

Navigating Projects in Academic Libraries: A Scoping Review of Project Management Applications

Abstract

Despite the prevalence of project-based work in academic libraries, there is a notable variance among academic libraries in their application of formal project management methods. This scoping review examines peer-reviewed academic literature to uncover examples of formal project management methods, techniques, and tools being utilized in academic libraries in order to identify broader trends about the methodologies used, the settings in which they are applied, and the successes or challenges the libraries have experienced. The study concludes with recommendations for future research and a call for a more rigorous integration of project management training in library science education, to better prepare librarians for the increasingly project-oriented nature of library work.

Introduction

Project management as a professional discipline applies knowledge, skills, tools, and techniques to the systematic management of a variety of projects, which are generally defined as being specific, unique undertakings that have definite start and end times, are composed of independent activities and processes, and involve the deployment of resources, such as money, goods, and human labor, to achieve the undertakings (Igberaese, 2023). Project management is used in a variety of industries, including construction, manufacturing, and software development, where complex projects are often encountered and its use has resulted in more efficient work and cost savings (Winston & Hoffman, 2005). Although their projects rarely exhibit the complexity of these other industries, academic libraries frequently embark on projects to improve their spaces and services, providing ample opportunity to enjoy the benefits that formal project management provides (Winston & Hoffman, 2005).

Tasked with the efficient oversight of projects, project managers are often required to deal with competing priorities and resources as they balance tensions between formal controls

and informal controls (Heales et al., 2007). Another dichotomy observed in project management literature are distinctions between “external projects,” which tend to be larger and incorporate stakeholders from outside the company or outside a specific portion of the organization, and “internal projects,” which are smaller and often involve teams and groups who have already been working together (Heales et al., 2007). Perhaps because external projects involve more formal project management control than internal projects, where informal or preestablished means of communication, authority, and control are used, external projects are often viewed as more successful, efficient, and well-managed (Heales et al., 2007). These internal projects more closely resemble projects undertaken by academic libraries (Winston & Hoffman, 2005), suggesting that library projects may be better served by adopting better project management practices.

To determine whether this benefit might arise, the first question to ask is: have academic libraries utilized project management principles and what successes and failures have they encountered as a result? Older commentary notes the lack of literature on the subject (Winston & Hoffman, 2005), suggesting an examination of the current literature would be a good first step toward answering that question. A scoping review is an appropriate mechanism to evaluate the peer-reviewed literature discussing formal project management principles in academic libraries as it is an ideal process for quickly assessing the volume of literature available, identifying broad themes, and suggesting more specific questions for examination and research (Munn et al., 2018),

Project management in libraries

Multiple publications have focused on introducing project management concepts to librarians (Bartlett, 2018), but articles that provide overviews of project management methodologies do not necessarily link them with specific applications and vice versa (Greene, 2010). These include a series of articles from the mid-2000s to introduce project management

concepts in the area of digital libraries but without applications to specific projects (Cervone, 2004, 2005b, 2005a, 2006, 2007) to a series of more recent articles that present case studies without reference to specific project management methodologies (Michalak, 2023; Michalak & Rysavy, 2020, 2022, 2023; Rysavy et al., 2021)

Many literature reviews and broad examinations of project management in libraries have been undertaken. A 2018 study performed a bibliographic evaluation of 20 years of project management literature in the areas of information and documentation based on articles indexed in the Library, Information Science, and Technology Abstracts (LISTA) database (Cobo Serrano, 2018). The study divided the publications into three chronological phases: 1996-2003, during which there were few articles per year on the topic of project management; 2004-2008, in which the publication volume on project management substantially increased; and 2009-2015, during which the publication volume stayed relatively constant at a high value (Cobo Serrano, 2018). The study noted a drop in 2015, but in retrospect this is likely due to time lag between publication of articles and appearance in the LISTA database.

A recent systematic review from 2023 explored what project management software is used by libraries, what advantages are provided by using project management in libraries, and what challenges are presented by using project management in libraries (Özdamlı et al., 2023). The study was limited in scope, including only open access articles from 2017-2022, but was broad in that it covered all types of libraries (Özdamlı et al., 2023). The study identified Norton Dashboard, Asana, and Trello as popular project management software packages and also identified Kanban as a preferred tool (Özdamlı et al., 2023). Generally, project management in libraries led to better outcomes, improved documentation and communication, and the acquisition of additional skills by librarians (Özdamlı et al., 2023). Challenges included budgeting issues, lack of buy-in, and overreliance on project management methodology (Özdamlı et al., 2023).

Surveys and interviews have been used to explore the use of project management in libraries. In 2011, academic librarians were surveyed about how web projects were managed within their libraries (Fagan & Keach, 2011). Several trends, echoed in other surveys and studies, were identified in this study. The types and sizes of projects were varied, perhaps due to the recency of web development and the introduction of project management principles to libraries (Fagan & Keach, 2011). Communication was seen as a key skill for successful project management along with documenting processes for future use, while budgeting and interpersonal conflicts appeared to be points of difficulty (Fagan & Keach, 2011). Finally, a preference for informal organization versus formal project management methods or software was expressed by several of the academic librarians (Fagan & Keach, 2011).

A 2012 study surveyed and interview librarians in Ontario, Canada with the majority of projects involving technology projects (Horwath, 2012). Those librarians who were interviewed thought that formal project management processes were not needed as often for small projects but were needed for larger, more complex, or higher visibility projects and were definitely needed in information technology projects regardless of size (Horwath, 2012). As a best practice it was recommended that all projects include training or pilot phases to relieve the anxieties of staff and librarians who are uncomfortable with formal project management methods (Horwath, 2012).

A 2016 survey of international academic librarians revealed that 83% of the librarians had been involved in projects during the previous five years but 91% reported neither specific project management methods nor software had been utilized in those projects (Serrano & Arqueró Avilés, 2016). Where formal project management methodologies were mentioned, PMBOK, Scrum, and PRINCE2 were the most commonly named (Serrano & Arqueró Avilés, 2016). Responding librarians considered project management to be an essential education concern for academic librarians, but found it was hindered by a lack of resources, complexity

in project management software, and a general lack of knowledge of project management techniques (Serrano & Arquero Avilés, 2016).

A 2021 study expanded on this survey by modifying it and disseminating it to librarians, both academic and public, in the United States (Guimaraes et al., 2021). This study revealed a number of gaps in libraries with respect to project management including the omission of project management duties from job descriptions despite having librarians and staff work on projects in various roles, the absence of project management training for librarians despite an acknowledgement by administration of the importance of project management skills, and an insufficient amount of educational development in project management for library school graduates (Guimaraes et al., 2021).

More specific studies have focused on project management in library science education. A study in 2005 examined 54 programs accredited by the American Library Association for course offerings in project management within library science programs (Winston & Hoffman, 2005). The study found that nearly all of the programs (98.1%) offered courses in general management principles with 63% of those programs requiring at least of general management course (Winston & Hoffman, 2005). Courses in academic library management, however, were far less prevalent, occurring in only 9.3% of the programs, while project management courses were even rarer, occurring in 3.7% of programs (Winston & Hoffman, 2005). A later study in 2014 examined 312 international library science programs across the Americas, Europe, Oceania, Africa, and Asia (Avilés et al., 2014). The study found that 34.3% of those programs included project management within the curriculum suggesting an overall increase from the state of the discipline in 2005 (Avilés et al., 2014). The importance of project management to academic libraries is underscored by the significant number of library and information science programs which include course offerings in project management (Avilés et al., 2014).

A 2007 study examined a decade of position announcements for academic librarians and found that the percentage of job descriptions encompassing project management responsibilities increased from 4.1% in 1993 to 11.2% in 2003 (Kinkus, 2007). The study also found that more ads explicitly used the terms “project management” and “project manager” in 2013 than 2003 suggesting a maturing understanding of, and need for, project management in academic libraries during that time (Kinkus, 2007).

While a few of these studies focused specifically on academic librarians, none limited their evaluations to instances where specific project management methods were coupled with concrete examples from academic libraries. Moreover, only one of the studies (Özdamlı et al., 2023) used formal evidence synthesis methodology to harvest articles for evaluation. As a scoping review of academic libraries’ experiences with formal project management methods, this study takes a novel approach at condensing this important aspect of academic library management.

Although academic libraries share common functions with other types of libraries—organizing and disseminating information and creating spaces for individual and communal use of resources—they also have features and missions that distinguish them (Saunders & Jordan, 2013). Academic libraries are inevitably situated within a broader educational institution and have missions that include educating students, supporting faculty instruction, and consulting with researchers. Budgeting and work fluctuate with the ebb and flow of the academic year and lag behind other libraries (Regazzi, 2012). Academic libraries place a greater emphasis on assessment and evaluation than other libraries (Saunders & Jordan, 2013) which is emphasized in the lesson-learned steps of formal project management. Thus, while there is some overlap with the responsibilities common to all libraries, academic libraries’ distinct environment provides an interesting lens through which to examine formal project management techniques.

Methodology

A standard scoping review comprises five phases: (1) identifying a research question and inclusion and exclusion criteria; (2) locating relevant literature, often through iterative searches of academic library databases; (3) selecting relevant studies; (4) coding and evaluating the literature for broad and common themes; and (5) summarizing and reporting the findings (Arksey & O'Malley, 2005). These phases will be expanded upon in the sections below.

Identifying the research questions

The first phase of a scoping review generates the initial research question along with the inclusion and exclusion criteria for the articles to be included within the review (Arksey & O'Malley, 2005). The process is somewhat iterative as the initial question may be too broad or narrow for the study. Likewise, the various criteria for inclusion and exclusion will fluctuate as the focus of the research question narrows or widens.

The broad research question which first guided this inquiry sought to examine the current landscape of academic literature about the use of project management in academic libraries. Initial exploratory searches revealed a large corpus of articles addressing project management in academic libraries, but not so large to imply that that the research question suffered from vagueness. The broad research question was then refined into more specific questions that guide the remainder of the scoping review:

RQ1: What is the current landscape of peer-reviewed articles discussing the application of specific project management methods to actual projects in academic libraries?

RQ2: What trends, commonalities, and lessons can be gleaned from the experiences of academic libraries using project management techniques for their projects?

With the research questions set, the next step was to establish inclusion and exclusion criteria that yielded an appropriate number of articles for in depth examination.

Inclusion and exclusion criteria

During the initial exploration stage, a large number of articles were identified whose subject matter was identified in part as “project management.” It is unknown whether these keyword phrases were identified by authors, editors, or publishers, but they often appeared only tangentially related to the disciplinary side of project management. That is, they were classified as project management only because they described a “project” over which there was some type of “management.” It became clear that these articles were too vague for this scoping review and should ultimately be excluded.

With this in mind, the primary inclusion criteria for this study are articles which (1) are contained in peer-reviewed, academic literature, (2) discuss as a primary or secondary objective the use of project management techniques, tools, or software, as applied to a particular project, and (3) are situated in an academic library in a postsecondary education environment.

Consequently, criteria for excluding results from the study include articles where project management is mentioned or addressed only in passing or in subject terms, where project management is described in a general manner without any application to an actual project, articles in a language other than English, abstracts without full papers available, conference proceedings, and other grey literature, which is literature that is “produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers, i.e., where publishing is not the primary activity of the producing body” (Moore et al., 2023). Although grey literature may, and likely does, contain relevant information on this research topic, it has been excluded from this study due to its inconsistent coverage in the selected databases. A grey literature examination may be a valuable later extension of this study. Table 1 summarizes these inclusion and exclusion criteria.

TABLE 1 Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed, academic literature	Grey literature
Discusses the use of project management techniques, tools, or software in reference to a specific project	Project management mentioned only in passing or no discussion of a specific project
Situated in an academic library at postsecondary level	Only abstracts available or conference proceedings without paper Articles not in the English language

Search strategy

The second phase of a scoping review is to locate relevant literature for the research question (Arksey & O'Malley, 2005). This second phase is inherently iterative in nature and requires not only the selection of appropriate academic databases and indices for examination but also the use of a common search string which balances broad terms with specific terms. Too broad of a search will result in an unwieldy number of results to scour through while too narrow of a search runs the risk of excluding potentially relevant studies. The search string's format may have to be varied based on the search logic of each database or other limitations of the search platform, but the function of each search string should work similarly across the different databases and should include the same search terms.

Database selection

Because project management techniques can be applied in a number of different situations, a search for project management literature is fundamentally an interdisciplinary inquiry. Articles about academic libraries would be expected to be located in databases about library science, but might also be included in education databases. Project management, having broad applications, could be found in databases covering business, technology, entrepreneurship, and engineering, to name a few. In a scoping review, the number and variety of databases should be large enough to cover the breadth of relevant disciplines but not so large as to be overly burdensome; the general goal is to identify and report on the

general state of published literature (Bork & Mondisa, 2022). With this in mind, this study incorporated searches from six databases and indices providing broad coverage of the literature. These databases and indices are summarized in Table 2.

TABLE 2 Selected databases and indices

Database/Index	Coverage Area
ABI/Inform	Business, Entrepreneurship
Engineering Village (incl. Compendex and Inspec)	Engineering, Technological Entrepreneurship
ERIC	Education
LISTA	Library Science
Library Literature and Information Science Index	Library Science
Scopus	Multi-disciplinary citation index

Search string

The initial searches were very basic, simply combining the terms “project management” and “academic library” to get a general sense of the number of results expected in each of the databases and indices as well as to identify other keywords or terms that would be helpful to expand the search. These initial searches also allow for the consideration of whether to use full-text searching (in databases where this is an option) or to limit the searches to narrower fields such as the title, abstract, and subject terms for the articles, where the most relevant results are expected to hit. Full text searching does retrieve more results, but often at a significant cost to efficiency (Lin, 2009). For consistency across databases, this study elected to limit searches to the title, abstract, and subject terms for articles, regardless of whether a full-text search was an option. This also should serve to filter out articles where project management was not a primary focus of the article. Through the iterative searching process, key terms or unique identifiers from project management that occurred in relevant literature were noted and used to expand the search string descriptors to locate additional relevant results. The final search string for each database or index is listed in Appendix A.

Data cleaning

The final search in each database or index was conducted on September 23, 2023. Articles written, published, uploaded, or indexed after this date are not included in this study's analysis or results. The initial searches of the databases and indices yielded a total of 828 records. The bibliographic information from each database or index search was converted into an RIS file—a standardized format developed by Research Information Systems, Incorporated for use in bibliographic reference managers—and then imported into Zotero, an open-source software package for the management of citations, bibliographic data, and research materials. Zotero provides the ability to quickly identify and remove duplicative records from the searches. Deduplication of the results removed 324 results, leaving a new subtotal of 504. Zotero also allows for the easy identification of non-journal articles. After 14 non-journal and 14 non-English articles were removed, 476 articles remained for retrieval and review.

Study selection

The third phase of the scoping review is to select the articles for inclusion in the study (Arksey & O'Malley, 2005). For the review of the articles, the results from Zotero were imported into Rayyan. Rayyan is a web- and mobile-based application that was designed to streamline the screening process for systematic reviews. Although it is designed for multiple reviewers, this study used it for a solo reviewer for its functionality that allows articles to be tagged with their specific inclusion or exclusion criteria.

The title, abstract, and keywords of the remaining 476 articles were reviewed and classified immediately as “yes” (within the scope of the review), “no” (outside the scope of the review), or “maybe” (possibly within the scope of the review but needing more detailed review of the article). The predominant reasons for excluding articles from the review were tangential mentions of project management—notably there were several articles where

“project management” was a keyword for the article, but mentioned nowhere else. After screening and assessment for eligibility, 46 articles remained and will be evaluated in this study. Figure 1 illustrates the review’s progress using updated guidelines for the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) (Page et al., 2021).

Coding and evaluating the literature

The fourth phase of the scoping review process is evaluating the literature to identify and establish themes across the articles (Bork & Mondisa, 2022). As the articles were reviewed, certain aspects were identified including the discussion of broader concepts in project management, identification and discussion of particular frameworks or techniques, the

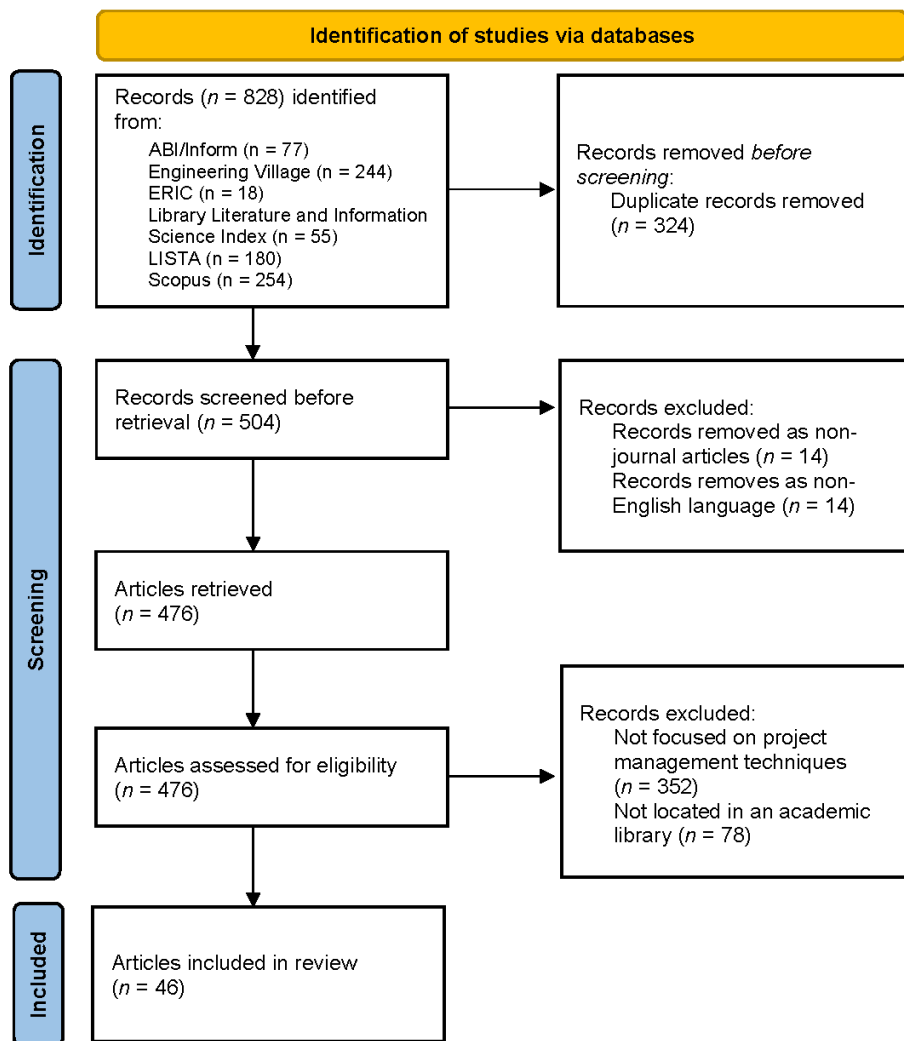


Fig. 1 PRISMA 2020 flow diagram (Page et al., 2021) for article review in this study. Template from (PRISMA, n.d.).

use of particular tools or software, and the type of project each was applied to. Because not every article included these items, Table 3 does contain blank entries where those items were absent. Notes and key points from each article are also noted in Table 3. The coding and production of the table was used in identifying the themes discussion in the next section.

Discussion

General themes and observations

The review, evaluation, and analysis of the articles in this scoping review uncovered several observations and themes among academic libraries utilizing project management techniques. No single formal project management method was dominant among academic libraries, with several studies only using portions or broader concepts from those systems.

The literature is also peppered with sometimes contradictory themes about the propriety of formal project management methods in academic libraries. These themes included:

- A dichotomy between libraries identifying specific project management methodologies and those only adopting specific tools or techniques;
- The general sense that formal project management techniques improved the performance of projects and the satisfaction of team members;
- Observations or opinions that librarians are not properly trained in project management or inclined to accept formal project management; and
- Librarians will often modify formal project management techniques to make them less structured but more adaptable for library use.

Finally, the studies included multiples use cases where project management systems, tools, or concepts were put to use in specific aspects of academic libraries. All of these are discussed in more detail below.

Table 3 Overview of reviewed sources

Citation	Location	Frameworks/ Techniques	Software/ Tools	Type of Project	Summary Points
(Afshari & Jones, 2007)	United Kingdom	PRINCE2		Digital repository	<ul style="list-style-type: none"> • Dual project managers (library & IT) • Project managers reported to multiple constituencies through advisory boards • Using a formal PM framework greatly assisted institutional support
(Anzalone, 2000)	Italy	PMBOK		New librarian orientation	<ul style="list-style-type: none"> • Distinguishes PM from strategic planning • Overview of PM process, but not every portion was supported by an example
(Ballinger, 2019)	United States	Agile Scrum	Kanban board	Metadata remediation	<ul style="list-style-type: none"> • Distinction between Agile and Scrum within framework of libraries • Analog Kanban board • Two-week sprints with two-week gaps • Daily standups • “Extensively modified” Scrum
(Bielavitz, 2012)	United States	PMBOK	Priority matrix	Multiple	<ul style="list-style-type: none"> • Modified a priority matrix for use in libraries • Evaluated potential projects based on weighted factors • Project were judged on importance vs workload considerations
(Bjornen & Ippoliti, 2021)	United States		Customer journey mapping Design thinking Project charter/MOU	Research data services	<ul style="list-style-type: none"> • Outline of the project management process for creating a research data services program • Deliberate steps taken to ensure alignment of actions and services with final goals
(Burich et al., 2006)	United States			Self-assessment survey and chat reference service	<ul style="list-style-type: none"> • Very basic overview on PM phases • No discussion of specific PM techniques or tools • “When project management techniques are used in American libraries, most often they are used informally, often without managers being conscious of their use.”

Citation	Location	Frameworks/ Techniques	Software/ Tools	Type of Project	Summary Points
(Burke et al., 2018)	United Kingdom	Agile Scrum	Sprint approach Product owner Scrum master Data wrangler	Data visualization dashboards	<ul style="list-style-type: none"> • Discussion of development of library analytics dashboard using Agile/sprint method • Not located in the library, however; performed by outside software developer
(Burruss & Rowell, 2017)	United States		Trello Skills inventory matrix Work breakdown structure Gantt chart	Digital humanities Creating wiki Redesigning seminar course	<ul style="list-style-type: none"> • Used Trello • Provides discussion of specific techniques applied in library project
(Carey et al., 2005)	United States	CORE Project Management	Charter Deliverables Schedule	Serials cancellation	<ul style="list-style-type: none"> • Applied only some part of CORE framework
(Carpan & Linoski, 2019)	Canada		Trello	License agreements	<ul style="list-style-type: none"> • Used to manage workflow of license approval between library and counsel
(Chambers & Perrow, 1998)	United Kingdom	PRINCE	Microsoft Project Project Statement Work Breakdown Structure	Digital Libraries	<ul style="list-style-type: none"> • Included survey of project management throughout UK academic libraries • Discussed PRINCE framework, but used less formal structure • Structure was still more formal than many other libraries
(Chen & Chen, 2017)	United States		Trello	Research and publication	<ul style="list-style-type: none"> • Describes using Trello to manage workflow on research and article writing • Soft project management treatment
(Collins & Wilson, 2018)	United States	Agile	Project “one- pagers” Workflow diagrams	Electronic Resource Management	<ul style="list-style-type: none"> • Agile-like workflow with iterative processes • Used to develop more of design thinking approach

Citation	Location	Frameworks/ Techniques	Software/ Tools	Type of Project	Summary Points
(Dulock & Long, 2015)	United States	Agile	Scrum/Sprints Backlog chart Burn Down chart	Digitization	<ul style="list-style-type: none"> • Agile-like workflow with iterative processes • Used two-week sprints • Scrum masters develop important, transferable skills • Good example of PM usage
(Egberongbe et al., 2017)	Nigeria	PRINCE2	P2MM maturity scale	Quality management	<ul style="list-style-type: none"> • Applied maturity model from PM to evaluate QM
(Feeney & Sult, 2011)	United States	BYU Process	WBS Network diagrams Microsoft Project	Portfolio management Product management	<ul style="list-style-type: none"> • Comprehensive examination of formal project management process • Excellent literature review
(Flerlage & Satterley, 2021)	United Kingdom	Agile Scrum	Trello	Book move	<ul style="list-style-type: none"> • Agile is a good choice for library projects • Cross-disciplinary teams • Less structured
(Glendon & Baumann, 2014)	United States		Project Management Office	Library IT	<ul style="list-style-type: none"> • Establishment of project management office in library IT • Process for prioritization of projects
(Greene, 2010)	Ireland	PMBOK	Work breakdown structure Gantt chart	Open access repository and portal	<ul style="list-style-type: none"> • Deliberate effort to apply PMBOK principles • Planning phase was not done exactly per PMBOK but was retroactively examined
(Harden & Ajamie, 2020)	United States	Agile Scrum	Product Owners	Website redesign	<ul style="list-style-type: none"> • Success attributed to clearly articulated authority • Discussed gender dynamics and soft skills of librarians
(Harper, 2018)	United States	PMBOK	EasyProjects Work breakdown structure (“task list”)	Collection relocation and integration	<ul style="list-style-type: none"> • Deliberate effort to avoid formal PMBOK principles and terms
(Hswe et al., 2012)	United States	Agile		Curation of digital objects	<ul style="list-style-type: none"> • Used daily and weekly meetings to establish the Agile cadence • Similar to Scrum, but Scrum is not explicitly mentioned

Citation	Location	Frameworks/ Techniques	Software/ Tools	Type of Project	Summary Points
(Kachoka & Hoskins, 2017)	Malawi	PMBOK		Floor renovation	<ul style="list-style-type: none"> • Examination of a project after-the-fact to determine whether PMBOK principles were followed • Conclusion was that formal project management principles were not followed
(King, 2013)	United States	PMBOK	Project Overview Statement Work Breakdown Structure Gantt Charts Tom's Planner	Service assessment	<ul style="list-style-type: none"> • More a discussion of basic PMBOK principles but still tied to a specific project
(Kipps & Jones, 2020)	United States		Trello	Collection management workflows	<ul style="list-style-type: none"> • More of an application to ongoing workflows. • Talks about project management, but does not indicate how the workflows are projects
(Knapp et al., 2018)	United States	Agile Scrum		Digital newspaper archive	<ul style="list-style-type: none"> • Discusses Agile and Scrum methodologies but does not provide specifics of their application
(Lewis, 1995)	United Kingdom	PRINCE	Microsoft Project Terms of Reference Gantt Chart	Library computer system replacement	<ul style="list-style-type: none"> • Early article encouraging use of formal project management principles for complex library projects
(Maddox Abbott & Laskowski, 2014)	United States			Technical services	<ul style="list-style-type: none"> • Good article with several different examples of formal project management principles in a technical services setting
(McBurney et al., 2020)	United States	Agile Scrum	Sprints	Research	<ul style="list-style-type: none"> • Librarian adapted sprint method to collaborate on research questions with faculty • Two-week sprints • Former research projects had lasted years • Application process

Citation	Location	Frameworks/ Techniques	Software/ Tools	Type of Project	Summary Points
(J. McLean & Canham, 2018)	Canada		Kanban Trello	Electronic resources	<ul style="list-style-type: none"> • Kanban boards improved communication among team members and stakeholders • Simplified scheduling
(Miller, 2018)	United States		Needs recruitment Resource leveling	Digital scholarship	<ul style="list-style-type: none"> • Discuss use of project manager to lessen load on librarians • Time tracking due to grant funding
(Mitchell, 2018)	United States		Google suite of software	Program management	<ul style="list-style-type: none"> • Developed “lightweight” project management approach • Used dashboard approach for communication • Article includes templates for PM and project charter
(Niemi-Grundström, 2014)	Finland	Agile		Library services	<ul style="list-style-type: none"> • Instituted Agile methods for improved communication and transparency • Release plans were published and modified as needed
(Ostergaard, 2016)	United States		Trello Kanban	Collection development Electronic resources	<ul style="list-style-type: none"> • Kanban process used to monitor specific resources in the acquisition process
(Petersohn et al., 2013)	United States	PMBOK	Resource leveling Iron triangle Deconstructing activities Smoothing Alternative Scheduling WBS (Work Breakdown Structure)	Grant-funded digitization	<ul style="list-style-type: none"> • Resource management was needed to work with single available scanner and varying personnel availability. • Multiple “external” issues to project including system migration, system upgrade, and personnel turnover.

Citation	Location	Frameworks/ Techniques	Software/ Tools	Type of Project	Summary Points
(Porter, 2019)	United States	PMBOK	Portfolio management Program Management	Physical remodel of library Service-level reimagination	<ul style="list-style-type: none"> • Outside consultant acted as program manager. • Project charters are drafted and approved through a tollgate meeting • Formality of project management process was not initially liked. • Siloed information in the library. • Overapplication to ongoing business and operations
(Sadler, 2015)	Canada	PMBOK	Gantt Charts SWOT analysis MOST analysis	Library construction	<ul style="list-style-type: none"> • Provides an overview of project management principles for librarians overseeing construction projects • Does not go into specific details of techniques, but highlights techniques and processes to be aware of
(Shein et al., 2018)	United States	Agile	Google suite	Archival planning	<ul style="list-style-type: none"> • Interesting study on applying Agile methodology informally • Qualitative and quantitative methods • Focus on flexibility, trust, empowerment, and collaboration
(Stanley et al., 2003)	United Kingdom	PRINCE2		Electronic resources projects	<ul style="list-style-type: none"> • Describes implementation of formal project management methods • Library piloted the PMM as it was already being used by the university's IT department • Very detailed discussion and comparison with non-PMM managed projects
(Stewart-Mailhiot & Ryan, 2015)	United States			Academic integrity module	<ul style="list-style-type: none"> • Discussion of undertaking a project with no formal PM training • Discusses how formal PM training would have made it easier

Citation	Location	Frameworks/ Techniques	Software/ Tools	Type of Project	Summary Points
(Stoddard et al., 2019)	United States	Agile	Scrum Kanban Trello	Collection management	<ul style="list-style-type: none"> • Good literature review of Agile methodologies • Spend entire budget was a goal • Project charters used • Iterated work • Stakeholder reviews • Agile training provided to team managers and members • Identify dependencies early • Reflection important
(Vargas Ochoa, 2022)	United States	Waterfall		Website migration	<ul style="list-style-type: none"> • Minimal discuss of PM techniques • Waterfall approach for migration of systems
(Veldof & Nackerud, 2001)	United States			Web page design	<ul style="list-style-type: none"> • Specific application of project management to web site design • Breaks web design into six stages • Multiple project manager model
(Vinopal, 2012)	United States		Project portfolio management	Digital projects	<ul style="list-style-type: none"> • “Gentle introduction” to project portfolio management • Presented a “Gantt chart” with no dependencies. Just a schedule.
(Wu et al., 2020)	United States	Agile	Product owner Matrix structure Project management office	Website redesign Institutional repository	<ul style="list-style-type: none"> • Project management structure needed to overcome hierarchical structure • Hired full-time project manager
(Wusteman, 2009)	Ireland	Agile		Federated search package	<ul style="list-style-type: none"> • More of a description of the software product • Does work Agile concepts into the discussion of the development of the package

Project management frameworks used by academic libraries

A number of different project management frameworks were specifically identified in the literature and applied in the academic library projects. The most common methodologies were Agile and Scrum methods, the Project Management Body of Knowledge (PMBOK), and the Projects in Controlled Environments system (PRINCE) and its successor PRINCE2. Other systems identified included the waterfall method, the CORE Project Management System, and the BYU Process. In total, 30 of the 46 articles included in this study (65.2%) identified a specific project management methodology that was used in their libraries.

Agile and Scrum

Agile project management originated in software development in response to the traditional waterfall method of project management in which projects were conducted linearly with one step beginning only when the prior step had been accomplished (Stoddard et al., 2019; Vargas Ochoa, 2022). Agile project management revolves around four core values of favoring individuals and interactions over formal processes, focusing on working products over detailed documentation, collaborating with clients in preference to negotiating contracts, and being responsive to change in lieu of adherence to a plan (Beck et al., 2001). An additional twelve principles based on these values include concepts of emphasizing shorter project cycles, self-organizing teams, daily communication, and the ability to maintain a constant working pace (Agile Alliance, 2024). Scrum is recognized as the most popular Agile development methodology (Hron & Obwegeser, 2022).

In its most basic form, Scrum organizes the development cycle into two- to four-week periods called sprints (Hron & Obwegeser, 2022). At the beginning of each sprint, a planning meeting occurs to determine what can be achieved within the next period and what is needed to achieve that (Hron & Obwegeser, 2022). During the sprint, the team meets each day for a brief (15 minutes or fewer) stand-up meeting where three issues are addressed: what did you do yesterday, what are you doing today, and what roadblocks are you having for accomplishing these (Hron & Obwegeser, 2022). In response to this, the Scrum master, the leader of the team, addresses the roadblocks while the remainder of team

continues to work on the focus of the sprint; the Scrum master is also the team's liaison with the product owner who is responsible for the overall project that the sprints address (Hron & Obwegeser, 2022). Every sprint ends with a retrospective meeting about the success or challenges which can be utilized to improve the next sprint (Hron & Obwegeser, 2022). Agile or Scrum methodologies were specifically called out by thirteen (28.3%) of the articles.

PMBOK

The Project Management Institute is one of the leading professional organization for project management and it publishes the elements of its project management system as the PMBOK (King, 2013). Broadly, the PMBOK breaks project management into five distinct phases—initiation, planning, execution, monitoring and controlling, and closure—which are frequently referred to as “traditional project management” (King, 2013). The PMBOK is the basis for the Project Management Certification Program which serves as a validation exam for the skills of professional project managers (Webster, 1993). Nine of the articles (19.6%) explicitly used PMBOK methods.

PRINCE2

Developed in the United Kingdom, PRINCE2 is a project management methodology widely used and recognized in its private sector (Matos & Lopes, 2013). A project managed under PRINCE2 is guided by the project's business case, which defines the project's outcomes within the broader setting of the organization's justification, commitment, and rationale for the project (Matos & Lopes, 2013). Under PRINCE2, the planning emphasis is on dividing the work into phases with the methodology being designed for flexibility among different levels of scale, culture, organization, or geography (Matos & Lopes, 2013). An earlier iteration, PRINCE, has been described as being driven by products (Lewis, 1995). Five of the articles (10.9%) specifically identified using PRINCE or PRINCE2 methodologies.

Formal project management is important to academic libraries

One common theme echoed through many of articles was the recommendation to adopt at least some formal project management processes in academic libraries. A formal project management structure was seen as necessary to ensure the efficient and orderly completion of projects (Burich et al.,

2006). This view was justified by experiences during the actual implementation of formal project management processes or during retrospective evaluations of how projects were managed by libraries. In one case, the PMBOK principles were utilized as an after-the-fact rubric to determine whether formal project management techniques were used in a library renovation, concluded they were not, and then surmised that formal project management would have improved the flow and outcome of the project (Kachoka & Hoskins, 2017).

Formal project management procedures were not always initiated from within the libraries, but were imposed upon the libraries through external influences or requirements. For example, after Imperial College London used the PRINCE2 methodology to implement an integrated institutional repository because the university's information technology department required its use for technological projects, they found a significant improvement in the conduct and success of their project (Afshari & Jones, 2007). Because project management is common in the area of software development, formal project management principles have been unsurprisingly adopted by libraries after seeing their success in information technology departments (Stanley et al., 2003).

In those projects that extended beyond the library to other units at the institution or to other institutions, formal project management was deemed essential to establishing roles and responsibilities, setting boundaries, allocating resources, and agreeing upon timelines (Burich et al., 2006). Despite requiring time consuming documentation, formal methods provide greater understanding of the tasks along with their complex interrelations leading to better adaption for future projects (Lewis, 1995).

With regards to professional development, project management is seen as a vehicle through which management experiences are provided to librarians (Harden & Ajamie, 2020). Cross training credentialed information professionals—including librarians, archivists, and curators—in project management techniques is an important step for successful library management and for developing future library leaders (Miller, 2018). To support the development of these skills, librarians should be given professional training in formal project management (Stoddard et al., 2019) and librarians who have managed projects should share their experiences by training other librarians (Harden & Ajamie, 2020)

Where projects were managed without formal training, reflection after-the-fact suggested that formal training would have made a positive difference in their outcome and management (Stewart-Mailhiot & Ryan, 2015). Some librarians have overcome their lack of formal project management training by working with teaching faculty with expertise in order to identify the major project management issues which were holding projects back (Harper, 2018).

The importance of formal project management in libraries is underscored by some recommendations to use professional project managers where librarians cannot be adequately trained in project management (Stoddard et al., 2019). In a project for the design of a library's web site, one recommendation was to train librarians in project management to develop expertise or outsource the role to those who are (Veldof & Nackerud, 2001). Similarly, having the use of full-time project managers assisted the success of projects to such a degree that one library established a dedicated project management office to oversee all of the library's projects (Wu et al., 2020).

Having a broader view of project management was echoed in situations where the library used program or portfolio management to synchronously manage several projects (Mitchell, 2018), such as in a digital library technology services department (Vinopal, 2012). The broad view of project management also led to situations where recurring duties that would normally be classified as processes were broken into smaller units that were classified and managed as projects (Collins & Wilson, 2018).

From a geographical standpoint, formal project management was seen as more accepted in the United Kingdom than the United States (Burich et al., 2006). However, this perception was not necessarily reflected in all data; one study found that only 3% of library managers in the United Kingdom reported using formal project management techniques (Chambers & Perrow, 1998). Despite this, specific aspects from project management, such as Gantt charts, were used by 27% of the managers (Chambers & Perrow, 1998). In United States libraries, formal project management techniques were instead used informally, many times without management awareness (Burich et al., 2006).

Librarians' acceptance of project management

Despite the number of articles that advocated for adopting formal project management techniques in academic libraries, there were several that also thought formal project management was unneeded. Although they recognized that academic libraries, with their numerous projects, were fertile grounds for implementing formal project management framework, they made a distinction between the libraries as project-based and the librarians who were seen as either resistant to, or untrained in, formal project management methodologies.

Broadly characterized as coming from humanities or social science backgrounds where project management is an unfamiliar concept, librarians may inherently reject formal project management roles and responsibilities (Burich et al., 2006). Librarians are exposed to general management principles in library school, but do not often see project management courses (Burich et al., 2006). One author even proposed straw-man “rules” that librarians follow to avoid project management and then tore down those rules in an argument for a formal project management structure (Cervone, 2004). Examples of these imagined rules include “don’t bother to understand the project requirements,” “forget planning – it’s too time consuming,” and “when it is late, add more people” (Cervone, 2004). While these rules are plainly invented to demonstrate what not to do, it does underscore the perception that librarians are not cut out for project management roles.

The divergent views of academic libraries as both ripe for project management techniques but unsuited for their implementation was echoed in a number of articles. Libraries were seen as passive institutions, waiting for innovations to mature before adopting them (Collins & Wilson, 2018), but other authors see libraries as eager adopters from other disciplines when the end goal is the improvement of library services (Dulock & Long, 2015). Similar dissonance occurs where some authors refer to librarians as “accidental project managers” who are assigned to lead projects without having the benefit of formal project management experience or education (Feeney & Sult, 2011), while others do not see a way to avoid this as they allege formal project management methodologies would overwhelm librarians with their complexity (Chambers & Perrow, 1998).

Explanations for the reluctance of librarians to accept formal project management techniques are varied. Some have viewed the tension as arising from library, or more broadly academic, culture where strict hierarchies and control paths are not always viewed favorably (Burress & Rowell, 2017). Similarly the resistance may come from views that the techniques are too rooted in a corporate or business mentality (Stoddard et al., 2019). The business analogy has been extended to characterize libraries, with their numerous departments and distinct procedures, as equivalent to large construction projects where each library department is akin to a subcontractor (Anzalone, 2000).

Using project management jargon might confuse librarians who are not familiar with formal project management techniques (Harper, 2018), but, on the other hand, by adopting the vocabulary of project management, academic librarians can transform the idea of collaboration from a provision of a service to one of active engagement (Burress & Rowell, 2017). Regarding the issue of jargon, unspecific terms are used often in library literature when discussing project management without attention to underlying formal project management principles (Petersohn et al., 2013).

The tension between these two broad viewpoints—librarians as incapable of formal project management versus libraries in need of project management—is palpable in the literature, although generally authors are optimistic about the ability of librarians to implement formal project management techniques in academic libraries. Perhaps the issue is simple one of perception and librarians' formal instruction, training, or resistance to new procedures are no different than other professions. The articles do not offer concrete data on this issue, often relying only on anecdotal evidence or sweeping generalizations. Suffice to say, that until academic librarians are regularly provided with the opportunities for formal project management training, either during their education or through professional development, any statements decrying their abilities to project manage are simply speculation.

Librarians modify formal project management to fit their needs

Possibly because of this general resistance to formal project management structures, librarians have more recently been utilizing Agile principles in project management, appreciating it for its

flexibility and ability to accommodate change (Flerlage & Satterley, 2021) and being seen as preferred to a waterfall with its stricter focus on order (Wusteman, 2009).

Despite the inherently flexibility of the Agile and Scrum methodologies, librarians still modify these procedures, often diluting their work impact. Sprints were modified to incorporate regular breaks to allow team members to focus on their “regular work,” and considerations were made to reduce sprints from two-week periods down to two-day periods (Ballinger, 2019). In this case, the authors acknowledged the severe modifications they made to Scrum methods and noted “some might argue that it would not count as Scrum” (Ballinger, 2019).

In other situations, scrums were reduced from daily meetings to twice weekly (Collins & Wilson, 2018) or libraries simply adopted only the aspects that were thought to improve outcomes (Dulock & Long, 2015), classifying the practice as “rightsizing” project management principles (Harper, 2018). The ease with which multiple libraries abandoned formal project management techniques was common among several articles.

Use cases for formal project management in academic libraries

Academic libraries applied project management techniques in a variety of areas. As might be expected from the origins of project management, a majority of projects occurred with digital and information technology projects. Libraries also reported using project management techniques for construction and other physical projects, which is also a logical adaptation since project management is frequently encountered in construction projects. In addition to these more traditional areas, libraries found other areas in which to apply project management methodologies and found ways to apply specific tools and software on particular projects.

Digital projects

Formal project management techniques were often used in digital projects. As might be expected, Agile techniques were used in diverse digital and electronic projects including metadata projects (Ballinger, 2019), library analytics dashboards (Burke et al., 2018), website redesigns (Harden & Ajamie, 2020; Wu et al., 2020), digital curation (Hswe et al., 2012), newspaper digitization (Knapp et

al., 2018), archival projects (Shein et al., 2018), data visualization (Stoddard et al., 2019), institutional repositories (Wu et al., 2020), and a federated search platform (Wusteman, 2009). One non-profit in the United Kingdom utilized Agile and Scrum approaches to develop a library analytics dashboard in conjunction with a number of higher education institutions (Burke et al., 2018). In one case, the workload of a digitization project resulted in the establishment of a project management office that ensures significant involvement from library personnel (over 25%) in assessing the strength of future projects (Glendon & Baumann, 2014).

PRINCE2 was also used for digital projects including establishing an institutional repository (Afshari & Jones, 2007), replacing a computer network (Lewis, 1995), and other assorted digital and information technology projects (Stanley et al., 2003) illustrating the flexibility of this older project management methodology. General project management principles were also used in the digitization of a special collection (Maddox Abbott & Laskowski, 2014).

Physical projects

Project management techniques were seen in projects ranging from major construction projects to smaller physical changes at libraries. Where the Agile and PRINCE2 methodologies were the dominant framework used in digital projects, PMBOK methods were more commonly used in physical projects. Libraries applied the PMBOK in a number of physical projects such as the full construction of a library (Sadler, 2015), renovation of individual floors (Kachoka & Hoskins, 2017), library remodeling (Porter, 2019), and physical collection relocations (Harper, 2018). General project management techniques, perhaps inspired by the PMBOK, was used in a project to merge two libraries (Maddox Abbott & Laskowski, 2014).

Although more commonly seen in the digital space, Agile techniques were also described in the physical space as being used in book move project, where scrums were used to identify and select individual books for retention, relocation, or removal and then further Agile processes were used in the physical move of those books by a third-party contractor (Flerlage & Satterley, 2021).

Library operations and services

Outside of the digital and physical spaces, project management techniques were also involved in the areas of library operations and services. Agile techniques were used to improve library services through better communication (Niemi-Grundström, 2014), to monitor workflows in technical services (Collins & Wilson, 2018), and to track contract negotiations (Stoddard et al., 2019). Although these examples of Agile methodologies were used in non-software situations, it was still noted that the awareness of Agile methodology was instilled in the libraries through software development situations (Collins & Wilson, 2018).

General project management principles and some lesser-known methodologies were used also used by libraries, for processing a cataloging backlog (Maddox Abbott & Laskowski, 2014), for using the CORE Method for serials cancellation (Carey et al., 2005), and incorporating the BYU Libraries method for course resource management (Feeney & Sult, 2011). Services also created using structured project management included self-assessment tools (Burich et al., 2006) and chat reference services (Burich et al., 2006) while one library used PMBOK for assessment initiatives (King, 2013).

An interesting use of Scrum was in a research setting using the sprint period as a time of intense collaboration among faculty researchers and a team of subject specialist librarians (McBurney et al., 2020). The research sprints were undertaken after a selective application process for faculty proposals and allowed librarians to undertake cross-disciplinary projects that were best-served by the process (McBurney et al., 2020).

Use cases of tools and techniques

Project charters

Where broad methodologies were not used, some specific tools from project management were adopted for specific uses. Project charters are high-level documents that are prepared at the outset of a project and they outline a project's purpose, general requirements, objectives, deliverables, sponsors, and the manager's authority (Bjornen & Ippoliti, 2021). Project charters may have other names—such as a one-pager (Collins & Wilson, 2018) or a project statement (Chambers & Perrow, 1998)—depending on

the framework, but still fulfill the same general principles. Charters and the similar memoranda of understanding, which are used to define responsibilities between different groups, departments, or organizations, were seen as excellent tools for establishing roles in the development of a research data services program (Bjornen & Ippoliti, 2021), in series cancellation projects (Carey et al., 2005), and in technical services workflows (Collins & Wilson, 2018). They were also deemed crucial in larger program management activities (Mitchell, 2018).

Work breakdown structures

Work breakdown structures are documents that demonstrate the relationship between the deliverables or objectives for a project and the particular tasks that need to be performed; they ideally breakdown the total work needed into individual and discrete tasks (Burress & Rowell, 2017). These specific tools were used and discussed in regards to digital humanities projects (Burress & Rowell, 2017), institutional repositories (Greene, 2010), collection moves (Harper, 2018), and assessment initiatives (King, 2013).

Gantt charts

Gantt charts are one of the most commonly used tools by project managers and provide a graphical depiction of a project's schedule identifying dependencies among tasks and allowing for the quick identification of project progress, and where opportunities for extending or compressing deadlines exist (Geraldi & Lechter, 2012). In library settings, Gantt charts were used for scheduling in construction projects (Sadler, 2015), digital humanities projects (Burress & Rowell, 2017), and computer network replacement (Lewis, 1995). However, some items that were identified as Gantt charts were more akin to a basic schedule as they only conveyed start and end dates with no specific tasks identified, no dependencies, and no obvious interrelation of the tasks' schedules (Vinopal, 2012). Ideally, Gantt charts should be granular enough to determine the effect of each specific task on the overall schedule (Geraldi & Lechter, 2012).

Resource allocation

Resource leveling is a vital technique in project management that allows the project manager to overcome scheduling difficulties and the overallocation of resources in order to ensure a project is accomplished on time and on budget (Miller, 2018). Effective resource leveling is an important tool in the library setting because academic libraries are frequently asked to accomplish projects without full resources and while balancing the competing time priorities of librarians and library staff (Miller, 2018). Resource leveling was used in projects for digital initiatives departments (Miller, 2018) and was examined closely in a study on a mass digitization project (Petersohn et al., 2013).

Kanban boards

Kanban, meaning signboard or billboard in Japanese, is a lean project management tool, frequently used in an Agile environment, that relies heavily on the visualization of workflows to optimize the completion of tasks or projects (J. McLean & Canham, 2018). The Kanban method is a valuable tool for repetitive tasks or projects whose individual tasks are common from project to project (J. McLean & Canham, 2018). The basic visualization tool for work progress is a Kanban board on which tasks or steps are represented on cards and physically moved from one column to the next as items are accomplished; Kanban boards may have a number of columns, but typically have at least three indicating tasks to do, tasks in progress, and tasks completed (J. McLean & Canham, 2018).

The simplicity of the Kanban system appears to appeal to librarians and is seen as low-effort and intuitive (Ballinger, 2019). Trello, an electronic version of a physical Kanban board, was identified frequently in the literature and was used for tracking license agreement negotiations (Carpan & Linoski, 2019), studying the information seeking behaviors of students (Chen & Chen, 2017), managing technical services (Collins & Wilson, 2018), overseeing book moves (Flerlage & Satterley, 2021), monitoring collection management workflows (Kipps & Jones, 2020), managing the life cycle of electronic resources (N. McLean, 1999), and acquiring electronic resources (Ostergaard, 2016).

Conclusions and Future Work

Projects are ubiquitous in academic libraries but there is no consistent system of formal project management within academic libraries. This scoping review has uncovered examples of project management in academic libraries ranging from the “lightweight” (Mitchell, 2018) to incredibly formal (Afshari & Jones, 2007). If there is any consistent trend among academic libraries, it is that each uses project management principles and tools to fit each unique situation and environment. It is perhaps this lack of uniformity and willingness to “break the rules” of project management that causes some authors to question whether academic librarians even have the ability or desire to follow a formal project management system.

The differences in approaches among the libraries and the differences in opinions among the commentators would likely be addressed through better education and training of academic librarians in project management principles. The most recent studies on the state of project management education in library science programs found that opportunities for formal education were limited (Guimaraes et al., 2021; Serrano & Arquero Avilés, 2016). Project management skills, however, are critical for handling the negative trends of decreasing budgetary, personnel, and resource support (Crumpton & Bird, 2019). Incorporating project management skills into library science programs, either as stand-alone courses or as learning objectives in existing classes, would be one way to increase the knowledge and understanding of project management principles within academic libraries.

Gaps in project management education at the graduate level could be addressed through continuing education opportunities and on-the-job training. As noted earlier, this study excluded grey literature from the scope of the review. An area for additional exploration would be to expand the study to grey literature with a specific eye toward uncovering continuing education resources about project management for librarians. Uncovering and consolidating those resources might improve academic librarians’ abilities with regards to project management.

Another area for future examination is the recent trend of incorporating professional project managers or full project management departments into the operation of academic libraries. By having

designated personnel for overseeing projects this would lessen the need of academic librarians to learn project management techniques on-the-fly in their roles as “accidental project managers” (Feeney & Sult, 2011). Presumably this would lead to better managed projects that are more in alignment with an academic library’s strategic goals. Encouraging larger academic libraries to incorporate this model would provide a larger body of experience from which to draw conclusions.

Overall, the diverse examples uncovered in this study demonstrate the breadth of value that formal project management methodologies bring to projects located within academic libraries. Although this is yet another skill that academic librarians are being asked to learn, it is a skill that is transferable across all of the departments in an academic library and beyond.

APPENDIX A. Search strings for each database

Database/Index	Coverage Area
ABI/Inform	abstract(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR summary(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR mainsubject(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college))
Engineering Village (incl. Compendex and Inspec)	(((((("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) WN KY)) AND ({ja} WN DT))
ERIC	abstract(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR summary(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR mainsubject(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college))
LISTA	TI(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR SU(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR AB(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR KW(("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college))
Library Literature and Information Science Index	TI (("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR AB ("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)) OR SU (("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college))
Scopus	("project management" OR agile OR waterfall OR scrum OR sprint OR gantt OR kanban OR prince2 OR "portfolio management") AND library AND (academic OR university OR college)

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