librarian and classroom instructor is a very important factor in the success of a library instructional effort (Allegri, 1985; Barratt et al, 2009; Bordonaro & Richardson, 2004; Ferrer-Vinent & Carello, 2008; Hearn, 2005; Leibiger, 2011; McMillen & Fabbi, 2010; Robinson & Schlegl, 2004; Tennant & Miyamoto, 2002). Such collaborative relationships can result in the librarian providing course-integrated information literacy instruction sessions with assignments that reinforce or build on the instruction (Kobzina, 2010; Leibiger, 2011; Oakleaf, 2010; Simmel, 2007; Tennant & Miyamoto, 2002). The course-integrated instruction often results in a librarian being included as a co-instructor, guest lecturer, or embedded librarian in a face-to-face course (Allegri, 1985; Bowler & Street, 2008; Bordonaro & Richardson, 2004; Carlock & Anderson, 2007; Dugan, 2008; Hall, 2008; Kobzina, 2010; Tennant & Miyamoto, 2002; Winterman, Donovan & Slough, 2011). Studies examining the impact of a librarian in a face-to-face class have found high levels of student satisfaction and a demonstrated increase in students' understanding and use of library

resources (Carlock & Anderson, 2007; Ferrer-Vinent & Carello, 2008; Leibiger, 2011; McMillen & Fabbi, 2010; Tennant & Miyamoto, 2002). Additionally, students report reduced feelings of library anxiety and increased confidence in their ability to locate library materials after participating in these projects (Ren, 2000; Tennant & Miyamoto, 2002). Instructors indicated high levels of satisfaction and suggested that students used higher quality resources as a result of such projects (Barratt et al., 2009; Bordonaro & Richardson, 2004; Ferrer-Vinent & Carello, 2008; Hearn, 2005; Leibiger, 2011; McMillen & Fabbi, 2010; Robinson & Schlegl, 2004; Tennant & Miyamoto, 2002).

Librarians that collaborate with faculty to provide semester-long library instruction services are sometimes referred to as embedded librarians (Dugan, 2008; Kesselman & Watstein, 2009; Shumaker & Talley, 2009). Librarians embedded at the course level are often seeking to increase the research or information literacy skills of the students in the course by becoming a part of the instructional team (Dugan, 2008). Librarians are embedding in a variety of different courses and levels. Tennant and Miyamoto (2002) and Tennant, Edwards, and Miyamoto (2012b) describe the implementation and modifications of a librarian embedded in a face-to-face undergraduate genetics course. The partnership between the health science librarian and genetics faculty allowed students to participate in library instruction that was scaffolded and had direct application to their course assignments (Tennant & Miyamoto, 2002). Students were pleased with the collaborative effort and reported reduced feelings of anxiety and increased confidence in using specialized library resources. Carlock and Anderson (2007) report on a similar project that involved integrating a librarian and library instruction in a series of sequential nursing courses. They found that students

participating in the series of sequential instructional workshops performed better on graded assignments than students that participated in a single session. This suggests that collaborative relationships between the librarian and faculty member can result in increased student success.

Distance Education and Library Services

Distance education has been available for individuals since the late nineteenth century in the form of correspondence courses (Moore & Kearsley, 2005). Changes in technology, coupled with the improvements in telecommunications, provided opportunities for distance education in different formats, most currently in the form of online courses (Moore & Kearsley, 2005). Student enrollment in distance education in the United States has increased tremendously with the easy access to online courses; over 6.1 million higher education students took at least one online course in the fall 2010 term (Allen & Seaman, 2011).

While early iterations of distance learning were useful, the few students using such services were often not provided adequate instructional and educational opportunities from their campus librarians (Appavoo, 1985). Materials were delivered to students, but instruction was not a priority (Appavoo, 1985). The fast growth of online learning, coupled with the increasing availability of information online, has provided numerous challenges for students in distance learning courses and librarians wishing to provide instruction to these students (Gandhi, 2003).

Library Services to Distance Learners

According to the Association of College and Research Libraries (ACRL, 2008) Standards for Distance Learning Library Services, all students, faculty, and staff of a higher learning institution are entitled to the same services from the institution library.

Thus libraries attempt to provide alternative methods of delivering services to those institution members that are at a distance. Providing library services and a contact person is very important for students that are online, as they are “far less likely to be able to find a human to assist them than are face to face students” (Lillard & Dinwiddie, 2004, p. 140).

There are four categories of services that most libraries strive to provide to distance learners: access to library resources, materials delivery services, reference services, and instructional services (Appavoo, 1985; Moyo & Cahoy, 2003; Raraigh-Hopper, 2010). The present goal for most libraries is to ensure that distance education students have access to the same quality of services and materials as students that take courses face-to-face (Moyo & Cahoy, 2003). In the past, prior to the widespread use of computers, the Internet, and electronically available materials, distance education students were provided services to the extent that were possible. There was an understanding that these services were not equal to the services provided to face-to-face students, yet there were seemingly insurmountable barriers to the equitable services that could be provided (Appavoo, 1985). Improvements in telecommunications and the development of the Internet led to the creation of web-based distance education courses. These developments provided “motivation for educational institutions to adopt the premise that all barriers imposed by distance can be surmounted” (Dewald, Scholz-Crane, Booth, & Levine, 2000, p. 33).

Though many libraries and librarians are attempting new methods for meeting the needs of their online students (Edwards, 2011; Moyo & Cahoy, 2003; Raraigh-Hopper, 2010), many institutions report challenges to providing student services to

adequately meet the needs of their online students (Instructional Technology Council, 2012). Some librarians (Bell & Shank, 2004; Jackson, 2007; Regan & Walcher, 2005; Shank & Dewald, 2003) have suggested that the institutional reliance on and management of the LMS is a barrier for librarians that want to place their instructional content in online courses. The LMS is an all-inclusive learning environment - course management software that contains the content and tools for students to participate in an online course. Often the course is completely contained within the LMS, requiring students to login only to the LMS to participate in all aspects of their course. Libraries frequently have been and continue to be left out of the LMS used for instruction (Jackson, 2007; Shank & Dewald, 2003) which requires librarians to proactively initiate a role within the LMS.

Theories and Literature That Inform Library Instruction for Distance Learners

The theories and literature that inform library instruction for distance learners include the Dunning-Kruger effect, situated cognition, cognitive apprenticeship, transactional distance, and interactions for distance learners. The Dunning-Kruger effect (Kruger & Dunning, 1999) suggests that students with poor information literacy skills are less likely to realize they have poor skills; instead they tend to overestimate their skills. Thus students with poor information literacy skills are less likely to ask for help with research tasks (Gross & Latham, 2007) which is particularly problematic when they are taking online courses and have no formal library instruction (Sullo, Harrod, Butera & Gomes, 2012). Unlike students taking courses on campus, there is little chance that online students will encounter their campus librarian if there is no formal library instruction provided to them. Instead students are expected to figure research out themselves. If that is an expectation of faculty and/or librarians, librarians must create

tools that are easy to locate and use (Sullo et al., 2012). As Staley, Branch, and Hewitt (2010) state, “students may or may not stumble across digital learning objects available on the library web site” (Programme Improvements section, para. 5).

Situated cognition suggests that successful learning is accomplished when individuals participate in authentic learning experiences (Brown, Collins, & Duguid, 1989). Learning experiences are successful when individuals learn new concepts in environments that allow for their immediate application. Library instruction is most successful when the instruction takes place at the point of need and is used by students immediately to accomplish an authentic activity. Likewise, cognitive apprenticeship suggests that librarians can successfully implement instruction by first modeling their skills and tools for the students, then by supporting students’ efforts to participate in the search process (Collins, Brown, & Newman, 1990). Librarians providing instruction for distance learning students must focus on providing library instruction that is timely and addresses student needs for the assignment.

Since traditional education differs from online education, theories related to distance education are also important for library instruction aimed at distance education students. Moore’s (1972, 1991) theory of transactional distance states that dialogue and structure are the two variables that determine the transactional distance. Dialogue is the “interaction between the teacher and learner when one gives instruction and the other responds” (Moore, 1991, p. 3). Structure is the way a course is designed using the technology available. Successful courses are designed to have adequate opportunities for quality dialogue with a structure that is appropriate for the material. Course designers must be aware of the audience for the course as the type or amount of

dialogue and the structure differs for different students (Moore, 1991). Librarians that are providing or creating library instruction materials need to be aware of transactional distance; it should influence the type of materials and kinds of instruction that occur at an institution. Librarians should address the needs of different learners in their population by providing a blended library instructional approach that includes multiple instructional methods and materials (Mestre, 2010; Robinson et al., 2005).

Librarians, particularly librarians that work with distance learners, should be knowledgeable of the three types of interactions that Moore (1989) describes as taking place in distance education. Moore suggests that the three kinds of interaction in distance education are learner-content interaction, learner-instructor interaction, and learner-learner interaction. Learner-content interaction is essential for learning to take place, as it is “the process of intellectually interacting with content that results in changes in the learner’s understanding, the learner’s perspective, or the cognitive structures of the learner’s mind” (Moore, 1989, p. 2). Learner-instructor interactions consist of interactions that provide opportunities to motivate students’ interest, organize the application of knowledge, assess understanding, and provide support and encouragement. Learner-learner interactions are those that transpire between learners in a course. These interactions between learners may occur independently or with instruction from the course instructor. Such interactions are useful for students to gain confidence, increase their learning, and share ideas with fellow students without the presence of an instructor. Moore contends that institutions that provide distance education using only one medium fail to address all three types of interactions well, which results in a lower quality learning experience (Moore, 1989). Librarians providing

instruction to distance learners should keep this in mind and create instructional tools and experiences that enable learners to have a multimodal experience with opportunities for interaction with the content and librarian (Mestre, 2010).

Formats of Library Instruction for Distance Learners

The following section highlights the variety of ways that librarians are providing instruction for distance learners, including print materials, traveling to remote sites, recorded videos, tutorials, video and web conference, and embedded librarians. There appears to be little difference in the tools used by librarians to provide online library instruction to undergraduate and graduate students. While many authors lament the lack of information literacy instruction provided to graduate students (Cooney & Hiris, 2003; Rempel & Davidson, 2008), many librarians report on the various tools used to meet the information literacy needs of both graduate and undergraduate students (Barnhart & Stanfield, 2011; Chisholm & Lamond, 2012; Guillot, Stahr, & Meeker, 2010).

Print materials

Print instructional materials were the standard for distance education students in the past (Appavoo, 1985; Viggiano, 2004). Libraries, such as Athabasca University, created printed materials and mailed them directly to students (Appavoo, 1985; Wielhorski, 1994). Other libraries simply uploaded the versions of print materials to the school or library website (Wielhorski, 1994). Though these guides provide a wealth of information, Wielhorski (1994) states that the length of the documents was a barrier for distance student use.

Travel to remote sites

Students participating in courses at a satellite campus or remote site are often considered distance learners. The regular meetings of the class at a single location

provide the librarian an opportunity to visit the students for a face-to-face library instruction session (Arnold, Sias, & Zhang, 2002). According to Viggiano (2004) this is the preferred method of instruction for many librarians.

Recorded video

Though the mechanism for recording and distributing videos has changed, librarians have been using such videos for several decades (Appavoo, 1985; Viggiano, 2004). Appavoo (1985) recommended recording video tutorials on VHS tapes that were then mailed as library instruction for distance education students. More recently, Viggiano (2004) examined online streaming recorded videos for library instruction, and concluded that many of these efforts were a “representation of the librarian as expert, but standing alone do not allow interaction with the librarian” (p. 41). Moore’s (1972, 1991) theory of transactional distance suggests that there should be some form of interaction between the instructor and student, thus this form of instruction will not meet the needs of students unless coupled with other methods.

Tutorials

Librarians create tutorials using a variety of software tools for library instruction. Tutorials vary in their purpose; some are designed to provide instructions for using a particular source, such as the library catalog or particular databases, while others provide a comprehensive overview of the information seeking process (Brumfield, 2008; Holliday, Ericksen, and Fagerheim, 2006; Zhang, 2006). Tutorials are a creative means of providing library instruction to those students that cannot interact with the librarian face-to-face. Early tutorials for distance education students were available on CD-ROMs that were mailed to students (Arnold et al., 2002; Gandhi, 2003; Tricarico, Tholl, & O’Malley, 2001; Wielhorski, 1994). Web-based tutorials for library instruction are useful

for both distance and face-to-face students. For all students the availability of instruction at any time, particularly at the point-of-need, is desired (Henner, 2002; Raraigh-Hopper, 2010).

Successful design and use of tutorials is best done in collaboration with instructional faculty (Appelt & Pendell, 2010; Gandhi, 2003; Michel, 2001). Instructors that include the tutorials in their classes as part of the curriculum demonstrate to their students the value they have placed on the library and library instruction (Gandhi, 2003).

Video conference & web conference

Lietzau and Mann (2009) suggest that the asynchronous nature of much library instruction for distance education students does not “meet the needs of students who learn through interaction and desire face-to-face or real-time instruction” (p. 108). Video and web conferencing tools can be used to provide synchronous online library instruction sessions (Barnhart and Stanfield, 2011; Handler, 2011; Henner, 2002). The tools available within these conferencing programs provide users access to: “text chat, shared whiteboard, sharing of an application or desktop, file transmission, interactive video and audio transmission” (Henner, 2002, p. 83).

Online embedded librarians

Online embedded librarians are those librarians that are embedding in the LMS. Librarians are increasingly attempting to be involved in the LMS, as students in most online courses are able to access all course materials, assignments, and communication tools within the LMS. The all-inclusive nature of the LMS makes it essential for libraries to be embedded in the LMS, as students want a ‘one-stop

shopping' experience (Black & Blankenship, 2010; Lillard & Dinwiddie, 2004; Washburn, 2008; York & Vance, 2009).

Embedding in the LMS can be at the macro-level or the micro-level (Shank & Dewald, 2003; York & Vance, 2009). The macro-level involvement is the placement of library specific links in the LMS. The links are either general or subject specific, allowing them to be embedded in numerous courses or all courses with little involvement from the librarians or instructors (Collard & Tempelman-Kluit, 2006; Daly, 2010; Shank & Dewald, 2003; Washburn, 2008). Though this gets the library into the course, it is problematic as students often have no instruction on how to use the resources (Kearley & Phillips, 2004).

Embedding at the micro-level is much more customizable and user-focused. It typically involves a librarian being added to, or embedded within, the online course (Dinwiddie, 2005; Shank & Dewald, 2003; Shumaker & Talley, 2009). Though there are variations on the embedded librarian practices in online classrooms, many librarians monitor discussion boards and course email, provide links to useful resources for assignments, and provide instruction on how to access and use library resources (Dinwiddie, 2005; Markgraf, 2004). Dewald et al. (2000) suggest that the relationship between online instructors and librarians is critical to students' use of the library and librarian. They assert that just like in the face-to-face classroom, a collaborative relationship is necessary to ensure students' relationship with the librarian is able to form. Though this collaboration can take many forms, librarian involvement is best accomplished when fully involved in the online classroom as co-instructors (Figa et al., 2009; Shank & Dewald, 2003; York & Vance, 2009). Including the librarian as a co-

instructor in the course suggests to the students that the library component of the course is as important as the topic of the course (Hearn, 2005), which can influence their use of the library and librarian.

Students prefer to have a contact person for library-related issues (Francis, 2012; Ismail, 2011) and tend to have similar questions and issues at the same time (Markgraf, 2004). The embedded librarian is able to assist with this by knowing what the assignments are, when they are due, and what resources are most useful for students to use (Hoffman & Ramin, 2010; Markgraf, 2004; Matthew & Schroeder, 2006). Additionally, the online embedded librarian can communicate with all students in the course simultaneously using email or announcements, eliminating the redundancy of questions and frustration on the part of the student (Bennett & Simning, 2010; Figa et al., 2009; Markgraf, 2004). Studies of courses with an embedded librarian indicate that it is very well received by students and instructors (Edwards et al., 2010; Figa et al., 2009) and that such personal contact encourages more frequent contact with a librarian both during and after the class (Bennett & Simning, 2010; Bozeman & Owens, 2008; Lillard & Dinwiddie, 2004).

Though the popularity of embedded librarians in online courses is increasing, there are presently no “model” programs available to use as a standard (Sullo et al., 2012). The popularity of such programs is apparent by the number of articles devoted to the topic; the journal *Public Services Quarterly* devoted an issue to the topic (Volume 6, Issue 2/3). A plethora of best practice recommendations are available in the literature (Bozeman & Owens, 2008; Markgraf, 2004; Shank & Dewald, 2003; York & Vance, 2009). Many of the best practices are related to the activities that the librarian should do

in the online classroom. Collaboration with faculty in the planning of such a project is the most frequently suggested practice. While the articles overwhelmingly support the implementation of the embedded librarian, they also suggest that the time-intensive nature of such projects is a major issue (Bennett & Simning, 2010; Bozeman & Owens, 2008; Burke, Tumbleson & Frye, 2010; Calkins & Kvenild, 2010; Dinwiddie, 2005; Drumm & Havens, 2006; Edwards et al., 2010; Figa et al., 2009; Hearn, 2005; Hoffman, 2011; Hoffman & Ramin, 2010; Jackson, 2007; Kearley & Phillips, 2004; Markgraf, 2004; Matthew & Schroeder, 2006; Schutt & Hightower, 2009; Shank & Dewald, 2003; Tumbleson & Burke, 2010; Veal & Bennett, 2009). While most suggest limiting the number of courses the librarian is embedded in, others recommend a two week duration of embedment (Calkins & Kvenild, 2010; Matthew & Schroeder, 2006). The increasing number of online courses suggests that librarians find a way to serve as many courses as possible – thus the recommendation for a shorter period of embedment appears to better meet the needs of librarians wishing to serve as many students as they can.

Assessment of Library Instruction

Assessment of library instruction is a key for librarians to understand the effectiveness of their instructional products (Fiegen, 2011; Oakleaf, 2008), yet many librarians are often unaware of the methods needed for proper assessment (Hines, 2008; Oakleaf, 2008). Assessment of the completed project is an essential and ongoing process and can include assessment “to provide statistical information to administrators, to compare delivery systems, to determine cost-effectiveness, to judge the performance of an individual learner, and to measure and provide feedback on overall learning in a course or course component” (Dewald et al., 2000, p. 39). To assess learning, librarians should examine the learning objectives for their instruction session (Morrison, Ross,

Kalman, & Kemp, 2011; Oakleaf, 2008). Information literacy skills are best assessed with application activities, particularly opportunities that challenge students to apply their information literacy skills to situations that they will encounter (Carlock & Anderson, 2007; Dewald et al., 2000; Leibiger, 2011). Methods librarians use to assess information literacy training include pretest/posttest measurements (Anderson & May, 2010; Dewald et al., 2000; Edwards et al., 2010; Kealey, 2011; Knight, 2002; Kraemer, Lombardo, & Lepkowski, 2007; Staley et al., 2010; Winterman, 2009; Winterman et al., 2011), student feedback (Bordonaro & Richardson, 2004; Brown, Yff, & Rogers, 2011; Dewald et al., 2000; Ferrer-Vinent & Carello, 2008; Hensley & Miller, 2010; Kimok & Heller-Ross, 2008; Michel, 2001; Schutt & Hightower, 2009; Tennant, Edwards, & Miyamoto, 2012a; Tennant et al., 2012b; Tennant & Miyamoto, 2002; Tumbleson & Burke, 2010; Washburn, 2008), rubrics (Bowler & Street, 2008; Carlock & Anderson, 2007; Kohl & Wilson, 1986; McMillen & Fabbi, 2010; Oakleaf, 2008; Pritchard, 2010), library assignments (Ferrer-Vinent & Carello, 2008; McMillen & Fabbi, 2010; Tennant & Miyamoto, 2002), and citation analysis (Ackerson, Howard & Young, 1991; Barratt et al., 2009; Clark & Chinburg, 2010; Davis & Cohen, 2001; Davis, 2002; Edwards, 2011; Hearn, 2005; Hovde, 1999; Hurst & Leonard, 2007; Kohl & Wilson, 1986; Robinson & Schlegl, 2004).

Pretest/posttest

Pretest/posttest assessments, in the form of fixed-choice tests, are frequently used in the evaluation of library instruction (Anderson & May, 2010; Dewald et al., 2000; Edwards et al., 2010; Kealey, 2011; Knight, 2002; Kraemer et al., 2007; Staley et al., 2010; Winterman, 2009; Winterman et al., 2011). These tests allow librarians to examine students' information literacy skills and perception of their skills prior to and

after library instruction (Dewald et al., 2000; Oakleaf, 2008). There are challenges with using this method of assessment. Frequently student scores on the pretest and posttest are very similar (Anderson & May, 2010; Kraemer et al., 2007). Oakleaf (2008) suggests that these tests are testing students' recall of information and not their actual use of the information learned in the session. Similarly, Kohl and Wilson (1986) suggest that while these measures allow librarians to better identify changes in student attitude toward library research and understanding of tools, they do not allow librarians to assess use of such resources.

Student feedback

Student feedback provided in the form of a survey, interview, or course evaluation allows librarians to better understand how their instruction is received by students (Bordonaro & Richardson, 2007; Brown et al., 2011; Dewald et al., 2000; Ferrer-Vinent & Carello, 2008; Hensley & Miller, 2010; Kimok & Heller-Ross, 2008; Michel, 2001; Schutt & Hightower, 2009; Tennant et al., 2012; Tennant & Miyamoto, 2002; Tumbleson & Burke, 2010; Washburn, 2008). While these assessments can provide a wealth of information (Dewald et al., 2000), they are sometimes challenging to design (Brown et al., 2011) and provide only student opinions or perceptions (Kohl and Wilson, 1986).

Rubrics

Oakleaf (2008) suggests a rubric-based assessment method. Students benefit from rubrics in having well-defined expectations from their instructors and an assurance of receiving useful feedback. Librarians benefit from the use of rubrics in that they are cost-effective and provide detailed data that can be used to improve future instruction sessions (Carlock & Anderson, 2007). Challenges for librarians include the time and

understanding required for effective construction of rubrics that provide useful and reliable information (Oakleaf, 2008).

Library assignments

Library assignments are designed for students to complete after library instruction, often to reinforce the skills needed to successfully complete future assignments in their course (McMillen & Fabbi, 2010; Tennant & Miyamoto, 2002; Tennant et al., 2012b). University of Nevada-Las Vegas librarians successfully partnered with instructors in the College of Education to develop a library assignment that would target information literacy skills needed by students in for completing a major paper in their face-to-face course (McMillen & Fabbi, 2010). The assignment allowed librarians to assess student learning, while simultaneously forcing students to collect and analyze resources that were needed to prepare for a major paper in their course. Tennant and Miyamoto (2002) describe a semester-long partnership in a face-to-face undergraduate genetics course. Students participated in multiple instruction sessions with the librarian. After each session, students completed graded assignments related to the library instruction. These kinds of assignments can be useful for multiple purposes, allowing librarians to better gauge information literacy skills and student learning, while encouraging students to participate in activities that prepare them for future assignments in their courses.

Citation analysis

Citation analysis, or bibliometrics, is a method of analyzing bibliographies (Davis & Cohen, 2001). Historically this analysis method was used to examine publication trends (Davis & Cohen, 2001; Edwards, 2011). Increasingly this is a method utilized by librarians to evaluate the bibliographies of student research papers as a means of

assessing library instruction (Ackerson et al., 1991; Barratt et al., 2009; Clark & Chinburg, 2010; Davis & Cohen, 2001; Davis, 2002; Edwards, 2011; Hearn, 2005; Hovde, 1999; Hurst & Leonard, 2007; Kohl & Wilson, 1986; Robinson & Schlegl, 2004). Citation analysis is a method “evaluating both instruction effectiveness and the impact of the Internet on undergraduate citation behavior” (Clark & Chinburg, 2010, p. 533). Methods for citation analysis vary, but most allow for a “statistical comparison of the number, age, and/or type of sources cited” (Clark & Chinburg, 2010, p. 533). Hurst and Leonard (2007) performed citation analyses on bibliographies from face-to-face students in a junior level business class and found that students selected more academic resources when they were in a course with a library instruction session. Likewise, Barratt et al. (2009) and Robinson and Schlegl (2004) found face-to-face student bibliographies to be of a higher quality in courses that had a library instruction session tied to a course assignment. Edwards (2011) was embedded in an online educational technology course and examined students’ citations on a course assignment. Students in the online course had high quality resources in their bibliographies for the course assignment.

Gaps and Challenges in the Literature

While there are many reports of librarians implementing online embedded librarian projects, often these do not include formal assessments of student learning or student application of information literacy skills in these. Rather, student satisfaction or perception assessments were the dominant form of evaluating the projects (Schutt & Hightower, 2009; Tumbleson & Burke, 2010; Washburn, 2008). Hines (2008) points out the lack of assessment by librarians for online students. She surveyed librarians from 143 institutions that serve distance education students, with a 55% response rate; she

found that 60% of the librarians indicated that no assessment was done for their distance students. Those that did assess distance education efforts were focused on tracking Web statistics, surveying students, and examining course evaluations. While the overwhelming majority of the studies did not assess learning, several researchers used citation analysis on bibliographies of student papers (Clark & Chinburg, 2010; Edwards, 2011) and pre/posttest assessments (Edwards et al, 2010; Kealey, 2011). There is a demonstrated need for additional studies that examine student learning of information literacy skills in courses with an embedded librarian.

It is clear from the review of the literature that librarians are making great attempts to provide instructional services to distance learning students. While there appears to be considerable praise for the embedded librarian in the online classroom, there are also frequently noted issues with the embedded librarian projects as presently designed. The literature is filled with discussions of the time-consuming nature of these projects and calls for a less time-intensive model of such a service (Bennett & Simning, 2010; Bozeman & Owens, 2008; Burke et al., 2010; Calkins & Kvenild, 2010; Dinwiddie, 2005; Drumm & Havens, 2005; Edwards et al., 2010; Figa et al., 2009; Hoffman & Ramin, 2010; Jackson, 2007; Kearley & Philips, 2004; Markgraf, 2004; Matthew & Schroeder, 2006; Schutt & Hightower, 2009; Shank & Dewald, 2003; Veal & Bennett, 2009).

These findings demonstrate a need for a study that examines a model of online embedded librarianship that is scalable while simultaneously examining the value of such a project on student information literacy skills. Such a project provides information

that is useful for librarians that are planning on implementing or modifying an online embedded librarian program.

Connection to Context

The context for this study is online sections of an English II course in a community college. As recommended by Shank and Dewald (2003) the library has a presence in the LMS for the college. The presence is minimal - students can access the library's webpage by clicking on a tab at the top of the main LMS page. Presently students participating in online courses, other than those in the English II course at the Plant City Campus, are provided with no formal library instruction. Few services, other than access to the online library materials, are available to distance learning students. The Dunning-Kruger effect (Kruger & Dunning, 1999) suggests that this allows students in online courses to remain unaware of the library and unaware of their low information literacy skills. Moore's (1972, 1991) theory of transactional distance is a key for librarians at the community college to reduce the distance between the librarians and students, which can increase students' awareness of their information literacy skills. These theories, along with situated cognition, suggest that the college librarians should provide services other than the online library materials to students in online courses. The following project is one such effort at providing library instruction to students in an online course.

CHAPTER 3 METHODOLOGY

Introductory Remarks

This chapter describes the design and implementation of the embedded librarian project at Hillsborough Community College and provides the methodology for the data collection and analysis of the study. An overview of the project, including context and history of the project, will be followed by a discussion of the design of the current study, and the methodology. The methodology for the research portion of the study includes a description of the study, participants, and assessment tools. The chapter will conclude with a discussion of validity and reliability.

Context and History of the Project

The English II Course

The librarian in this study has worked closely with an English faculty member at the college to establish an embedded librarian in each of English II courses that she teaches online. This undergraduate course is intended to introduce students to a variety of works of literature, as well as to provide instruction in writing a variety of essays, including a formal research paper. English II is typically taken in the semester following students' completion of English I. Students in the course have all taken English I at the college level, either as a formal course at the college or as an Advanced Placement course during high school. Students could have taken English I recently, or many years ago if they are a student that has a gap in their educational career. Students may or may not have had any formal library instruction prior to their enrollment in English II, as English I does not typically require formal library research for assignment completion.

This online English course is the second in a series of two English courses required for students pursuing an Associate of Arts degree at the community college. All sections of English II require that students write a variety of researched essays; the sections taught by the instructor in this project require that students write three literature-based researched essays. Though students may have experience reading English literature from their time in high school, rarely do they possess the skills to conduct literature-based research. The freshman series of English courses provide students with their first introduction to college-level research (Foley, 2001). While this introduction is essential, English instructors frequently report challenges for students to complete a well written, thoroughly researched, research paper (Broskoske, 2007; Foley, 2001). Collaboration between a librarian and course instructor is one way to address some components of this issue. For this project the librarian and course instructor collaborated to provide students with information literacy instruction and practice. This ongoing collaborative relationship and participation by the librarian in the class has allowed the librarian to gain a better understanding of the requirements of the course and the needs of the students in the class.

The Online Embedded Librarian

As described earlier, embedded librarian projects can vary – from face-to-face departmental librarians to face-to-face course-embedded librarians to online course-embedded librarians. This project evolved as the course evolved from a face-to-face offering to an online only course. The course that was the focus of this project has been served by a librarian in a face-to-face format for multiple years and as an online-only course for the past three years. As the instructor transformed her courses, first to a blended format and now to fully online, the librarian remained involved in the course.

The involvement by the librarian in the course changed over time. As most courses at the campus are available in a face-to-face format the librarian has great access to and success in working with students in the face-to-face environment. Yet when the course transitioned from fully face-to-face to blended, and then to completely online, it was challenging for the librarian to maintain access to the students in the course. No longer was the librarian able to stop in the classroom to talk with the students, instead she had to communicate with the course instructor to provide information to the students in the course. Over time, with numerous conversations and modifications, the librarian has been included as a co-instructor in the online course.

Prior to the librarian being embedded in the online class as a co-instructor, the instructor would contact the librarian with any questions she had received from students that required librarian assistance. The librarian provided an answer to the instructor who then relayed this to her students. The instructor's acting as a go-between for the librarian and students could have increased the distance that students felt from the librarian. The librarian collected many of the questions and created a LibGuide, an online tip sheet, which was intended to address the more frequently asked questions. Additionally the guide contained information, tips, and resources that addressed the various research-related assignments in the course. Though this served as a useful instructional tool, the structure of the tool, along with the lack of student-librarian communication, continued to produce increased transactional distance between the librarian and students. Each semester the instructor reviewed the LibGuide and contacted the librarian to make relevant changes. After numerous changes, the instructor and librarian met to talk about how they could better meet the needs of the

students. Collectively they decided to add the librarian to the course, first as a student-guest and eventually the librarian was added to the course as a co-instructor. Most importantly, this role allowed the librarian to communicate directly with students within the course, while also allowing the librarian to make changes to the course content and arrangement, add announcements, monitor discussion boards, and upload documents.

This has been an ongoing project, with the librarian embedding in an increased number of courses and sections each semester. It has required a great deal of collaboration and communication between the librarian and instructor. The collaboration between the librarian and instructor consisted of extensive communication to establish goals for the librarian's involvement in the course, the refinement of assignments that require library research, and a plan for the kind and timing of instruction that will take place. Each semester the librarian and instructor meet several times to discuss the project. Typically they communicate prior to the beginning of the semester to discuss any changes in the course content or assignment requirements. Throughout the semester they communicate when issues or questions arise. Additionally, they typically meet at the conclusion of the semester to discuss the project. Recently this resulted in the instructor sharing feedback from the student evaluations of the course. Several of the evaluations praised the project and others provided information that was used by the librarian to improve the quality of the videos in the course.

Design of the Current Study

The design of the current study continues the work began by the librarian embedded in the online English II courses and extends this work by modifying the degree of embedment from a full-semester to a two-week embedment. The design of both the overall project and the current study are based on best practices in educational

and library literature. The librarian focused on addressing both the communication and instructional needs of students in the online course to improve students' information literacy skills. Moore's (1972, 1991) theory of transactional distance, best practices recommended by Bozeman and Owens (2008) and York and Vance (2009), and questions posed by Markgraf (2004) were used to structure the project. Collaboration between the librarian and instructor is a key element of the success of any library instruction (Dewald et al., 2000), and is essential for the success of an online embedded librarian project (Bozeman & Owens, 2008; Shank & Dewald, 2003). Instruction was designed using the Morrison et al. (2011) instructional design method.

In this study, the online embedded librarian was included in the online classroom as a co-instructor. Students searching for the course in the schedule of classes saw both the instructor and librarian names as the instructors for the course. In addition to elevating the importance of the librarian to students, having this instructional status enabled the librarian to work and communicate with students in a variety of ways within the course that are impossible when the librarian is an 'outsider'. Adding a librarian to a course is challenging as it is allowing someone other than the primary instructor in the classroom which could have political and financial implications, thus there must be a clearly defined role for the librarian in the course that prevents infringement upon the course instructor's ability to be the primary instructor in the course. The addition of the librarian to the course is also a challenge because it is allowing an 'outsider' in the classroom (Dewald et al., 2000). In this study, the established relationship between the course instructor and the librarian made the addition of the librarian to the course a very easy process.

The online nature of this project required that the librarian consider Moore's (1972, 1991) theory of transactional distance. This theory suggests that the dialogue and structure in an online course are key factors to reduce the distance that the student feels from the instructor, in this case the librarian. Meaningful communication between the librarian and the students is a type of dialogue that makes students feel more connected to their course. The structure of the library instruction, providing instructional materials in a variety of formats and making them accessible to students at their point of need, was designed keeping students' busy schedules in mind.

The time intensive nature of such projects requires that librarians limit the number of courses that they are embedded in (Bozeman & Owens, 2008; York & Vance, 2009). The librarian-researcher was embedded in four different sections of the same course for this study. Three of the sections involved the librarian being embedded for only two weeks, while one section involved the librarian being embedded for a full semester (Table 3-1).

Communication

During the first week of the course, the librarian sent a course message to students in each section of the course that contained a brief introduction to the librarian and study, information about how the librarian was able to assist the students in their course, and asked for students' permission to participate in the project. This message stressed the variety of communication methods available to use for working with the librarian (Bozeman & Owens, 2008; Shank & Dewald, 2003). A schedule for the librarian's monitoring of communication (Appendix A) was posted in the course and on the course LibGuide. Communication methods used in this project included course message, email, instant message, discussion board, telephone, and in-person visit

(Table 3-2). Communication with students was timely, yet manageable (Markgraf, 2004; York & Vance, 2009). Messages in response to student questions included both text answers and screenshots or brief video screen captures, when needed to properly address the question (Sekyere, 2009). Communication methods that were only monitored during the period of embedment were course message, Ask the Librarian discussion board, and Blackboard instant message. Other communication methods, email, telephone, and office visits, were monitored throughout the semester as these are standard communication tools for all students at the campus. Students that wished to communicate with the librarian during the time that she was not embedded within the course had to use email, telephone, or office visits in order to get a response.

The librarian was an active participant in the course during the time that she was embedded. Active participation, as described by Markgraf (2004) and York and Vance (2009), requires that the librarian decide and notify students of her level of involvement in the course. Additionally, Bozeman and Owens (2008) recommend that the librarian actively provide information when it appears that students are having difficulty with an assignment or task. For this project the librarian focused on using the variety of communication methods described above. When she noticed students asking similar questions or questions that were relevant to the entire class, she attempted to address those questions in a manner that met the needs of most students. For example, a student sent an email to the librarian asking for assistance in locating the materials for the library research assignment during the week students were working on the assignment. Rather than responding only to the student, the librarian sent a response to the entire class that reminded them of the LibGuide tips for the assignment.

Instruction

This project was about more than communication with students. Instruction for students consisted of a course-specific LibGuide, a recorded video introduction to the library, and a synchronous online instruction session. Graded assignments were completed by students throughout the semester that required the application of learned information literacy skills.

Instructional Design Process

The content for the online embedded librarian project was designed using the Morrison et al. (2011) instructional design process and best practices in embedded librarian literature. Initially the librarian and instructor met to discuss issues students were having in the course. The information provided by the instructor, along with the knowledge of the student population from the librarian, was key to assessing the performance of the students. Their poor selection of resources was due to lack of knowledge or understanding of research skills.

The librarian-researcher is very familiar with the variety of students that participate in online courses at HCC, thus a formal learner analysis was not done. Instruction was designed to meet the needs of most learners, with varying formats (video, print, and graphics) and varying communication methods in an attempt to address the different learning styles and preferences of the students.

The instructional components of the course were all available within the students' online course. This allowed the instruction to be housed within an area that is familiar to the students, with the desire of increasing their comfort with both the information and the librarian. Additionally, the content of the instruction was directly related to assignments that students had to complete within the course. Examples used by the

librarian in the LibGuide were drawn from the assignments that students would complete in the course.

The librarian used a screen recording program to document the steps required by students to locate materials that were appropriate for the research essays in the course. This allowed the librarian to view and breakdown the various steps and tasks that are necessary for students to complete to successfully locate the research materials for their essays.

The librarian developed the following instructional objectives for the embedded librarian study.

As a result of participating in this instruction, students will be able to:

- identify appropriate research sources
- access subject-specific library resources
- effectively search library resources
- select articles relevant to their topics
- evaluate and critically appraise selected articles for appropriateness to topic
- organize citations in a comprehensive bibliography using MLA citation style
- identify when and how to contact the librarian for assistance.

Students were required to complete various assignments that require library research in the course. The library research assignment (Appendix B) and critical analysis essay (Appendix C) were used to evaluate student learning from the library instruction in this study.

Instructional Components

The librarian and instructor collaborated on the content for a course LibGuide. This guide was a course-specific webpage with information and resources intended to assist students in completing the research for their assignments. The resources selected for the guide are those that were most useful for students when completing

their library research assignment and research papers. Each recommended resource was listed on the guide with a link directly to the resource and tips and instruction for using each of the resources. Each research assignment in the course had a tab, or a page, within the guide that included instructions and resources directed at that assignment (Shank & Dewald, 2003). Example searches directly related to students' assignments were included, as were printable instruction sheets for each of the recommended databases listed in the LibGuide. A LibGuide can have a status of "published", which allows anyone with internet access to locate the guide, or a status of "private", which only allows individuals with the specific URL to access the guide. For the purposes of this project, there was a guide created for each section of the course and all were marked as "private" to enable the librarian to verify that the views of the guide were from students in the course. Students in each section were able to locate their section-specific guide linked within two content areas of the course in the LMS. While students initially had to access the LibGuide from within the LMS, they did have the ability to bookmark the page to access it later without going through the LMS.

The course instructor required that all students watch an introductory librarian-created video during week 2 of the course. The library welcome video provided students with a brief overview of the librarian's role in the course, the LibGuide, and library databases.

An online synchronous instruction session was offered to students during the second week that the librarian was embedded in each of the courses. The session was announced to students in the course one week prior to the session, with a reminder announcement posted the day before the session. The synchronous instruction

provided students with an in-depth introduction to the librarian, library, and resources necessary for their course assignments. Participating students were asked to participate in the session by asking and responding to questions and sharing their search results. The sessions were recorded and a link to the session was posted in each class.

Within the course were graded assignments that required students to use library resources. Bozeman and Owens (2008) recommend this as a way to get students to use the library resources that are required for future assignments in the course. Simultaneously this provides students with a graded incentive to utilize the library resources. Students completed a library research assignment and three researched essays in the course. Each of the assignments required library research for successful completion. The library research assignment in the course for this study was required for each student in the course. The assignment required that the students utilize both the LibGuide for the course, as well as library databases, to correctly complete all questions on the assignment. This assignment (Appendix B) was originally designed by the course instructor. Over time the assignment has been modified with input from the librarian. Prior to the start of this project, modifications included revising questions, updating database names, and adding a question to gauge students' experience with library instruction. The essays written by students in the course required a minimum of three scholarly/academic sources for a successful grade. For this study, the librarian evaluated only students' performance on the library research assignment and the first essay in the course.

Method

The intervention used in this study, an online embedded librarian in multiple sections of an online English course, was evaluated using mixed methods. This section

will present literature relevant to the design, describe the method, describe the data analysis, and discuss the methods used to address validity.

This project examined the impact of an online embedded librarian on student information literacy/research skills in four sections of an online English 1102 course, three sections had an embedded librarian for a two-week duration and one section had an embedded librarian for the full duration of the semester. The librarian was embedded in the online courses to provide instruction and communication to students. This instruction was intended to increase students' information literacy skills, which improves their performance on research-based assignments. The different sections used in this study allowed for examination of student information literacy skills when in a course with a 'just-in-time' librarian or a 'just-in-case' librarian. A 'just-in-time' librarian is one who is embedded in the course for a limited time at a strategic point in the course. A 'just-in-case' librarian is one who is embedded in the course for a full semester.

The librarian was embedded in four online English courses. All courses were taught completely online by the same instructor with the same content, activities, and assignments. Two of the sections of the course were 12 weeks in duration, while two of the courses were 16 weeks in duration. All content in the courses was exactly the same for week one through week nine. The librarian was embedded for the full duration of one section and embedded for two weeks at different times in the remaining three sections (Table 3-2). As described earlier in the chapter, the librarian provided embedded communications and instruction during the selected weeks of embedment. The course instructor promoted the embedded librarian project to students by listing the librarian's information in the course syllabus and allowing the librarian to have full access to the

course. The course instructor was aware of the time required for providing the embedded librarian services and was in favor of investigating a more sustainable model of service.

The overall research questions for this project are:

- How does the timing of an embedded librarian in an online English course impact students' learning and application of information literacy skills;
- What are the differences, if any, in students' information literacy skills, with a two-week embedded librarian and a full-semester embedded librarian?

These questions were addressed by:

1. Examining the differences (if any) in student performance on an instructor-assigned library research assignment;
2. Examining the differences (if any) in student bibliographies on one essay in the course;
3. Examining the difference (if any) in access of and utilization of librarian provided materials;
4. Conducting a face-to-face interview with the course instructor; and
5. Maintaining a researcher notebook.

The collected data from the list above was used to evaluate this project.

Students' information literacy skills were evaluated using both the library research assignment (1) and the bibliography from the first essay in the course (2). Student utilization of the librarian provided materials (3) were examined to provide information that demonstrates which, if any, of the provided resources were used, along with the frequency and timing of their utilization. The instructor feedback, via the face-to-face interview (4), provided the researcher with information about the context of the study. Finally, the librarian-researcher maintained a researcher notebook (5) during the project and noted unusual events and issues that could have impacted the study. This

research was approved by the University of Florida Institutional Review Board (IRB 02 for non-medical research – 2012-U-1339).

Analysis of Student Work Related to Library Instruction

All student work evaluated by the researcher was done after the course instructor has graded the assignments. Grades calculated by the course instructor were not shared with the researcher. The researcher examined student work, in the form of a library assignment and critical analysis essay, to evaluate information literacy skills only. The results of the study were not shared with the course instructor until the course finished and final grades were posted.

Library assignment

Students completed a library assignment during week five of the course that was designed to direct students to use a variety of library and research resources. Each of the resources used to complete the assignment were acceptable to use for other assignments within the course. Library assignments for each section of the course were collected and evaluated by the librarian-researcher. Each question on the assignment was marked correct or incorrect. Correct answers were given a point. Incorrect answers received zero points. A score of 13 points indicated a paper with no incorrect answers. The scores were compared using ANOVA to determine if significant differences exist between the different variants of embedded librarian.

Citation analysis

Citation analysis was used to examine the resource selection of students in the sections of the course for their first essay in the course. While citation analysis was traditionally used to evaluate library collections (Davis & Cohen, 2001; Knight-Davis & Sung, 2008), librarians are increasingly using it to assess student learning from

information literacy instruction (Ackerson et al., 1991; Ackerson & Young, 1994; Barratt et al., 2009; Clark & Chinburg, 2010; Davis & Cohen, 2001; Davis, 2002; Edwards, 2011; Hearn, 2005; Hovde, 1999; Hurst & Leonard, 2007; Kohl & Wilson, 1986; Lindauer, 1985; Robinson & Schlegl, 2004; Young & Ackerson, 1995). Librarians use variations of this methodology to evaluate the number and quality of resources cited in bibliography. Citation analysis can be conducted in a quantitative or qualitative manner. A quantitative citation analysis, such as those conducted by Barratt et al. (2009), Clark and Chinberg (2010), Davis and Cohen (2001), Davis (2002), Hovde (2000), Hurst and Leonard (2007), Malone and Videon (1997), and Robinson and Schlegl (2004), examine bibliographies to determine and quantify the types, ages, and origin of resources used by students in research papers. According to Tunon and Brydges (2006) such examination is based on constructivist theory and assumes that each citation is independent of the others. These studies are useful in examining students' use of electronic information or websites, but do not address student learning from library instruction. Qualitative citation analysis is a methodology that examines student bibliographies in concert with the research papers or essays they accompany (Ackerson et al. 1991; Ackerson & Young, 1994; Lindauer, 1985; Knight-Davis & Sung, 2008; Kohl & Wilson, 1986; Young & Ackerson, 1995).

Citations from the critical analysis essays were evaluated using a modified version of the Young and Ackerson (1995) model that was based on the Kohl and Wilson (1986) citation analysis method. This method of analyzing citations is a qualitative method. The method assesses each student bibliography as a whole, examining the appropriateness of the resources, the timeliness of the materials, and the

quality of the resources for the topic. The subjective nature of this analysis required a detailed rubric (Appendix A). Two librarians, the librarian-researcher and a librarian from another campus of the community college, evaluated each of the citations from the critical analysis essays. Each of the librarians has a master's degree in library and information science and at least six years of experience as a librarian in an academic library. To establish reliability for this measure, the two librarians used the rubric for each of the bibliographies. An intraclass correlation coefficient (ICC) was calculated to determine interrater reliability. Scores calculated by the librarians for each student were combined and averaged to get a single score for each bibliography.

Log data analysis

In addition to looking at student work, it was imperative that the researcher examine student access of library provided instructional materials. If students successfully completed their assignments, yet never accessed any of the library instructional materials, it cannot be claimed that the librarian had any impact on student learning. Thus student access of the library provided materials were monitored using the Blackboard Statistics Tracking feature. The quantity of accesses of items, as well as the timing of the access was noted. The LibGuide software provides an additional tracking feature that was used for this project to examine the number of accesses of the LibGuide for each section. It was particularly important to monitor the timing and quantity of access of the instructional materials, as the timing of the access could have an impact on the timing of future embedded librarian projects.

Instructor interview

The researcher conducted a face-to-face interview with the course instructor at the conclusion of the course. The interview was designed using Patton's (1987)

methodology for qualitative interviews and was used to gather qualitative information from the instructor regarding her perception of students' use of the library and performance of students in the sections with differently timed embedded library services (Appendix H).

Student interaction tracking

The researcher kept track of the time spent as an embedded librarian using Toggl, an online time tracking tool. This tool allowed the researcher to log the exact amount of time spent doing each activity related to the course. Time was tracked by individual course section and by activity (Appendix E).

Interactions with students, such as answering questions and posting responses in the discussion board, were recorded using Gimlet, an online library reference question tracking tool. The tool enabled the librarian to track the number, type, and duration of questions, as well as the section number of the student and how the question was received (Appendix F).

Researcher notebook

The researcher kept notes about her experience in the sections using an online word processing program. These notes consisted of reactions to events and reflections on the sections and projects as they occurred.

Validity and Reliability

Construct Validity

Construct validity was addressed in this study by using multiple sources of data. Student learning of library research skills was measured by examining the application of library research skills in two work products from each student that volunteered to participate from each section of the course. This included examining their library

research assignment (week 5) and bibliographies from the critical analysis essay (week 5).

In addition to the work products, data were collected from the instructor to examine her opinion of the project. An interview was conducted with the course instructor to explore her impression of the project, particularly her impressions of student performance in the different sections of the course.

Internal Validity

Internal validity was addressed by embedding the same librarian in multiple sections of the course. All sections of the course were fully online, requiring no on-campus meetings, thus students randomly selected which section, of the same course with same instructor, to enroll in. Consistent instruction and data collection procedures were maintained for each of the sections.

External Validity

The findings of this study are useful to those librarians and faculty members interested in the inclusion of embedded librarians in online courses. The study provides information about the timing of embedment, which is particularly important when librarians are working to balance both face-to-face and online course responsibilities. Additionally the findings of this study are applicable to future sections of this course at HCC.

Librarian as Researcher

The librarian for this project also served as the researcher. The librarian-researcher has worked as a professional librarian from 2001 to the present, from 2006 to the present as the solo faculty librarian for the Plant City Campus of Hillsborough Community College. In this capacity she is the primary provider of library instruction for

all courses that are taught at the Plant City Campus. In addition to providing instruction for face-to-face courses, she has worked as an embedded librarian for online English courses at the campus for the past three years. Additionally the librarian-researcher teaches at least one section of a fully-online course, independent of the library, each school year. These experiences have been a basis for the formation of the librarian's feelings about providing library instruction for students, particularly online students. The librarian focuses on providing a student-focused service that encourages use of the library, encourages students to contact the librarian for help, and empowers students to use their experiences and knowledge to assist in their research experience.

The librarian-researcher is a third year student in an online doctoral program for educational technology. This experience has provided her with education and knowledge that enables her to better understand the technological and communication issues that arise when one is a student in an online course.

The librarian-researcher and course instructor for this project are both tenured faculty members at the college, thus they work as colleagues. Though they work as colleagues at the college campus, the librarian is a guest in the instructor's course. This role is one that the librarian would like to maintain, thus the librarian is careful to avoid overstepping the bounds of the librarian role in the classroom. Occasionally this is challenging, as students contact the librarian for course-related questions.

In the role of both librarian and researcher, there is a potential for bias. The librarian-researcher, in the role of librarian, is interested in providing embedded librarian services to additional courses, thus the examination of the current project. The librarian-researcher, in the role of researcher, is interested in examining the differences that

occur as a result of the timing of the embedded librarian. Additionally, the course instructor is interested in the librarian providing embedded librarian services to more courses that she teaches each semester. The librarian-researcher collected a variety of data, both qualitative and quantitative, from each section of the course to prevent these potential biases from impacting the results of the study. In addition, an impartial librarian from another campus assisted with the citation analysis, as it is a subjective process. Overwhelmingly the librarian is interested in providing the best service to students that is possible, which is instrumental to removing bias from this project.

Table 3-1. Embedded librarian timing by section.

	Section A	Section B	Section C	Section D	Assignments
Week 1				Embedded	
Week 2	Embedded			Embedded	View library orientation video
Week 3	Embedded	Embedded		Embedded	
Week 4		Embedded	Embedded	Embedded	*Planning Pages for Critical Analysis Essay Due
Week 5			Embedded	Embedded	*Critical Analysis Essay Due *Library Assignment Due

Table 3-2. Communication between librarian and students.

Communication	Description	Intended Interactions
Ask the Librarian Discussion Board	Discussion board within the Blackboard LMS course environment. Checked twice daily Monday – Friday and once Saturday.	Students post questions that are relevant for the entire class; answers are useful for all.
Course Messaging	Internal course messaging (mail) system. The messages are accessible only when logged into the Blackboard LMS. Checked twice daily Monday – Friday and once Saturday.	Students are able to communicate directly with the librarian. Most communications are expected to be personal in nature.
Instant Message/Chat	Blackboard Instant Message program. This is downloaded to a user’s computer and runs independently of the Blackboard LMS. Students are invited to download the widget at the beginning of each term. When they log in, they see only members of their enrolled courses. The librarian is available approximately 11.5 hours per week (Monday – Thursday).	Interactions between students and librarian are synchronous and quick. Messages are more private in nature, and often require an immediate answer.
Email	Students are provided with the librarian’s HCC email address and encouraged to contact her for assistance and questions. Checked daily.	Students are able to communicate directly with the librarian. Most communications are expected to be personal in nature.
Telephone	Students are provided with the librarian’s office telephone number and encouraged to contact her for assistance and questions.	Students are able to communicate directly with the librarian. These communications are expected to be personal in nature.
Office visits	Students are provided with the office location information for the librarian.	Students can visit the librarian in her office.

CHAPTER 4 RESULTS

Introductory Remarks

This chapter presents the results of a study conducted to examine differences in students' learning and application of information literacy skills with different timings and different durations of an embedded librarian in an online community college English course.

The study was conducted with four sections of an online English course during the spring 2013 semester at Hillsborough Community College. Section A had the librarian embedded during weeks two and three of the semester; Section B had the librarian embedded weeks three and four; Section C had the librarian embedded weeks four and five; and Section D had the librarian embedded for the full semester. Students voluntarily provided the librarian access to their assignments, which were analyzed to evaluate the students' information literacy skills. The research questions guiding the study were:

- Research Question 1 (RQ1): How does the timing of an embedded librarian in an online English course impact students' learning and application of information literacy skills?
- Research Question 2 (RQ2): What are the differences, if any, in students' information literacy skills, with a two-week embedded librarian and a full-semester embedded librarian?

Data collected to address these questions is presented in this chapter.

Descriptive data for the four sections of the class is presented first. Next is information about the communications between the librarian and students in all four sections. This is followed by data that addresses RQ1, as RQ1 investigates only the difference in timing data pertains only to the two-week sections of the course (Sections A, B, and C). Data

that addresses RQ2 is presented next. This is followed by an analysis of student performance on the library research assignment and citation analysis score with access of instructional materials. Finally, qualitative data consisting of the instructor interview and notes from the researcher notebook follows, and the chapter concludes with a summary of findings.

Descriptive Data

Seventy-seven students were enrolled in the four sections for the full duration of the first five weeks of the course, of these, 30 students provided permission for their work to be viewed by the librarian-researcher (Table 4-1). Of these 30 students, seven students did not complete either assignment that was examined by the librarian. Two of these seven students withdrew from the course; while the remaining five of these students did not complete either assignment yet remained enrolled in the course. The remaining 23 students completed at least one of the two assignments. Twenty-two students completed the library research assignment, and twenty-two students completed the first essay for the course. One student completed only the library research assignment, and one student completed only the first essay for the course.

Communication with Students

Students were invited to interact with the librarian using communication tools within the course LMS (course messaging, instant message, and discussion board), as well as standard communication tools (email, telephone, and in-person visits to the library). The librarian monitored the amount of time spent on each of the communication methods with students using Toggl, an online time tracking tool (Appendix E). A total of ten hours and 39 minutes were spent working with section A; 17 hours and 27 minutes

were spent working with section B; 20 hours and 10 minutes were spent working with section C; and 40 hours and 41 minutes were spent working with section D (Table 4-2).

The librarian received 24 requests for assistance from students in all four sections. Students in sections C and D contacted the librarian most often, with nine questions (37.5%) per section, followed by section A with four questions (16.7%), section B with two questions (8.3%) (Table 4-3). Analysis of the questions posed by week of the course, including all sections, indicate that students most frequently contacted the librarian during weeks one and four of the course. Twenty-nine percent (seven questions) of the questions asked of the librarian were asked during week one. Twenty-five percent of the questions were asked during week four. Questions posed by students to the librarian were classified as library-related (LR), such as requests for assistance with research, citations, and accessing the library resources, or course-related (CR), such as requests for help with the Blackboard LMS and questions about due dates of assignments. CR questions were forwarded to the instructor. Of these questions, during week one students asked three CR questions and four LR questions. During week four, six questions were asked with four being LR (reference, library instruction session, and citation assistance) and two CR (Table 4-4).

Questions were most often posed to the librarian using the LMS course messaging system and the course discussion board. Eleven (45.8%) of the questions were sent using the course messaging system and nine questions (37.5%) were asked in the course discussion board (Table 4-5). Students did not contact the librarian using regular email or in-person visits at all during this project.

Questions posed by students were primarily library-related. Library-related questions were categorized as reference, citation, library instruction session, or directional. Questions classified as reference were those that required research-assistance; questions classified as citation were those that posed questions about how to cite a resource using the MLA citation style; questions classified as library instruction session were those that posed questions about the timing and access of the online library instruction session; and questions classified as directional were those that posed questions about where to access a particular resource. Sixty-seven percent of the questions posed by students were library-related: 45.8% reference, 8.3% citation, 8.3% library instruction session, and 4.2% directional (related to the library) (Table 4-6). Eight questions (33.4%) were asked that were course-related. Questions posed to the librarian were generally not complex, with 87.5% of the questions posed being answered in fewer than ten minutes.

Comparisons of communications with students demonstrate that students in sections C and D (librarian embedded during weeks 4 and 5 and library embedded for full semester of the course) more frequently contacted the librarian for assistance as they posed 75% of the questions, with each group posing 37.5%. Students in section A (librarian embedded weeks 2 and 3) posed 16.7% of the questions and section B (librarian embedded weeks 3 and 4) posed 8.3% of the questions.

Research Question 1 Data

The first research question for this study is, 'How does the timing of an embedded librarian in an online English course impact students' learning and application of information literacy skills?' This question focuses on the examination of the timing of a two-week embedded librarian in an online course, thus data in this

section includes only data about those three course sections. Data used to examine students learning and application of information literacy skills include student utilization of librarian provided materials, performance on the library research assignment, and citation analysis of the bibliography from the critical analysis essay.

Utilization of librarian provided materials

Links to the LibGuide created for each section were available to students within the course LMS. The link to the guide was available in two different content areas of each course, under both the “Writer’s Resources” section and within each weekly module. Student access of the LibGuide was monitored using both the statistics tracking feature within the LibGuide software and via the course LMS statistics tracking. The statistics tracking feature within the LibGuide software is useful in obtaining daily access data for the guide and subpages within the guide, yet does not provide information about which student has accessed the guide. The LMS statistics tracking allows the instructor to view which student has accessed content within the course, both by student and by date. A technical LMS tracking problem prevented the librarian from collecting robust student access data of the LibGuide from the “Writer’s Resources” section. Thus the librarian relied on data tracking from both the LibGuide software and the LMS tracking of views from the weekly modules within the course.

The LibGuide software access report indicated that the guides for each course were accessed by students during the observed time. Guides for each of the three sections were accessed during the first five weeks of the course. During these first five weeks section A had 215 views; section B had 80 views; and section C had a total of 143 views (Table 4-7). The weekly number of views of the guide and section (Figure 4-1) were analyzed using the chi square test of independence. There was a significant

effect $X^2(8, N=438)=54.77, p<.000$, which indicates there is a significant difference in the weekly access of LibGuide by section.

Overall, students most frequently accessed the guides during weeks that they had a research-related assignment due, which was weeks four and five. Students completed their planning pages for their first essay during week 4 and their library research assignment and first essay during week 5. An independent-samples t-test was conducted to compare total accesses of the course-specific LibGuide by the three sections during weeks with ($M=55.83, SD=40.152$) and without ($M=11.44, SD=10.113$) a research-related assignment due. There was a significant difference in the number of access of the LibGuide for weeks with an assignment due ($(M=55.83, SD=40.152), t(13)=3.223, p=0.007$). These results indicate that there were a higher number of accesses of the course-specific LibGuide by students in all sections during weeks that a research-related assignment was due. Differences between the accesses of each of the sections were examined and revealed that there were no significant differences in LibGuide accesses between these three sections during the weeks that assignments were due [$F(2,3)=1.555, p=0.344$].

Additionally, the researcher was interested in knowing if the LibGuide was more frequently accessed during different times of the semester regardless if an assignment was due. Thus, a one-way between subjects ANOVA was used to examine if significant differences exist in the weekly access of the LibGuide for all three sections of the course. There was a significant difference in LibGuide views for the five weeks [$F(4, 10)=6.392, p=0.008$]. Bonferroni post hoc comparisons indicated that the LibGuide was accessed significantly more often during week five than weeks one and three. Students

were required to view the library materials during week two, completed a research-related assignment during week four, and completed two research-related assignments during week five of the course.

Although the LibGuide was significantly more frequently accessed both during weeks that an assignment was due and during week five, it is important to understand if the availability of the librarian in the course had an impact on students' access of the LibGuide during other weeks. As this study is examining the timing of the embedded librarian on students' performance, an independent samples t-test was used to examine if there were differences in access of the LibGuide during weeks that the librarian was embedded in the course. There was no significant difference in access of the LibGuide during weeks that the librarian was embedded in the course – regardless of section (($M=23.83$, $SD=30.94$), $t(13)=-0.489$, $p=0.633$). This suggests that the degree of embedment of the librarian within the course had no significant impact on students' access of the course LibGuide.

While the LibGuide software tracking is useful in determining total accesses of the guides, it does not allow for the determination of who is accessing the guide. The LMS tracking of the accesses of the LibGuide within the course is useful for determining which students, and how frequently, access the guide from within the course. Although the librarian was not able to view which students accessed the LibGuide from the “Writer’s Resources” content section of the course, she was able to view which students accessed the LibGuide from within each of the weekly modules. Seventeen of the twenty-three students (73.9%) in the two-week embedded librarian conditions in this study accessed the LibGuide from within the weekly module. Fifty-seven percent of the

participants from section A, 67% of the participants from section B, and 100% of the participating students from section C accessed the LibGuide (Table 4-8). A chi square test of independence indicates that there is no significant difference in student access of the LibGuide from the LMS by section, $X^2(2, N=23)=3.74, p=0.154$.

The library orientation video was included as part of the students' weekly required activities by the instructor in week two of the weekly modules for the course. The video was accessed by twenty-two (95.7%) of the students in the two-week embedded librarian condition of this study. One hundred percent of students in sections A and C viewed the orientation video, while 90% of students in section B viewed it (Table 4-9).

The synchronous library instruction session was not included as part of the required weekly assignments for students, instead the instructor requested that the researcher post the date and time of the session as an announcement in the course. It was attended by only two of the 23 students (8.7%) in the two-week embedment condition of this study. One student attended from each of sessions A and C, no students attended from section B.

Library research assignment

The library research assignment was completed during the fifth week of the course by 18 students in the two-week embedment condition of this study. The maximum score for the library research assignment was 13 points. The five participants in section A had an average score of 10.80 points (SD=2.387); the seven participants in section B had an average score of 10.71 points (SD=2.289); and the six participants in section C had an average score of 9.5 points (SD=2.739) (Table 4-10).

A one-way between subjects ANOVA was conducted to compare the effect of the timing of the embedment of the librarian on students' library research assignment scores. Results indicate that there was no significant difference between at least one of the groups at the $p < .05$ level [$F(2, 15) = 0.513, p = 0.609$]. This suggests that the timing of the librarian's embedment in the course did not have an impact on students' performance on the library research assignment.

Citation analysis of critical analysis essay

Students ($n=17$) completed their critical analysis essay during week five of the course. The assignment required students to write an essay that analyzed a literary work using three or more scholarly academic sources. The librarian-researcher and a librarian from another campus at the community college, each of whom have at least six years academic librarian experience, evaluated each of the 17 bibliographies of these essays using a citation analysis rubric (Appendix G). Interrater reliability of the ratings of the two librarians was calculated using the intraclass correlation coefficient and was found to be high, $ICC(2,2) = 0.895$.

The maximum score possible for the citation analysis of each bibliography was 9. The five participants in section A had an average score of 6.51 points ($SD=2.65$); the seven participants in section B had an average score of 2.57 points ($SD=2.12$); and the five participants in section C had an average score of 4.43 points ($SD=3.61$) (Table 4-11).

A one-way between subjects ANOVA was conducted to compare the students' scores on the citation analysis in the three sections. Results indicate that there was no significant difference between at least one of the groups at the $p < .05$ level for the three sections [$F(2,14) = 2.975, p = 0.084$]. This suggests that the timing of the librarian

embedment in the course was not significantly related to students' selection of resources for their critical analysis essay.

Research Question 2 Data

The second research question for this study is, 'What are the differences, if any, in students' information literacy skills, with a two-week embedded librarian and full-semester embedded librarian?' This research question was evaluated by examining the differences in scores on the library research assignment and citation analysis of the critical analysis bibliographies between students in the two-week embedded librarian conditions (Sections A, B, and C) and the full-semester embedded librarian condition (Section D).

Library research assignment

The library research assignment was completed during the fifth week of the course by twenty-two students in this study with a maximum score of 13 points. The five participants in section A had an average score of 10.80 points (SD=2.387); the seven participants in section B had an average score of 10.71 points (SD=2.289); the six participants in section C had an average score of 9.5 points (SD=2.739); and the four participants in section D had an average score of 10.00 points (SD= 2.449) (Table 4-12).

A one-way between subjects ANOVA was conducted to compare the effect of duration of the embedment of the librarian on students' library research assignment scores. Results indicate that there was no significant difference between at least one of the groups at the $p < .05$ level [$F(3, 18) = 0.363, p = 0.781$]. This suggests that the duration of the librarian's embedment in the course did not have an impact on students' performance on the library research assignment.

Citation analysis of critical analysis essay

Students (n=22) completed their critical analysis essay during week five of the course. The maximum score possible for the citation analysis of each bibliography was 9. The five participants in section A had an average score of 6.51 points (SD=2.65); the seven participants in section B had an average score of 2.57 points (SD=2.12); the five participants in section C had an average score of 4.43 points (SD=3.61); and the five participants in section D had an average score of 5.60 points (SD= 3.19) (Table 4-13).

A one-way between subjects ANOVA was conducted to compare the students' scores on the citation analysis in the four sections. Results indicate that there was no significant difference between at least one of the groups at the $p < .05$ level for the four sections [$F(3,18)=2.126$, $p=0.133$]. This suggests that the duration of the librarian's embedment in the course did not have an impact on students' selection of resources for their critical analysis essay.

Data That Addresses Both RQ1 and RQ2

Analysis of student performance and access of library materials

Students that accessed the LibGuide linked within the weekly modules in the course earned a higher score on their library research assignment than students in the course that did not access the LibGuide. An independent samples t-test was used to examine the differences between all students regardless of section. There was a significant difference in score on the library research assignment for students that accessed the LibGuide (M=10.88, SD=2.156) and students that did not access the LibGuide ((M=8.67, SD=2.251); $t(20)=2.116$, $p=0.047$). This suggests that students that accessed the LibGuide performed better on the assignment than students that did not access the LibGuide.

Students that accessed the LibGuide linked within the weekly modules of their course did not obtain a significantly different score on citation analysis than students that did not access the LibGuide. An independent samples t-test was used to examine the differences. There was no significant difference in scores for students that accessed the LibGuide (M=4.71, SD=3.23) and students that did not access the LibGuide ((M=4.22, SD=2.91); $t(20)=0.330$, $p=0.745$). This suggests that students that accessed the LibGuide did not perform better on their selection of resources for their critical analysis essay.

An independent samples t-test was used to examine if differences exist in library research assignment scores for students that contacted the librarian (M=11.33, SD=1.506) and students that did not contact the librarian ((M=9.88, SD=2.527), $t(20)=1.317$, $p=0.203$). Students' communication with the librarian did not have a significant relationship with their score on the library research assignment. Likewise, an independent samples t-test was used to examine if a significant difference existed in citation analysis scores for students that contacted the librarian (M=5.44, SD=2.86) and students that did not contact the librarian ((M=4.18, SD=3.20), $t(20)=0.089$, $p=0.384$). This suggests that students' contact with the librarian did not have a significant relationship with their score on the citation analysis.

Students from both the two week sections and full-semester section were invited to participate in the synchronous library instruction sessions. Though very few students from all sections attended the synchronous library instruction sessions (n=3) offered for their class, an examination of students' performance on the library research assignment and citation analysis scores, and examination of students' communication with the

librarian and access of the LibGuide were done. Students that attended the synchronous instruction session ($M=11.67$, $SD=1.528$) did not demonstrate a significant difference in scores on the library research assignment than students that did not attend the synchronous instruction session ($(M=10.05$, $SD=2.415)$, $t(20)=1.110$, $p=0.280$). Likewise, students that attended the synchronous instruction session ($M=6.38$, $SD=2.94$) did not demonstrate a significant difference in scores on the citation analysis than students that did not attend the session ($(M=4.29$, $SD=3.09)$, $t(20)=1.092$, $p=.288$). A t-test failed to reveal a significant difference in LibGuide accesses from students that attended the synchronous session ($M=5.33$, $SD=5.132$) and those that did not attend the session ($(M=2.07$, $SD=2.147)$, $t(2.078)=1.090$, $p=0.386$). Finally, a Fisher's Exact test indicated no significant difference in communication with the librarian based on students attendance at the synchronous instruction session ($p=0.128$).

Instructor interview

The researcher conducted a face-to-face interview with the course instructor after the collection of data to gather information about the instructor's perception of the embedded librarian project. The researcher asked the instructor a variety of questions (Appendix G), including if she noticed differences in students' work between the different sections of the course, if she felt that the librarian added value to the course, if she had suggestions for improving the embedded librarian project, and if she had received feedback from her students about the embedded librarian. Data from the interview were analyzed using open coding and the following concepts were found.

The course instructor was enthusiastic about the involvement of the librarian in her course. She noted that she had received positive feedback from students about the librarian and library instructional materials embedded in the course, saying "they also

mentioned how helpful the librarian is.” Specifically she noted that students were very appreciative of the LibGuide for their course, saying that they “have raved about the LibGuide,” and that they indicated that the use of the guide was very helpful for the completion of their library research assignment.

The course instructor did not note any differences in student work quality between any of the four sections of the course during the semester. She reported that section B contacted her more frequently with questions, but did not vary in performance from the other three sections.

The instructor indicated that the embedded librarian added value to her courses. She stated that the availability of the librarian within the course has improved students’ confidence in their ability to conduct research. Students have told her that they are “more comfortable just knowing that the librarian is there to help, even if they do not contact her.” She stated that it was not the actual contacts with the librarian, but instead “this knowledge of support boosts them.” These statements from the instructor suggest that the presence of the librarian is important, not necessarily the actual communications between the librarian and students. Additionally, the instructor noted that there has been a decrease in library-related questions directed to her since the librarian has participated in the course as an embedded librarian.

Likewise, the instructor indicated that students who had previously participated in her ENC 1101 course with an embedded librarian had a positive opinion of the library. These students, and other students in the class with library experience, often shared information with their classmates about the library and LibGuide for the course. This

information from the instructor indicates that learner-learner interactions about the library and research were taking place between students in the course.

Overall the course instructor was very positive about the embedded librarian and stressed that she would like to continue offering this service to her students.

Researcher notebook

The researcher maintained a research journal during the time of embedment in all course sections. The journal was a place for the researcher to note any unusual occurrences, issues with the courses, and reminder notes for the researcher. The data from the journal was analyzed using open coding followed by the constant comparative method to find similarities and differences in the data. Themes from this process were identified. The themes that were noted in the journal reflect challenges faced as an embedded librarian.

The researcher frequently noted that she was frustrated or concerned with having a lack of control in the course. As a guest in the course, she wanted to remain respectful of that role and not overstep boundaries. This led to occasions when the researcher had the desire to make changes, but felt that the changes were beyond the scope of her role in the course. In addition to the desire to make changes, the researcher noted concerns when the instructor made changes to the course that were unexpected to the researcher. These changes included modifications to students' viewing access within the course (could only see one week at a time, rather than the entire semester) and extending due dates of assignments. These frustrations appear to result from the balancing act required to have a presence in the course while maintaining a secondary role to that of the instructor.

Challenges with the LMS data tracking program were frequently addressed in journal as well. Early in the semester, the librarian noticed that the student viewing statistics for all items linked in the “Writers Resources” section of the course were the same. This was problematic as initially this was where students were to go to access the LibGuide from weeks three through twelve of the course. The LMS vendor indicated that the only way to address this issue was to modify the organization of the entire course. As the researcher was not the primary instructor in the course – this complete rearrangement of the course structure was not possible. Instead, the researcher was able to create a folder and link within each of the weekly modules of the course that provided students with access to the LibGuide and correctly tracked students accessing the guide.

Time management was frequently mentioned in the journal. Several times during the semester the researcher was left as the primary professional in the library, as various staff were on vacation. This presented challenges for managing the time required for monitoring the instant message portion of the embedded librarian project. Additionally, the researcher frequently noted students, staff, and faculty stopping in her office during times she was monitoring the instant messaging in the course. This also was an unexpected challenge that the researcher had to work with.

The researcher was surprised during the analysis portion of the embedment, as she had never evaluated student work from these courses before. The quality of students’ work was less than what she anticipated. This knowledge has provided her with information that will guide the provision of such services in the future. The researcher is going to address this issue with the instructor to suggest additional

modifications to the library research assignment and grading of the assignment for all sections in the future.

Summary of Findings

Overall findings from this study demonstrate that students utilized the librarian and library-related materials embedded in their course. Use of materials and communication were more frequent during times students were working on research-related class assignments. Students in all sections of the course more frequently accessed the LibGuide for the course during weeks that they were working on research-related assignments in the course. No findings that suggest the timing, or duration, of the embedded librarian on student access of the LibGuide were noted.

Analyses of the communications initiated by students in each of the sections demonstrate that students were more likely to communicate with the librarian using the LMS provided communication tools. Additionally, it is clear that students utilized the librarian for assistance with both library-related and course-related matters. Communications initiated by the students in each of the sections indicate that the students more often communicated with the librarian about library-related matters during week four of the course.

The overall findings from the library research assignment indicate that the timing and duration of the librarian embedded in the course has no significant impact on students' performance on the assignment, though students that accessed the LibGuide from the course obtained a higher score on their library research assignment. Likewise, the findings from the citation analysis indicate that the timing and duration of the librarian embedded in the course has no significant impact on students' performance on their resource selection for the critical analysis essay.

Table 4-1. Student participation per section.

Section	Course enrollment	Study participants
A	16	7
B	22	9
C	18	7
D	21	7

Table 4-2. Time monitoring communications with students.

	Course messaging (hours: minutes: seconds)	Instant message (hours: minutes: seconds)	Discussion board (hours: minutes: seconds)	Telephone (hours: minutes: seconds)	Total time (hours: minutes)
Section A	00:10:03	7:57:54	2:23:22	00:08:07	10:39
Section B	00:10:01	17:11:57	0:05:10	00:00:00	17:27
Section C	00:13:31	19:30:25	0:25:10	00:00:00	20:10
Section D*	00:53:31	39:34:38	0:12:51	00:00:00	40:41

*Section D communication was calculated for only the first five weeks of the semester.

Table 4-3. Student questions by section.

	Frequency	Percent
Section A	4	16.7
Section B	2	8.3
Section C	9	37.5
Section D	9	37.5
Total	24	100.0

Table 4-4. Question type posed to the librarian.

	Week 1	Week 2	Week 3	Week 4	Week5
Section A	1 - LR	1 - LR	1 - LR 1 - CR		
Section B	1 - CR		1 - CR		
Section C	3 - LR	3 - LR		1 - LR	2 - LR
Section D	2 - CR			3 - LR 2 - CR	1 - LR 1 - CR

LR = Library Related, CR=Course Related

Table 4-5. Origination of questions posed by students.

	Frequency	Percent
Course Messaging	11	45.8
Discussion Board	9	37.5
Instant Message	2	8.3
Telephone	2	8.3
Total	24	100

Table 4-6. Question topics posed by students.

	Frequency	Percent
Library-Related	16	67.0
Reference	11	45.8
Citation	2	8.3
Library Instruction Session	2	8.3
Directional	1	4.2
Course-Related	8	29.2

Table 4-7. Weekly LibGuide access by section.

	Week 1	Week 2	Week 3	Week 4	Week 5	Total Views
Section A	3	24*	8*	71	109	215
Section B	0	23	4*	5*	48	80
Section C	1	21	19	17*	85*	143

* indicates a week that the librarian was embedded in the course

Table 4-8. Student access of LibGuide within LMS by section.

	Accessed guide within LMS	Did not access guide within LMS	Percent viewed
Section A	4	3	57
Section B	6	3	67
Section C	7	0	100

Table 4-9. Library orientation video access.

	Accessed library orientation video	Did not access library orientation video	Percent viewed
Section A	7	0	100
Section B	8	1	88.9
Section C	7	0	100

Table 4-10. Score on library assignment.

	Mean	N	Std. Deviation
Section A	10.80	5	2.387
Section B	10.71	7	2.289
Section C	9.50	6	2.739

Table 4-11. Score on citation analysis.

	Mean	N	Std. Deviation
Section A	6.51	5	2.65
Section B	2.57	7	2.12
Section C	4.43	5	3.61

Table 4-12. Score on library assignment.

	Mean	N	Std. Deviation
Section A	10.80	5	2.387
Section B	10.71	7	2.289
Section C	9.50	6	2.739
Section D	10.00	4	2.449

Table 4-13. Score on citation analysis.

	Mean	N	Std. Deviation
Section A	6.51	5	2.65
Section B	2.57	7	2.12
Section C	4.43	5	3.61
Section D	5.61	5	3.19

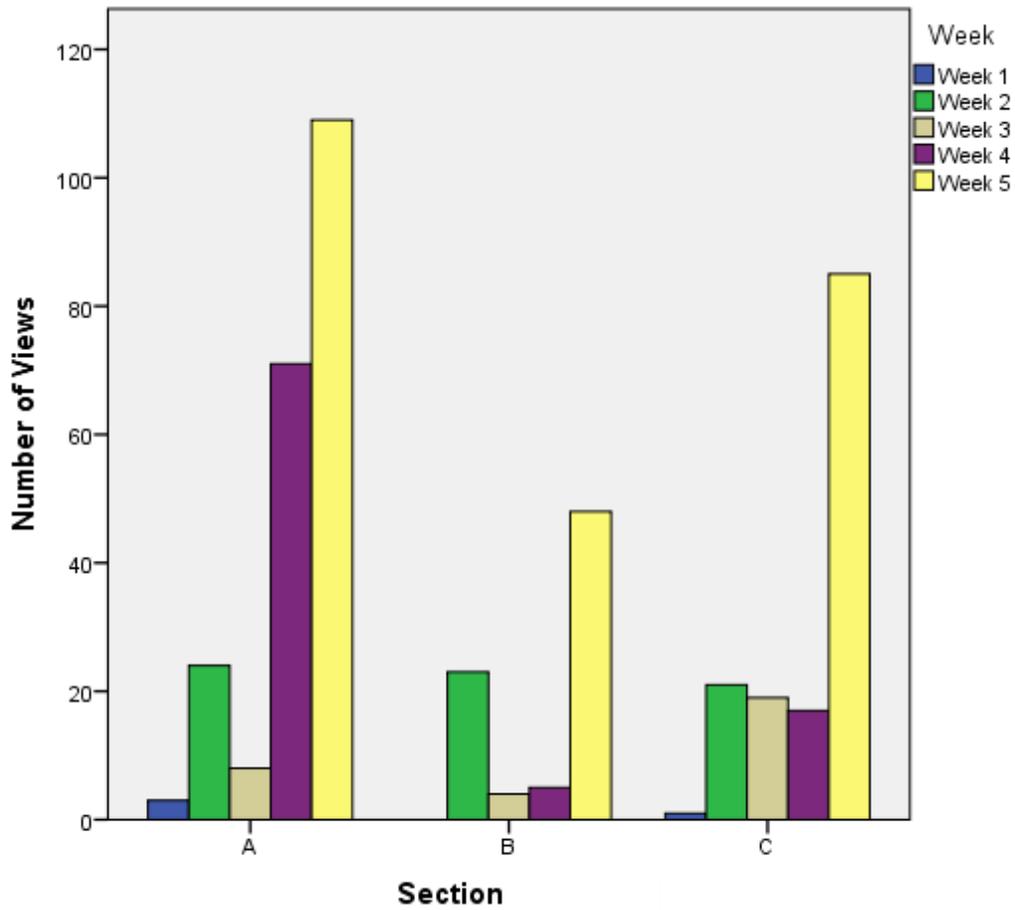


Figure 4-1. Weekly LibGuide views by section.

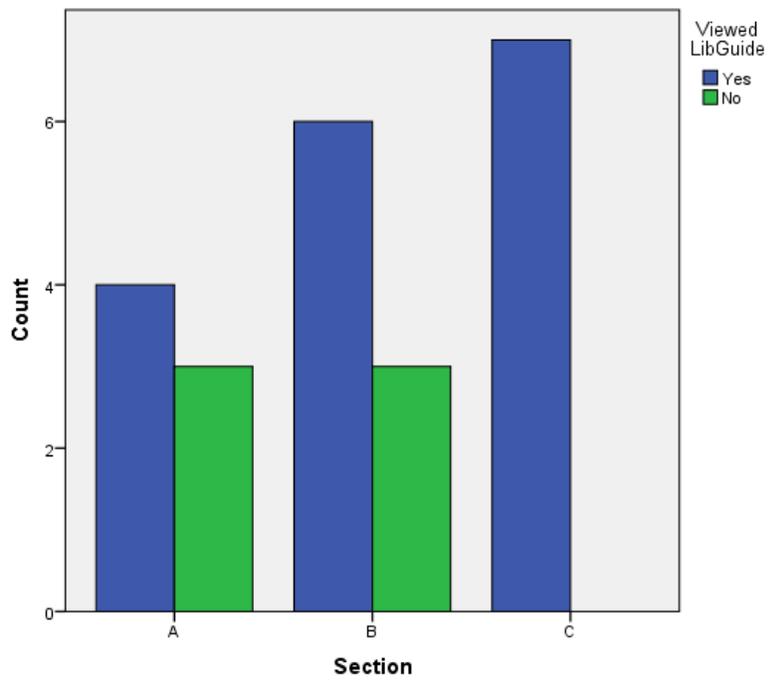


Figure 4-2. LibGuide views within LMS by section.

CHAPTER 5 DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

Introductory Remarks

This chapter presents the discussion, implications, conclusions, and future directions for research from this study of an online embedded librarian in multiple sections of a community college English course.

The continued growth of distance learning in higher education increases the need for services to distance learning students. Services provided to online students often have to be different from those provided to face to face students, as the needs of these two groups of students differ. Services for online students must attempt to increase students' feelings of connectedness with their institution, as this is important for the retention of online students (Cain & Lockee, 2002; Tait & Mills, 2003).

Online library services are one of such services that are useful for connecting students with their school, while simultaneously providing them with information literacy instruction and skills to ensure their success in school and life. Online embedded librarians are available to students at many institutions – these librarians work closely with classes, students, and instructors to provide customized library services to students in online courses (Shank & Dewald, 2003; Shumaker & Talley, 2009). Though many librarians have attempted and are currently providing such services, challenges are frequently mentioned in the literature, many of which are related to the time-intensive nature of providing such a service. This project attempted to find a means of addressing the time-intensive nature of such projects by implementing and evaluating a two-week embedded librarian service.

This study was conducted to examine the impact of the timing of an embedded librarian on students' information literacy skills in an online English course by looking at the differences in information literacy skills between students in three sections of a course with a two-week embedded librarian at different times during the first five weeks of the course. Additionally the researcher looked at the differences in information literacy skills of students in sections of a course with a two-week embedded librarian and a section of a course with a full-semester embedded librarian. This embedment consisted of the librarian accessing the course daily to monitor the library discussion board, course messaging, and instant messaging, as well as providing a synchronous library instruction session. During the time that she was not embedded in the course, she was still available to students in the standard ways that she was available for all students at the college, using email, telephone, and office visits.

Discussion of Major Findings

Findings indicate that there was no significant impact in the learning and application of information literacy skills for students in sections with different timings of an online embedded librarian, nor were there significant differences in students' information literacy skills with a two-week embedded librarian and a full-semester embedded librarian. Instead it was found that students that accessed the course-specific LibGuide created by the embedded librarian performed significantly better on one of the assignments in the course than students that did not access the LibGuide.

Instruction for students in the four sections of this course included a LibGuide, a recorded video orientation to the library, and an online synchronous library instruction session. Of the students in this study, 21 of the 30 students (70%) accessed the LibGuide from within one of their weekly modules and 28 of the 30 students (93.3%)

accessed the recorded video orientation to the library, while only three of the 30 students (10%) participated in the online synchronous library instruction session. The LibGuide and recorded video orientation to the library were required as part of the students' weekly assignments, while the online synchronous library instruction session was an optional activity that was announced by the librarian. Students' lack of participation in the optional activity demonstrates the need for the instructor's support to ensure student participation.

There were no significant differences in student access of the LibGuide found between students in the four different sections of the course. Rather, it was found that students in all sections of the course demonstrated higher access of the LibGuide during weeks that research-related assignments were due. This indicates that students are more likely to use library-provided materials during times of the course that require library research, regardless of the presence of a librarian actively embedded in the course. Students that accessed the LibGuide from within the course LMS obtained a higher score on their library research assignment – yet they did not score higher on the citation analysis of their critical analysis bibliography.

Research Question 1: How does the timing of an embedded librarian in an online English course impact students' learning and application of information literacy skills?

Analysis of the three sections of the course with differently timed two-week embedded librarian services revealed that students more frequently accessed the library instructional materials during weeks of the course when a research-related assignment was due (weeks 4 and 5). Similarly, students in section C (librarian embedded weeks 4 and 5) communicated with the librarian more frequently than did the students in sections A and B.

Though there were demonstrated differences in the access of library materials and communication with the librarian in the three sections with a differently timed embedded librarian, there were no significant differences in performance on the library research assignment between the sections [$F(2, 15) = 0.513, p = 0.609$]. Likewise, there were no significant differences in the score of the citation analysis for the critical analysis essay for the three sections, [$F(2, 14) = 2.975, p = 0.084$].

These findings suggest that it is not the timing of the embedment of the librarian, but rather the timing of the research-related assignments that has an impact on students' utilization of library-provided materials. The timing of the embedded librarian in the course does impact students' communication with the embedded librarian. These two findings suggest that a two-week embedment of an online librarian should be timed to coincide with research-related assignments in the course.

Research Question 2: What are the differences, if any, in students' information literacy skills, with a two-week embedded librarian and a full-semester embedded librarian?

The examination of the differences in students' information literacy skills in sections of the course with a two-week embedded librarian (Sections A, B, and C) and a full-semester embedded librarian (Section D) indicate that there was no significant difference in student performance on either the library research assignment [$F(3, 18) = 0.363, p = 0.781$] or the scores on the citation analysis of the bibliographies of the citation analysis [$F(3, 18) = 2.126, p = 0.133$]. The lack of differences found between the groups suggests that the duration of the embedded librarian in the course does not impact students' information literacy skills. These findings suggest that librarians would be able to serve additional sections of courses by focusing on providing a two-week embedment for courses.

Additional Findings

Analysis of student communication, access of library materials, and performance on research-related assignments between students in sections with a two-week embedded librarian and full-semester embedded librarian indicate that there are no significant differences in communication, use of the LibGuide, or performance on research-related assignments between the groups. The amount of time spent as an embedded librarian for the first five weeks in a full-semester course (40 hours, 41 minutes) was more than double that which was spent working with any of the three two-week sections (Section A: 10 hours, 39 minutes; Section B: 17 hours, 27 minutes; Section C: 20 hours, 10 minutes) of the course.

The researcher maintained notebook for this study revealed that the librarian had a variety of both positive and negative feelings and experiences during this study. Most frequently noted were challenges that the researcher-librarian encountered. Themes revealed in the notebook suggest that the she struggled with balancing her role in the course, was frustrated with the LMS software tracking, and had challenges with the time consuming nature of such a project. As an experienced embedded librarian, it was interesting that these issues occurred so frequently.

Student performance differences in the library research assignment and citation analysis were noted. Though there were significant differences in performance by students on the library research assignment that had accessed the LibGuide in the course, there were no noted differences between score on the citation analysis of bibliographies students completed for their citation analysis essay. Overall the librarian was surprised by the quality of work by students. This finding has implications for the provision of library instruction to students in online courses in the future. While the

librarian found that students performed better on their library research assignment, there was no difference in the performance found with the citation analysis. This suggests that students are able to apply the instructional information to very concrete activities, yet have difficulty applying them to a less structured activity.

Though the librarian noted frustrations with time-management in her journal, examination of the time spent working with each section shows that the majority of the time was spent monitoring the instant messaging communication tool. The overall time the librarian spent monitoring course messaging and discussion board was minor, as it was completed quickly each morning and afternoon. Monitoring of the instant message function was much more time consuming, as it required the librarian to be at a computer for a designated period of time. The instant message program allows the librarian to monitor all sections of the course simultaneously – thus the time commitment would not be as time intensive if all courses were scheduled for embedment at the same time of the semester. Evaluation of students' use of the instant message communication also indicates that it was not a popular choice for communication, suggesting that the amount of time devoted to this activity might be too much.

Discussion Summary

The primary goal of the online embedded librarian in this project was to provide instruction and communication tools and services to increase students' information literacy skills. While students utilized the tools and communicated with the librarian, the data from this study indicate that student performance on the activities used to measure information literacy skills did not differ between the courses with differing treatments. This suggests that the librarian could implement additional two-week embedded librarian services, in lieu of full-semester projects, to serve a larger number of students.

Additionally, the data suggest that students are more likely to access the instructional materials during weeks that assignments are due, thus the timing of the embedment should take place during those times.

Findings Related to the Literature

This study attempted to address two needs frequently noted in the literature for library services to distance learners – the need for assessment of information literacy skills of students in online courses with an embedded librarian and the need for a more scalable method for providing embedded librarian services to students in online courses. Hines (2008) found that librarians providing services to distance learning students most frequently assessed student satisfaction and perceptions. She suggested a need for assessment of student learning from such projects. Walsh (2009) explored the assessment methods librarians are using to evaluate students' information literacy skills and found that librarians are using a wide variety of assessment methods. Challenges noted by Walsh (2009) include a need for an assessment that is both easy to administer and useful for collecting data that truly assesses students' information literacy skills and application. Like Clark and Chinburg (2010), Edwards (2011), and Walton and Hepworth (2012), this study evaluated students' information literacy skills by examining student work products after participating in courses with information literacy instruction. The time-intensive nature of an online embedded librarian project frequently is noted as a barrier for providing such services (Bozeman & Owens, 2008; Matthew & Schroeder, 2006; York & Vance, 2009). As seen in this project, the librarian spent more than 40 hours working with Section D of the course over the first five weeks of the semester. This amount of time, coupled with the lack of differences in student information literacy skills between a full-semester embedment and a two-week

embedding provide support for the suggestions of Matthew and Schroeder (2006) and Calkins and Kvenild (2010) for a much shorter duration of embedding. The findings of this study support the findings of Carlock and Anderson (2007), Ferrer-Vinent and Carello (2008), Leibiger (2011), McMillen and Fabbi (2010), Tennant and Miyamoto (2002), Weaver and Pier (2010), that library instruction in a course that is directly related to and timed with assignments is successful in improving students' performance.

Threats to Validity

This study was designed keeping validity in mind by using multiple sections of a single course and using two raters for citation analysis. Though the project was carefully designed, a single librarian worked with students in a course taught by a single instructor at one campus of a community college. Four sections of the same course were selected for the project to provide for an adequate number of participants, yet a total of only 30 students participated in the project. Each of the sections of the course received a different treatment, thus seven students participated in three variations of the treatment and nine students participated in another variation of the treatment.

Implications

The results of this study provide for the following implications for librarians wishing to provide strategically timed embedded librarian services for online courses:

- Timing embedding around research-based assignments;
- Selection of multiple assignments for information literacy skills evaluation;
- Student perception of authority in the course.

Though these implications are listed separately, they are all intertwined. Each of the implications is related to the others, thus it is important to consider each and their application to the project while also being mindful of the others.

Timing

Findings from this study support the findings of others (Calkins & Kvenild, 2010; Matthew & Schroeder, 2006) that limited duration online embedded librarians are useful to students. Students in this study frequently accessed the materials provided by the librarian in their course, contacted the librarian for assistance, and the instructor indicated that the librarian was important in the success of the students in the course. The timing of the embedment will generate the most use by students if it is focused around times that they have research-based assignments due in the course. For this study, the assignments included a library research assignment and a critical analysis essay. It is important that the librarian work closely with the course instructor to determine what the course assignments are, when they are due, and what the requirements are to ensure that the embedment is most relevant to the students' needs. Library instructional materials should be integrated into the course during weeks that students will complete assignments that the instructional materials will address. Library instruction should be provided as a static guide or handout, video, and synchronous session in order to address the needs of the students in the course. As found in this study, it is essential that the instructor stress the importance of participation in the instruction provided by the librarian.

Assessment

Assessment of library instruction can be done in a variety of ways including pretest/posttest (Anderson & May, 2010; Dewald et al., 2000; Edwards et al., 2010; Kealey, 2011; Knight, 2002; Kraemer et al., 2007; Staley et al, 2010; Winterman, 2009; Winterman et al., 2011), student feedback (Bordonaro & Richardson, 2007; Brown et

al., 2011; Dewald et al., 2000; Ferrer-Vinent & Carello, 2008; Hensley & Miller, 2010; Kimok & Heller-Ross, 2008; Michel, 2001; Schutt & Hightower, 2009; Tennant et al., 2012a; Tennant et al., 2012b; Tennant & Miyamoto, 2002; Tumbleson & Burke, 2010; Washburn, 2008), rubrics (Carlock & Anderson, 2007; Oakleaf, 2008), library assignments (McMillen & Fabbi, 2010; Tennant & Miyamoto, 2002), and citation analysis (Ackerson et al., 1991; Barratt et al., 2009; Clark & Chinburg, 2010; Davis & Cohen, 2001; Davis, 2002; Edwards, 2011; Hearn, 2005; Hovde, 1999; Hurst & Leonard, 2007; Kohl & Wilson, 1986; Robinson & Schlegl, 2004). In selecting which courses to embed within and which time to embed in the course, it is important to carefully decide if the librarian is going to assess their participation in the course. If they do wish to do some form of assessment it is important to decide if they wish to assess students' perception of the librarian's participation in the course or student learning from the inclusion of a librarian in the course. Librarians wishing to assess students' information literacy skills must select methods of assessment that will allow for them to evaluate students' application of information literacy skills, useful assessments for this purpose can include pretest/posttest, library assignments, rubrics, citation analysis, and document analysis.

In this study, the researcher used both a library assignment and a citation analysis to examine students' information literacy skills. The library assignment required students to answer questions using library resources that were appropriate for future assignments in the course. Instruction was situated in the course so that students would learn new information and immediately apply it to a relevant assignment. The researcher found that students performed well on this assignment – those that

accessed instructional materials performed better than those that did not. It was assumed that students would then be able to apply these new skills to the more abstract assignment of writing a critical analysis essay using three scholarly/academic sources. Instead the librarian found that students performed poorly on this assignment. There were no significant differences between performance regardless of section of course or access of library instructional materials. This suggests that students' application of new information literacy skills to a concrete activity may differ from their application of skills to a less concrete activity. This suggests that librarians wishing to evaluate students' information literacy skills may wish to use multiple forms of assessment to get a clear picture of students' skills.

For this researcher, these findings will result in the modification of instruction for future sections of this course. The timing of the assignments in the course, as well as the timing of the library instruction may be modified to better address the deficiencies demonstrated by students in this study. The librarian plans to work with the course instructor to modify the due date of the library research assignment, making it due earlier in the semester, as the skills learned in this assignment are essential to students' successful research for their essays later in the course. Currently students are simultaneously working on both the library research assignment and conducting research for their first essay. Additionally, the librarian plans to suggest that the instructor make the synchronous instruction sessions a required component of the course.

Authority

Students in a course with both an instructor and an embedded librarian may have challenges with determining who the authority figure is in the course. At the beginning of

the course it is very important to clarify the roles of the instructor and librarian to the students in the course. After the clarification of such roles, it still sometimes problematic for students to know who to contact with issues. In this study, when students contacted the librarian for assistance with issues related to the course, such as questions about assignments or grades, the librarian referred the student to the course instructor.

Though the librarian was seen by students to be an authority figure in the course, as they continued to contact her about both course-related and library-related materials in the course, it was apparent that students understood that the librarian did not have any impact on the determination of their grades. Few students participated in the synchronous session for the course, which was announced in the course by the librarian. Students' lack of response to the announcement suggests that they students are likely to contact the librarian for help, but not necessarily participate in activities that are not related to their course grade.

In order to ensure student participation in library instruction, librarians must have a buy-in from the instructor in the course. The buy-in must go beyond the instructor supporting the librarian and allowing them into the course as a co-instructor. This requires that both the librarian and instructor collaborate to decide which library instruction activities are essential for students' success in the course. The instructor then must make these activities required components of the course.

Directions for Further Research

Future research in this area should continue to examine the implementation of short duration embedded librarian projects in online courses during time of research-related assignments. The time spent by the librarian when embedded for two-weeks was less than that spent on the full-semester, yet each of the two-week sections took

between five and ten hours per week for each of the two weeks of embedment. For a librarian that is balancing providing embedded librarian services to online courses while also providing traditional library services in a face-to-face setting, devoting such an amount of time to each course could be problematic. A majority of the time spent monitoring the communication was used on the instant messaging option, which was infrequently used by students. Eliminating or lessening the amount of time spent monitoring this mode of communication could greatly reduce the amount of time spent for each section, which would enable the librarian to have more time for other courses or other duties. Future studies could explore the different formats of interactions to examine which is more frequently used and if there are differences in the purposes of their use.

Informal student comments during the live online synchronous library instruction session indicated that the participants found it very helpful. The use of synchronous tools for instruction should continue to be explored, particularly if those sessions are required by the course instructor.

Though students communicated with the librarian, there were no significant differences between the information literacy skills of those that did communicate and those that did not (student-librarian interaction), yet there were differences between those that used the library-provided materials and those that did not (student-content interaction). Additional exploration of the differences in students' information literacy skills in sections that focus on providing/embedding relevant materials at important points in the course and in those that focus on the communication with students is needed.

Overall assessment of student information literacy skills is a huge avenue for future research. Librarians provide instruction for students in many courses, yet rarely do they see the effects of their instruction. For this researcher, this was the first time she formally evaluated student work that involved academic research. The quality of work was much different than anticipated and left the librarian questioning how to restructure the instruction to best meet the needs of the students. Student performance on the library research assignment differed between students that accessed the instruction materials and those that did not, yet there was no difference between student performance on the critical analysis essay. This suggests that additional or different instruction is needed to address students' higher order thinking skills.

Conclusion

The results of this study support the findings of others in the literature that recommend a short duration of embedment in online courses (Calkins & Kvenild, 2010; Matthew & Schroeder, 2006) as the time-consuming nature of such projects prevents them from being widely adapted. The lack of difference in performance between students in the two-week embedded librarian sections and full-semester embedded librarian indicate that a lengthy period of embedment is not necessary to provide relevant library materials and communications to students in online courses. Rather the timing of the embedment to coincide with students' research-based assignments is most effective.

As the number of online courses grows, institutions must address the information literacy needs of these online students. Online embedded librarians are one way of reaching students in these courses (Bozeman & Owens, 2008; Markgraf, 2004; York & Vance, 2009). This study found that students utilized the librarian embedded in their

course, as well as the materials that the librarian provided for instructional purposes in the course. Students that utilized the materials performed better on their library research assignment, suggesting that the involvement of the librarian in the course was useful in addressing students' information literacy skills.

This project provides ample information for the researcher to continue exploring the involvement of the librarian in online courses, particularly examining the student interactions with content, librarian, and fellow students for their information literacy needs.

APPENDIX A EXAMPLE OF EMBEDDED LIBRARIAN SCHEDULE

Librarian Availability

I will be embedded in your course for two weeks during this semester. This means that you can communicate with me directly within the MyHCC course website, using the "Ask the Librarian" discussion board, course mail, or Blackboard Instant Message during the time I am embedded in your class. Additionally, you can contact me anytime using regular HCC email, telephone, or just stop in the library to see me in person.

This chart provides my availability during the time I am embedded in your class. At times, in-class library instruction will interrupt this schedule.

I will be embedded in your class **Monday, January 28th - Sunday, February 10th, 2013.**

Communication Method	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<i>Within Blackboard</i>							
Ask the Librarian Discussion Board	Check at 8:00 am & 4:00 pm	Check at 9:00 am & 2:00 pm	Check at 8:00 pm	<i>not available</i>			
Course Mail	Check at 8:00 am & 4:00 pm	Check at 9:00 am & 2:00 pm	Check at 8:00 pm	<i>not available</i>			
Blackboard Instant Message	Logged in 8:00 am - noon & 1:30-4:00 pm	Logged in 8:00 am - noon & 1:30-4:00 pm	Logged in 8:00 am - noon & 1:30-4:00 pm	Logged in 8:00 am - noon & 1:30-4:00 pm	<i>not available</i>	<i>not available</i>	<i>not available</i>
<i>Outside of Blackboard</i>							
HCC email - messages to kheathcock@hccfl.edu	Logged in 8:00 am - 4:15 pm	Check at 9:00 am & 2:00 pm	Check at 8:00 pm	<i>not available</i>			
Telephone - office telephone 813-757-2121	Available 8:00 am - 4:15 pm	<i>not available</i>	<i>not available</i>	<i>not available</i>			
Library Office - Plant City Library, Room 115	Available 8:00 am - 4:15 pm	<i>not available</i>	<i>not available</i>	<i>not available</i>			

Comments (0)

Figure A-1. Example of librarian availability chart provided to students.

APPENDIX B
LIBRARY RESEARCH ASSIGNMENT

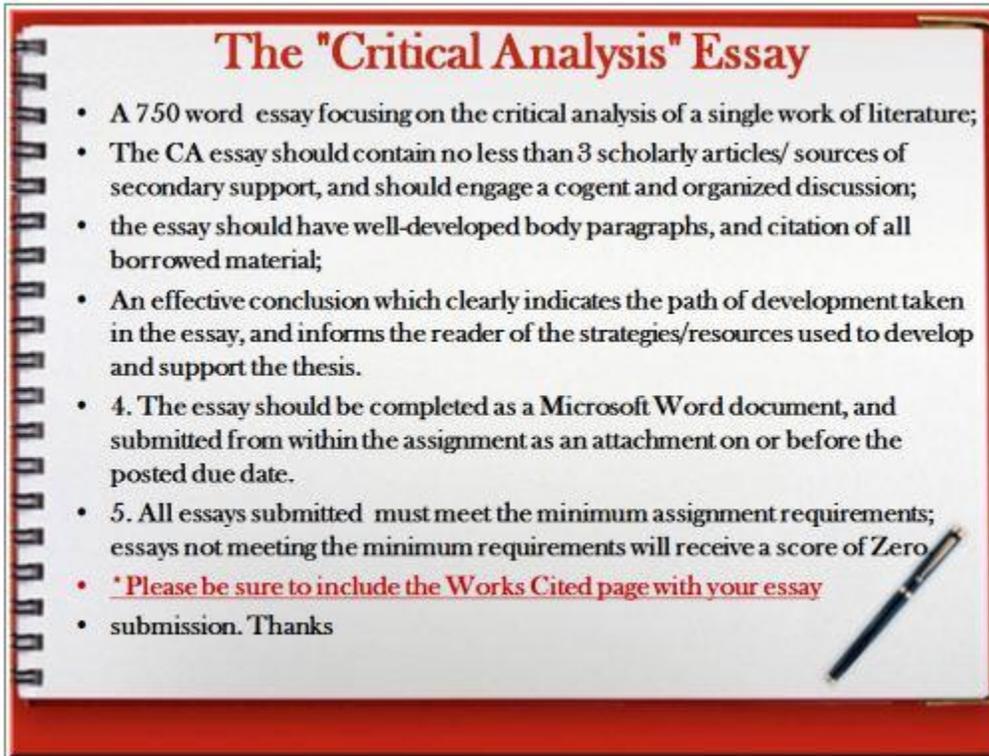
Library Research Assignment
ENC 1102

Please complete the library research project below utilizing the HCC library webpage, databases, and course LibGuide; applicable pages of your text books; the Internet; class lectures; and other materials as appropriate. All MLA formatting and guidelines apply, and this assignment must be submitted as a Microsoft Word attachment. Please provide citations for all entries. The completed project is worth a total of 100 points.

1. Have you had any formal library instruction, prior to this course? If so, when did you have this instruction?
2. Locate and cite one single-author book on the subject of networking.
3. Accessing the Library Databases, use the Oxford English Dictionary (OED) to locate a definition for "hypocrite"; cut and paste one entry, and provide a citation.
4. Use the Biography In Context database to locate a biography on Willa Cather.
5. Using the HCC library databases, locate a critical article addressing the works of Guy de Maupassant and provide a citation.
6. Fill in the blanks from the paragraph, excerpted from the "Comparing Scholarly versus Popular Articles" source on one of the HCC campus library pages: In general, _____ articles are viewed as having more _____. Articles from the popular press are viewed as having _____. This is why faculty often request students find "scholarly or academic journal", not "popular magazine" articles for their research sources.
7. Using the HCC library databases, locate an article addressing any literary aspect of Jessie Fauset's novel Plum Bun.
8. Using the HCC library databases, locate a critical article by Arnold Rampersad addressing the works of Langston Hughes.
9. Search the World Wide Web (WWW) to locate the American Memory project at the Library of Congress. Cite any film or collection from the site.
10. Locate and list five bibliographic entries for scholarly sources that you might find useful in your next essay; be sure to use MLA format.
11. Locate and cite a periodical article from a scholarly source that critically analyzes any work by Toni Morrison.

12. Provide a citation for a book with more than one author.
13. Provide a citation for an anthology of American Literature with an editor.
14. Using either an online or hardcopy source, locate and excerpt five lines from Edgar Allan Poe's "The Raven" and provide a citation.

APPENDIX C
CRITICAL ANALYSIS ESSAY INSTRUCTIONS



The "Critical Analysis" Essay

- A 750 word essay focusing on the critical analysis of a single work of literature;
- The CA essay should contain no less than 3 scholarly articles/ sources of secondary support, and should engage a cogent and organized discussion;
- the essay should have well-developed body paragraphs, and citation of all borrowed material;
- An effective conclusion which clearly indicates the path of development taken in the essay, and informs the reader of the strategies/resources used to develop and support the thesis.
- 4. The essay should be completed as a Microsoft Word document, and submitted from within the assignment as an attachment on or before the posted due date.
- 5. All essays submitted must meet the minimum assignment requirements; essays not meeting the minimum requirements will receive a score of Zero
- *** Please be sure to include the Works Cited page with your essay**
- submission. Thanks

Figure C-1. Critical analysis essay instructions.

APPENDIX E GIMLET LIBRARIAN INTERFACE

The screenshot displays the Gimlet Librarian Interface for tracking a reference question. At the top, a dark blue navigation bar contains the following elements from left to right: a tab labeled "Add question", a search input field with a "Search" button, and two tabs labeled "Reports" and "My account".

Below the navigation bar, the main content area is organized into several sections:

- Duration:** A dropdown menu with options "0-9 minutes" (selected) and "10+ minutes".
- Question type:** A dropdown menu with options "Course (non-library) st", "Blackboard Support", "Reference", "Directional", and "Citation".
- Asked by:** A dropdown menu with options "37741", "37775", "37807", and "37737".
- Format:** A dropdown menu with options "Email (@hccfl.edu)", "Phone", "Walk-up", "Course message", and "Discussion Board".
- Location:** A dropdown menu with the option "Reception desk".

Below these dropdowns, there are two large text input fields labeled "Question" and "Answer". To the right of the "Answer" field is a link that says "Change stats categories".

Below the input fields is a "Tags" section with a text input field. Below the input field, it says "Space separated - Showing top 20 tags." and includes a link "Edit tag list".

At the bottom of the form, there is a "Time of question" field with the value "1:40 pm" and a "Save" button. Below this field, there is an example text: "Ex: 3:15 pm, 4/15/09 8:03 am".

Figure E-1. Gimlet reference question tracking screen.

APPENDIX F
CITATION ANALYSIS RUBRIC

Evaluator Name: _____ Student Indicator: _____

Citation #	Type of resource	Criterion 1	Criterion 2	Criterion 3	Total
1					
2					
3					
4					
5					
Total					
Average Score					

Criterion 1: Was the type of source appropriate for the topic?

Criterion 2: Was an appropriate decision made vis-à-vis retrospective versus contemporary sources for the topic?

Criterion 3: How good was the quality of the source for the topic?

Types of sources:

A = Audio/visual

B = Book

J = Journal article

M = Magazine article

N = Newspaper article

W = Website

Scores:

0 = inadequate

1 = marginally adequate

2 = adequate

3 = superior

APPENDIX G
INSTRUCTOR INTERVIEW PROTOCOL

1. Have you noticed a difference in students' work in the four different sections of English 2 this semester?
 - a. What kind of differences?
2. What kinds of feedback, if any, have you received from students about the embedded librarian project this semester?
3. Do you have a preference for the timing of the embedded librarian in your courses?
4. Do you feel that the embedded librarian added value to your courses?
 - a. If so, in which ways?
5. What suggestions do you have for improving the embedded librarian project?

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BIOGRAPHICAL SKETCH

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