



Review Article

Embedded Academic Librarianship: A Review of the Literature

Stephanie J. Schulte

Assistant Professor and Education and Reference Services Coordinator

Health Sciences Library

The Ohio State University

Columbus, Ohio, United States of America

Email: schulte.109@osu.edu

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Abstract

Objectives – The purpose of this review is to examine the development of embedded librarianship, its multiple meanings, and activities in practice. The review will also report on published outcomes and future research needs of embedded librarian programs.

Methods – A search of current literature was conducted and summarized searching PubMed, CINAHL, Library, Information Science & Technology Abstracts (EBSCO), Academic Search Complete, and ERIC (EBSCO) through August 23, 2012. Articles were selected for inclusion in the review if they reported research findings related to embedded librarianship, if they provided unique case reports about embedded librarian programs, or if they provided substantive editorial comments on the topic. Relevant study findings were assessed for quality and presented in tabular and narrative form.

Results – Currently, there is disparity in how embedded librarianship is being defined and used in common practice, ranging from embedding an online component into a single course to full physical and cultural integration into an academic college or business unit of an organization. Activities of embedded librarians include creating course integrated instruction modules for either face-to-face or online courses, providing in depth research assistance to students or faculty, and co-locating within colleges or customer units via office hours for a few hours to all hours per week. Several case reports

exist in the recent literature. Few high quality research studies reporting outcomes of librarians or library programs labeled as embedded exist at this point. Some evidence suggests that embedded librarians are effective with regards to student learning of information literacy objectives. Surveys suggest that both students and faculty appreciate embedded librarian services.

Conclusion – Most published accounts discuss librarians embedding content and ready access to services in an online course management system. A few notable cases describe the physical and cultural integration of librarians into the library user environs. Future research using valid quantitative methods is needed to explore the impact of large scale, customized, embedded programs.

Introduction

Since the first mention of the phrase in the library literature in 2004 (Dewey), embedded librarianship has received much attention. An entire double issue of *Public Services Quarterly* was devoted to the topic in 2010 and ACRL recently published a book on the topic (Kvenild & Calkins, 2011). Kesselman and Watstein (2009) published a narrative review of various ways librarians have been embedded, including course integrated instruction, participation in research teams, collaborations in scholarly communication initiatives, and physical location of librarians in academic departments. Additionally, in 2009 the results of an in depth study of embedded librarianship were published as a result of funding from the Special Libraries Association (Shumaker & Talley, 2009). To date, this is the largest and most comprehensive look at embedded librarianship and factors associated with successful programs. Still, individual libraries may question whether to institute an embedded librarian program as they envision their futures and consider the evolving roles of librarians. Decisions about future directions are further complicated by the polysemantic nature of embedded librarianship as evidenced by the variety of activities and degrees of embeddedness described in the literature.

Objectives

The purpose of this review is to examine the development of embedded librarianship, its multiple meanings, and activities in practice. The review will also report on published outcomes and future research needs of embedded librarian programs.

Methods

A literature search of PubMed, CINAHL, Library, Information Science & Technology Abstracts (EBSCO), Academic Search Complete, and ERIC (EBSCO) was conducted using search terms of “embedded librarian,” “embedded librarianship,” embedded AND librarian and (embedded OR embed OR embed*) AND librarian*. A general search of the Web using the Google search engine was also conducted with similar terminology. The latest search was conducted August 23, 2012. Articles were selected for inclusion in the review if they reported research findings related to embedded librarianship, if they provided unique case reports about embedded librarian programs, or if they provided substantive editorial comments on the topic. Due to the large number of case reports on the topic, this review does not seek to be comprehensive in its presentation of them, but rather to provide a succinct awareness of current practices.

Results

History and Definitions

Historically, embedded librarianship can be traced back to departmental libraries, where librarians provided services and collections within the confines of the department itself. Some of these libraries still exist today, but many have been assimilated into main campus libraries. This has primarily been due to the expansion of digital content, competition for space for non-library uses, and economic factors associated with the costs of maintaining collections (Drewes & Hoffman, 2010). However, these same factors have served to isolate the librarian from his customer, causing librarians to explore ways to interact and integrate with those they serve. More recently, the expression "embedded librarian" takes root in the phrase embedded journalist, a concept connected to wartime media coverage in the last several years. In this situation, journalists become a part of their military unit, providing a perspective, "a slice of the war" ("Pros and Cons of Embedded Journalism," 2003) from their vantage point. Drewes and Hoffman (2010) provide a good discussion of the branch library concept and its connection to modern day embedded librarianship. Brower (2011) also provides a concise recent history of the concept that offers an overview and characteristics of such programs.

The topic of embedded librarianship can be somewhat difficult to define because of the wide range of approaches and interpretations presented in the literature. Dewey (2004) first described it as "a more comprehensive integration of one group with another to the extent that the group seeking to integrate is experiencing and observing, as nearly as possible, the daily life of the primary group" and states how "overt purposefulness" is key to this "comprehensive collaboration" (p. 6). Her paper discusses embedding librarians at a grand scale, weaving librarians throughout the fabric of academe. Shumaker and Talley (2009)

considered embedded librarians as those "who provide specialized services within their organizations" (p. 4). By itself this seems too broad; however, they further describe these librarians by their most common activities. These included collaborating or contributing to the customer's work or electronic workspace and attending meetings and conferences that were connected to the customer's discipline. They also determined that librarians who were physically located with their customer groups and were funded to some degree by their customers did more of these activities. Shumaker and Talley use language that shapes embedded librarianship well, including that they "provide complex and value-added services" (p. 5). They report that these services are focused on the customer not the library, provided to small groups in their environment, go beyond discovery and delivery of information, and are built on trusted relationships in the context of the customer. Kesselman and Watstein (2009) agree with this, but broaden the concept such that "collaboration and integration" are important factors to consider. Their stance includes models that could arguably be considered liaison models though not necessarily embedded as defined by Dewey or Shumaker and Talley's more restrictive descriptions. Likewise, recent usage of the phrase proffers it as the latest trend, resulting in its use where formerly liaison programs or course integrated instruction would have been used. In fact, many liaison librarians already do many of the embedded librarian activities noted by Shumaker and Talley (2009).

Much like embedded journalists, many recent reports of embedded librarians note librarians becoming a literal part of academic colleges or departments, business units, or medical teams. Recent literature references various degrees of time spent outside the library ranging from a few office hours (Covone & Lamm, 2010; Matava, Coffey, & Kushkowsky, 2010; Matos, Matsuoka-Motley, & Mayer, 2010), to more than 50 percent of time spent in the customer's

environment (Bartnik, 2007; Brown & Leith, 2007; Fitzgerald, Anderson, & Kula, 2010; Freiburger & Kramer, 2009; Martin, 2010). In the past, similar initiatives have been referred to as mobile or onsite reference, not embedded librarianship (Lee, Hayden, & MacMillan, 2004; Tao, McCarthy, Krieger, & Webb, 2009).

Other recent case reports of embedded librarianship refer to embedding librarians into a single course or research project (Berdish & Seeman, 2010; Chestnut, Wesley, & Zai III, 2010; Konieczny, 2010; McMillen & Fabbi, 2010; Muir & Heller-Ross, 2010). Characteristics of these cases include creating or participating in online subject guides and discussion forums within the course management system (CMS) housing the course. Online embedding provides easy access to librarians throughout the course, whether students are nearby or not. Some embedded librarians assume substantial teaching responsibilities (Manus, 2009). Other programs utilize the CMS approach in addition to face-to-face instruction and assistance (Pritchard, 2010). Whether embedded in an online or traditional course, these librarians' efforts are similar to those of liaison librarians.

Shumaker and Talley (2009) address these disparate definitions through their research methodology. In their initial survey, they found few distinctions between embedded and non-embedded librarians. Many traditional librarians and embedded librarians were actually participating in similar activities. After discovering this, they began using the "specialized services within their organization" (p. 4) idea to distinguish what they considered to be truly embedded.

Common Activities Identified in the Literature

The Shumaker and Talley (2009) study identified many activities common to embedded

librarians, some of which are used above to help define the concept. These same activities are also found in recent case reports and research studies. Table 1 summarizes common activities with their associated case reports. The majority of case reports describe the creation and integration of online learning objects of various types (e.g. tutorials, guides, and links) within the course management system for specific courses. Some describe office hours or some other co-location of librarians within a customer group. A few case reports describe purposeful integration of the librarian into the daily life of the customer to which Dewey (2004) spoke and are worth further discussion here.

Bartnik (2007) describes her embedded librarian role in the College of Business and Public Affairs at Western Kentucky University. Her experience allowed her to locate herself within the school full time and build close relationships as an ad hoc faculty member. Among her varied activities, she attended faculty meetings, assisted with publications, participated in interviews with faculty candidates, and provided in class and online instruction. She advocates for negotiating for office space in a high traffic area, remaining on the library's payroll, and taking advantage of every meeting of the customer group. Bartnik's experience speaks to a grand potential of embedded librarianship to build close customer relationships given the right circumstances and personalities. In a later article, Bartnik, along with her colleagues Farmer, Ireland, Murray and Robinson (2010), speaks of how new administrative duties took her away from her ideal embedded situation. Though her embeddedness did not end entirely, the overall experience changed, including the loss of ad hoc faculty member privileges, an overall decrease in connectivity with faculty, and fewer research consultations.

Table 1
Common Activities in Embedded Librarian Case Reports

Activity	Case Reports	
Embedded in course management system	Bennett and Simning (2010)	Matava et al. (2010)
Discussion board/forum participation	Chestnut et al. (2009)	Matos et al. (2010)
Links to library resources	Clark and Chinburg (2010)	McMillen and Fabbi (2010)
Online subject guides	Covone and Lamm (2010)	Muir and Heller-Ross (2010)
	Hoffman and Ramin (2010)	Sullo, Harrod, Butera, and
	Kealey (2011)	Gomes (2012)
	Konieczny (2010)	
Collaboration on Course Design/Assignments	Kealey (2011)	Muir and Heller-Ross (2010)
	Manus (2009)	Pritchard (2010)
	McMillen and Fabbi (2010)	
Co-teaching course (face-to-face or online)	Bartnik (2007)	Matos et al. (2010)
	Covone and Lamm (2010)	Muir and Heller-Ross (2010)
	Freiburger and Kramer (2009)	Pritchard (2010)
	Manus (2009)	
In depth research to support student research	Bartnik (2007)	
	Berdish and Seeman (2010)	
In depth research to support customer work	Bartnik (2007)	Freiburger and Kramer (2009)
	Fitzgerald et al. (2010)	
Grant applications		
Research projects		
Competitive intelligence		

Physical co-location with customers	Bartnik (2007)	Martin (2010)
	Brown and Leith (2007)	Matava et al. (2010)
Office hours (part- or full-time)	Clyde and Lee (2011)	Matos et al. (2010)
Permanent office with customers	Covone and Lamm (2010)	Searing and Greenlee (2011)
	Freiburger and Kramer (2009)	
Embedded via social media	Filgo (2011)	

Freiburger and Kramer (2009) discuss several librarians at the Arizona Health Sciences Library who spend at least half their time within their liaison colleges and whose activities span more traditional liaison work to newer roles such as providing literature searches to support grant applications and serving as co-principal investigators on grant applications. Martin (2010) adds spending 80% of her time in the pharmacy school at the same institution. They refer to their model as “liaison librarian in context” (p. 140). Librarians at Arizona Health Sciences Library have the flexibility to customize embedded services based on customer needs.

Fitzgerald et al. (2010) describe an innovative embedded librarian program where librarians provide onsite market intelligence service to the non-profit MaRS Discovery District, which assists entrepreneurs in Canada. These librarians are partially funded by the MaRS group and spend the majority of their time with the group, but retain all their University of Toronto connections, privileges, and responsibilities. The types of services provided range from the licensing of appropriate resources to in depth market analysis. This program is worth closer inspection for other reasons aside from the embedded aspect, including how they value their worth and how university librarians can work within a growing

trend of universities partnering with non-profits to commercialize research. Brown and Leith (2007) describe a somewhat similar situation where they are embedded in an Australian newsroom environment and support editorial functions of the media groups. Both of these embedded librarian programs demonstrate the use of information expertise in partnership with customer expertise to market a product. In many ways, these programs illustrate non-traditional librarian roles while still maintaining the identity and duties of a traditional librarian.

Similarly, Berdish and Seeman (2010) describe an embedded librarian program focused on providing in depth research assistance to students in graduate business programs at the University of Michigan. Specifically, they provide assistance in an action based learning environment dubbed MAP: multidisciplinary action program. MBA students in this program are doing extensive research on a real project for a real company. Librarians in this program provide research help by being assigned to specific small groups and providing overviews and recommendations about which resources to use. Each team arms itself with targeted information that can be used as they travel to work on their projects.

Librarians' willingness to investigate their customers' needs and tailor services is common among these cases. They are not passive bystanders, but rather, proactive partners filling information gaps. Though service oriented, the librarians are gaining professional reputations for excellent work and are highly valued partners.

Research Studies

Very few quality research studies using the conceptual phrase "embedded librarian" exist. The Shumaker and Talley study is an exception to this; however, it does not report outcomes from individual embedded librarian interventions. Comprehensive retrieval of research studies on the topic is more difficult due to the broad definition of embedded librarianship that pervades the current literature. Some case reports and studies reference studies that allude to embedded librarians within the full text of the article but not within the title, the index terms or the abstract, such as the study by Figa, Bone, and MacPherson (2009). Additionally, many studies evaluating the effects of embedding information literacy instruction of any kind within a face-to-face or online course could be considered relevant, since these activities are common to embedded librarian initiatives. For the purposes of this review, only studies that overtly considered the effects of embedded librarian initiatives were included (Table 2). Using these criteria, only seven quantitative studies were identified. This review also includes three qualitative studies reporting useful information, including one case study reporting methods of calculating value for services. Of the first seven studies, significant heterogeneity was found. One study was a pretest/posttest study, one was a citation analysis, one was a comparison of scores on writing assignments, two were analyses of reference questions, one was a post-implementation survey by an embedded program, and one was the descriptive Shumaker and Talley (2009) study.

Descriptive Study

The Shumaker and Talley study (2009) used two surveys and site visits to define embedded librarianship and identify qualities of successful programs. The first survey was meant to identify those who were involved with embedded librarian programs within the population of Special Libraries Association members. There were 961 employed respondents to this survey. The second survey was longer and sent to 234 embedded librarians (defined as providing specialized services with their customer group) from the first survey who indicated willingness to participate. Of those, 130 responded. Some findings of this study have been mentioned previously, and this review does not aim to give a comprehensive summary of the study. However, measures of success were identified and are pertinent to this review. They defined success in three ways: an increase in the number of librarians offering embedded services within a program, an increase in the customer's demand of the services, and an increase in the number of services provided by the librarians to the customers. Only 11 participants met these criteria. They then categorized 22 factors that separated the 11 participants who met all the criteria and the 16 respondents who met none of them into 4 categories: marketing and promotion, service evaluation, services provided, and management support. In general, successful programs publicized themselves in a variety of ways, measured outcomes in financial terms to justify their services, counted everything they did, provided complex research services and data analysis, and had written agreements between library administration and customer administration. The full report is lengthy, but worth the effort for those considering embedded programs. Shumaker and Talley draw attention to the changing nature of librarian service, from production of a list of results to evaluation and synthesis of relevant information.

Pretest/Posttest Study

Edwards, Kumar, and Ochoa (2010) used a pretest/posttest questionnaire to measure student self efficacy and skills gained from embedding several librarian-created video modules on various research skills, and also gathered additional qualitative information. Librarians were available online two hours per week in addition to participating in online discussion forums. This study had a low return rate on the pre- and posttests, with only 9 of 31 participants responding in the pretest and 7 of 31 responding in the posttest. Self rated experience, comfort with resources and confidence in search increased slightly. The posttest also demonstrated more refined search techniques that were assumed to be the result of learning that occurred during the course. Feedback gathered from five students' responses to a request on a discussion board also indicated students learned research techniques. In an interview, the course's faculty member expressed valuing the collaboration and asked to use the videos in other courses. The findings are relatively weak, measuring a small sample of students' perceptions and skills in one course. However, they do hint at positive effects, if not of embedded librarians, of online video modules embedded into a course.

Comparison of Writing Assignment Scores

Bowler and Street (2008) evaluated intermediate level undergraduate writing assignments in five history and two women's studies courses to gauge effectiveness of instruction with varying levels of librarian embedment. Levels ranged from a single information literacy (IL) session plus collaboration on the assignment to co-teaching courses with information literacy either overtly taught by the expert (the librarian) or threaded throughout the course and taught by both the librarian and subject faculty. They used rubric-based scores to compare papers written early in the courses to final papers to measure improvement. Generally, greater levels of librarian embedment resulted in greater

improvement in writing assignments. The largest gains were seen when 5 librarians worked with problem based teams, noting an improvement of 21% in their problem based assignment. However, they also note that the cost of sustaining this level of engagement is prohibitive. Comparison of two co-teaching methods suggested librarians "obviously and conspicuously" (p. 443) embedded throughout the term was more effective than seamless threading of IL instruction. The authors noted a research score increase of 18% in the section where the librarian purposefully taught IL versus just a 0.5% increase in the section with IL threaded throughout. Through an exit survey in one course, they also determined even though students generally felt neutral about the librarian's assistance, their self rating of IL skills improved at the end of the course. The methods of this study were reasonable in theory; however, the authors fail to report the sample (class) sizes and the timing of the librarian instructional interventions with relation to the first and last writing assignments. They also do not include their grading rubric.

Analysis of Reference Transactions

Two studies evaluated reference transaction data related to embedded librarian interventions. Bennett and Simning (2010) conducted correlation and linear regression calculations to show a positive relationship between the number of librarian interactions in an online course (discussion board comments) and the number of reference transactions in an online-only university setting. Sullo et al. (2012) evaluated 82 reference questions encountered from 16 nursing and health sciences online courses with an embedded librarian component gathered in an approximate 16 month period. More than a third of questions were general research guidance questions, while another 22% were related to citation management, followed by 20% related to identifying, locating or using a library resource. As a result of these findings, librarians planned to embed resources within

the course management system so students did not have to find them on the library's web page.

Citation Analysis

Clark and Chinburg (2010) used citation analysis to assess the effects of embedded librarians in two online sections and one face-to-face section of the same course. The embedded component of the course consisted of a tutorial (PowerPoint with audio), links to resources, and participation in discussion forums as appropriate. No statistically significant differences were found between the online and face-to-face sections' bibliographies when evaluated for the types and numbers of citations. The nature of the course required students to use many more trade and technical journal or website citations, and the authors suggested this could have affected the results. They emphasize that at a minimum, the study illustrates that online and face-to-face instruction produced similar student bibliographies in this course.

Post-Implementation Survey

Following the closing of the Library and Information Science Library at the University of Illinois at Urbana-Champaign, several service changes were made, including placing an embedded librarian within the Graduate School of Library and Information Science (GSLIS) building several hours per week (Searing & Greenlee, 2011). One year after the change, faculty and staff at the library and the GSLIS were surveyed, and 105 responded. With regards to the embedded librarian, respondents indicated appreciation for their presence within the building but noted not using their services often. Based on this and other responses, the embedded librarian made changes to the program.

Qualitative Studies

Hoffman (2011) used a mixed methods approach, conducting a survey first to build interview questions and then phone

interviewing embedded librarians from five institutions about their experiences in online courses. The interviews presented contrasting experiences related to workload. Three librarians reported not being overly busy while two reported being quite busy. One librarian embedded in up to 35 sections of courses reported that this number of courses did not take a lot of time. This may suggest limited engagement on either the part of the librarian or the students in the class, though Hoffman did not speculate about this. Both librarians who reported significant workload increases also graded assignments. This study also found that students had a positive response to online embedded librarians. Hoffman noted the phrase embedded librarian is being used to describe both embedding in an online course and physical embedding in colleges or departments.

Kealey (2011) examined student learning in an online graduate epidemiology and evidence based practice course by using an embedded quiz in the course management system over three years. The quiz evolved somewhat over the three years; however, students consistently scored well. Despite excellent quiz scores, closer inspection of quizzes revealed student difficulties with Clinical Queries and MeSH in PubMed. Based on yearly reflections, Kealey revised her online video lecture and saw learning improvements.

In an effort to measure value to their organization, Fitzgerald et al. (2010) developed a "valuation formula." The formula was value equals time spent (at CAN\$200 per hour) divided by cost of the resources delivered. The cost per hour was selected because it fell between typical fee-based library services and consulting MBAs charges. Based on this formula, these librarians calculated that they had provided CAN\$4.5 million of resources and CAN\$480,000 of service in 2008. This represented ten times the investment in databases licensed for the MaRS group.

Table 2
Summary of Embedded Librarian Research Studies

Author	Study Type	Population	Findings
Bowler and Street (2008)	Comparison of writing products	Students in five intermediate level undergraduate history courses and two undergraduate women's studies courses; sample size not given	18% improvement in research scores of writing assignment when librarian co-taught course and presented as expert in the class and taught IL content. Almost no improvement (1%) seen when content was threaded throughout with both subject faculty and librarian teaching but librarian was not presented as IL expert.
Shumaker and Tally (2009)	Descriptive: Two surveys combined with site visits	First survey: Special Libraries Association membership (n=961) Second survey: respondents identified from first survey as providing specialized services with their customer group (n=130 of 234 identified)	First survey: demonstrated substantial overlap in duties of non-embedded librarians and embedded librarians. Determined specialized services within their customer group as essential factor. Second survey: measures of successful programs identified as 1) increase in number of librarians offering embedded services, 2) increase in demand for services and 3) increase in the number of librarians providing services. Only 11 respondents met all 3 measures. Successful programs marketed well, provided complex research and analysis services, and had written agreements between library and customer. Suggested a move away from producing lists of results to providing analysis and synthesis.
Bennett and Simning (2010)	Correlational study (using observation)	Psychology graduate students at an online university	Number of embedded librarian postings in online course statistically significantly correlated to number of reference transactions ($r = 0.491$; $p = 0.010$), indicating a moderate correlation.

Clark and Chinburg (2010)	Citation analysis	Research paper citations from 3 sections of a state university's upper-division undergraduate management information systems course receiving librarian instructional session; 1 section taught face-to-face (130 citations), 2 sessions taught online (247 citations).	Student citation patterns nearly identical despite instructional method. No statistical differences in the distribution or frequency of sources between the two instructional methods.
Edwards et al. (2010)	Pretest/posttest questionnaire; analysis of post-course feedback via discussion forum and faculty interview.	31 students in an online, 8 week Foundations of Educational Technology course.	Low response rate on both pre- (9/31) and posttest (7/21) surveys; some increases seen in students' perceptions of experiences and comfort with databases, as well as actual skills demonstrated; statistical comparison between pre- and posttest surveys not reported. Discussion forum comments were positive in nature. Subject faculty found collaboration successful, asked to use content in other courses, felt connecting librarian content and assignment in advance was key.
Fitzgerald et al. (2010)	Case study	Customers from the MaRS Discovery District, a non-profit entrepreneurial incubator working in collaboration with University of Toronto	Developed valuation formula. $\text{Value} = \frac{\text{time spent (at CAN\$200/hour)}}{\text{Cost of delivered resources}}$ The amount of services and resources provided by the librarians was ten times the cost of licenses resources.

Hoffman (2011)	Qualitative mixed methods: survey, phone interviews	Seven librarians from six institutions; reports information from interviews representing five of the six institutions	Time investment of embedded librarians varied; may be related to level and amount of teaching/grading responsibilities rather than number of courses alone. Students tended to report positive experiences.
Kealey (2011)	Qualitative reflection of online quizzes	Physician assistant students in a required online graduate level Epidemiology and Evidence Based Medicine course over three years (45 students in year 1; 52 students in year 2, 53 students in year 3).	Librarian-led online modules included screen capture videos for instructional purposes and were modified as necessary. High averages for the 5-point and 10-point assessments used in the course: 4.94-4.98 out of 5 and 9.0-9.17 out of 10, respectively. Analysis of actual responses revealed student weaknesses in understanding Clinical Queries and the use of Medical Subject Headings (MeSH) in Medline.
Searing and Greenlee (2011)	Survey, case study	Faculty and staff at the University of Illinois at Urbana-Champaign University Library and Graduate School of Library and Information Science (105 respondents)	Survey addressed many areas not directly related to an embedded librarian. With regards to a new embedded librarian model, GSLIS faculty noted enjoying easy access to librarian, but missed the physical collection they formerly had. Respondents split opinions on the advantages of the new model, with several noting no benefits while several noted no drawbacks.
Sullo et al. (2012)	Analysis of reference transactions	82 reference transactions from discussion boards and emails of online courses with embedded librarian	Classification of questions: 34% general research guidance; 22% citation questions; 20% using library resources; 10% off campus access.

Overall, there is a lack of formal, systematic processes to quantify outcomes demonstrating embedded librarian impact. Only two studies analyzed artifacts of learning and another two studies attempted to directly measure practical skills through free responses or quizzes. No study evaluated an embedded librarian who was physically and culturally integrated into an academic or business unit. Despite this, results suggest that librarians embedded in online and face-to-face course settings have positive effects on student learning.

Discussion

This review aimed to examine the development of embedded librarianship, its multiple meanings and activities in practice, and report on published outcomes. Librarians have sought to engage their customers – faculty, staff, students, business units, and the public – in a variety of ways for years. This review found that embedded librarianship is another attempt to do just that: engage. Current literature illustrates that the phrase embedded librarianship is widely applied and could mean anything from having an online presence in a course to wholly working amid the end user group. Commonly, embedded librarians are providing learning objects and a presence within the online course management system. While there are plentiful case reports describing embedded librarian work, there are few notable published cases where librarians have truly become part of “the daily life of the primary group” as Dewey suggests. The notable cases of Bartnik et al. (2010), Freiburger and Kramer (2009), Fitzgerald et al. (2010), Brown and Leith (2007), and Berdish and Seeman (2010) provide rich examinations of experiences reaching out to library users, building close relationships, and customizing services. Unfortunately, there are no high quality studies evaluating the effectiveness or value of embedded librarian programs like these.

Most research that does exist has sought to evaluate impact of instructional initiatives,

primarily where librarians are embedded in online or face-to-face courses. These evaluations are similar to those seen in the liaison or instruction librarian literature. Schilling and Applegate (2012) note that “without access to individual learners and artifacts, rigorous research methodologies cannot be implemented” (p. 261). The very nature of embedded librarianship supports this level of access to both learners and artifacts. The studies in this review attempted to evaluate educational impact of embedded librarianship by using artifacts that were convenient to them and by reflecting on their experiences, yet rigorous methods were generally not applied.

Embedded librarians who are physically and culturally integrated within their customers are akin to clinical librarians. Brett et al. (2010) suggested clinical librarians utilize the critical incident technique (CIT) to connect their work to important customer outcomes, which may also be appropriate for programs embedded to a lesser degree. CIT studies can be conducted by collecting in depth customer stories about positive and negative incidents or by presenting specific critical incidents followed by questions about their perceptions and behaviors following the incidents (Radford, 2006). While the stories and perceptions of customers may have enough influence on some institutional stakeholders, CIT is primarily a qualitative methodology. As such, future CIT research on embedded librarianship could provide a basis for forming hypotheses that could be systematically and quantitatively studied.

Clearly, future research is needed. As librarianship evolves from the production of lists of resources to the evaluation and synthesis of information, as noted by Shumaker and Tally (2009), questions arise regarding the time investment of individual librarians. Future research should explore how diverse, customized, embedded programs can realistically be evaluated using valid methods. Findings from in-progress research regarding library and librarian value may be beneficial to

inform future embedded librarian research. Remaining relevant to customers is vital to the survival of librarianship. Embedded librarianship, in its many forms and degrees of embeddedness, may prove to enhance the relevancy of librarians in the digital world.

Limitations of this review include inclusion of only studies that overtly used the concept of embedded librarianship to describe themselves. In doing so, many studies reporting outcomes related to integrating IL instruction in a variety of ways were not included. For programs focused solely on embedding instruction online or in the classroom, these studies would hold great relevance and should be considered. Additionally, the review did not include any programmatic evaluations of liaison librarian programs, though the author is not aware of any high quality reports. Because individual embedded librarian programs can and do vary greatly, the review may not be applicable to all situations.

Conclusion

A review of literature on the concept of embedded librarianship revealed multiple usages. Most published accounts discuss librarians embedding content and ready access to services in the online course management system. A few notable cases describe the physical and cultural integration of librarians into the customer environs. No rigorous reports of outcomes to evaluate impact of embedded librarianship were found. Some reports suggest that embedding librarians in online or face-to-face courses has positive impact on student learning. Future research using valid quantitative methods is needed to explore the impact of large scale, customized, embedded programs.

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