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Article abstract

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La structure organisationnelle entourant les services de découverte à l'échelle du Web dans les bibliothèques universitaires canadiennes

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Abstract / Résumé

This study analyzed how Canadian post-secondary libraries manage and administer their web-scale discovery service. Through a combination of survey responses and semi-structured interviews, the author investigated how Canadian academic libraries support their web-scale discovery service from an organizational structure perspective. Academic libraries can manage their discovery service from a technical services unit, a library systems or a web services department, or by a committee. However, there is consensus that a discovery service requires collaboration among many functional areas. Discovery service leaders often have organizational awareness to break down the silos between traditional library functions to perform the various duties related to managing and administering their web-scale discovery service. Individuals responsible for their discovery service work collaboratively with staff in many different areas and often have a strong user-centred focus.

Cette étude analyse comment les bibliothèques universitaires canadiennes gèrent et administrent leur service de découverte à l'échelle du Web. En combinant des réponses à un sondage ainsi que des entrevues semi-dirigées, l'autrice enquête sur comment les bibliothèques universitaires canadiennes soutiennent leur service de découverte à

l'échelle du Web d'une perspective de structure organisationnelle. Les bibliothèques universitaires peuvent gérer leur service de découverte à partir des départements des services techniques, des systèmes de la bibliothèque ou des services Web ou par comité. Toutefois, il y a consensus qu'un service de découverte requiert une collaboration entre plusieurs domaines fonctionnels. Les leaders de service de découverte ont souvent une sensibilisation organisationnelle pour éliminer les silos entre les fonctions traditionnelles de la bibliothèque afin de compléter diverses tâches liées à la gestion et à l'administration de leur service de découverte à l'échelle du Web. Les personnes responsables du service de découverte travaillent en collaboration avec le personnel de plusieurs domaines différents et sont souvent fortement axées sur l'usager.

Keywords / Mots-clés

web-scale discovery services, discovery services, Canadian academic libraries, academic libraries, post-secondary libraries, library organizational structure, organizational structure; service de découverte à l'échelle du Web, service de découverte, bibliothèques universitaires canadiennes, bibliothèques universitaires, bibliothèques postsecondaires, structure organisationnelle de la bibliothèque, structure organisationnelle

Introduction

Adopting a web-scale discovery service represents a significant shift in how academic libraries offer scholarly content to their users. Web-scale discovery services pre-harvest and pre-index metadata from a multitude of sources to create a single unified index (Breeding, 2007). Four web-scale discovery services are available on the market: EBSCO Discovery Service, Primo Central, Summon, and WorldCat Discovery. By adopting one of these services, a library can replace or augment their online public access catalogue with a service that resembles Google's search engine. These discovery services combine results from the library's Integrated Library System (ILS) as well as chapter- and article-level content from a central index that was previously dispersed among many different publisher websites and online indexes and databases.

While there are many case studies written about the selection, implementation, and usability of such services, this study is an attempt to analyze how Canadian post-secondary libraries manage and administer their web-scale discovery service, and the competencies of the library staff responsible for service management. Adopting a discovery service breaks down the boundaries of traditional library functions—technical services, library systems, and public services. Technical services encompasses the activities that take place behind the scenes related to managing a library's resources, such as metadata/cataloguing, collection development, acquisitions, serials, and electronic resource management. Library systems encompasses the areas responsible for various forms of computing infrastructure in a library, including computing hardware and software, maintenance of the library's ILS, and the library's website. Public services encompasses staff who regularly interact with patrons, including those who liaise with

students and faculty, provide instruction and information services in person or virtually, or who are employed by circulation or reserve departments.

Research Purpose

The purpose of this paper is to investigate how Canadian academic libraries manage and maintain their chosen web-scale discovery service. Research questions include:

- When an academic library adopts a web-scale discovery service, which functional unit in the library is primarily responsible for the discovery service?
- Are the responsibilities related to managing the discovery service centralized or distributed?
- Do Canadian academic libraries assign a single person to provide oversight to the discovery service or is the service managed by a team or a formal committee?
- What are the common skills and competencies of the library staff that maintain and support the web-scale discovery service and its associated life cycle?

An online survey was developed looking for insights and observations related to organizational structure, library human resources, and staff competencies organized around web-scale discovery services. Some semi-structured interviews followed with willing participants to gain a clearer picture of their library's organizational structure around web-scale discovery services and the library staff who manage the service.

Literature Review

Few articles have directly investigated the staffing implications for libraries that have adopted a web-scale discovery service. One study assessed whether discovery-related job positions were increasing by reviewing job postings and library staff directories (Ellero, 2014). The human resource repercussions for administering and maintaining a web-scale discovery service were addressed tangentially by authors whose primary focus was usually the implementation or assessment of a web-scale discovery service.

Human resources

Nichols et al. (2017) conducted a survey on librarian perceptions of successful web-scale discovery implementations at land-grant research institutions in the United States. Included in the survey results was a short section on "Discovery tool operations and maintenance" which outlined how libraries were organizing and supporting their discovery tools. The authors found that 45% of the respondents in their survey had standing committees responsible for oversight of the discovery service. Some of the open responses indicated that they had "an unofficial or loosely formed governance group" (Nichols et al., 2017, p. 93). Only 18% indicated that they employed a discovery librarian or had a similar position whose primary area of responsibility was the

administration of their discovery tool. The authors did not identify the functional unit associated with these positions. The authors wrote that throughout their survey, open-ended comments "emphasized the importance of responsible maintenance for the discovery tool and pointed out that insufficient staffing and technical support can be disastrous" (Nichols et al., 2017, pp. 94–95). The need to allocate human resources to support a web-scale discovery service cannot be overlooked when choosing to implement such a service. A discovery service requires ongoing care and attention and human resources devoted to its maintenance and support.

Ellero (2014) studied whether positions dedicated to managing a web-scale discovery service were increasing by examining discovery-oriented library job postings and Association of Research Libraries (ARL) staff directories for the presence of a discovery-oriented department or position. Ellero's investigation revealed that the number of instances where the term "discovery" appeared in job titles and department names remained small. From February 2012 through July 2014, Ellero encountered 23 job postings and 13 entries from staff directories for a total of 36 job descriptions. She found that discovery positions were distributed among seven primary job functions with director or manager making up the largest group (n = 10), followed by systems (n = 8), cataloguing or metadata (n = 7), acquisitions or electronic resources (n = 5), user experiences (n = 3), access services (n = 2), and general technical services (n = 1) (Ellero, 2014, p. 339). Excluding the director and manager positions, where these individuals are more likely to provide general oversight for "discovery" and are probably not responsible for the day-to-day activities related to supporting a discovery service, Ellero's study indicates that most positions reside in functional areas related to technical services or library systems. Ellero acknowledged that more research into this area was needed and that the lack of discovery-oriented job titles in her dataset did not necessarily mean that such positions did not exist. She concluded that discovery-related responsibilities were probably covered by other positions without "discovery" in their titles or through formal or informal teams. Ellero observed that "an environment of changing systems and information resources calls for consultative and collaborative practices" (Ellero, 2014, p. 346). She also wrote that "deeper integration of library technical and public services positions as well as team work is needed to engage effectively in the continual decision-making required in implementing and maintaining a web-scale discovery service" (Ellero, 2014, p. 346).

Yue and Beisler (2014) at the University of Nevada, Reno described how a new position and a new technical services department which included the term "discovery" were created in their library's effort to shift towards user-centred services. A vacant position was repurposed and renamed the Knowledge Access and Discovery Librarian; this position then led the new department called Design and Discovery. The authors discussed how the Knowledge Access and Discovery Librarian position evolved from a standard metadata and cataloguing role to one that reflected the shift in technical services to be more user-focused. This new position included duties traditionally reserved for public services staff, such as serving on a public service desk, participating in the chat reference service, as well as some subject liaison librarian work (Yue & Beisler, 2014, pp. 273–274).

Ellero (2014) and Yue & Beisler (2014) seem to agree that even when discovery positions reside in technical services or systems functional areas, a user-oriented outlook is beneficial to successful discovery service management. Nichols et al. (2017) stressed that a web-scale discovery service requires human resources for a successful implementation.

Collaboration and cross-communication

McKinnon (2016) surveyed public service staff at McGill University in Montreal, Canada, to find out how front-line staff preferred to report discovery layer errors and how responses were perceived. At McGill University, the E-resources and Serials division within Collection Services was primarily responsible for access, troubleshooting, and discovery layer maintenance. Following the migration to a new discovery layer, the number of problem reports had significantly increased, and the library was looking for a method to "improve mechanisms for reporting and responding to problems" (McKinnon, 2016, p. 117). McKinnon's survey gathered information to improve workflows among the Collection Services areas and to reduce friction between front-line staff (public services) and Collection Services staff. McKinnon stressed the need for improving communication and collaboration within Collection Services and with front-line staff. A single point of contact for reporting problems was key to improving communication, which allowed reports to be triaged more efficiently. In addition, collaborating with all staff who worked with the entire life cycle of electronic resources was recommended. McKinnon thought that the "provide access" and "provide support" sections of the electronic life cycle needed to have equal emphasis with the "acquire" component by all staff in Collection Services (McKinnon, 2016, p. 125). As a result, Collection Services staff established monthly meetings so that everyone could "share information and to collaborate" to break down the silo between the Collection Development unit, who acquired electronic resources, and the E-resources and Serials unit who provided access and responded to problem reports from public service staff (McKinnon, 2016, p. 125). This article highlights the importance of cross-communication with public service staff as well as internal communication and collaboration between units within Collection Services.

Enoch (2018) described how two departments, the User Interfaces Department and the Serials and Electronic Resources Unit, worked together to implement Summon at the University of North Texas. After implementation, troubleshooting became the responsibility of support staff in the Serials and Electronic Resources Unit. After a year, User Interfaces and Serials and Electronic Resources staff worked together again to design a workflow for public service staff and patrons to submit trouble tickets that included the details needed for staff to investigate the issue. Enoch outlined the complex workflow of troubleshooting problems, from isolating the issue to identifying which department was responsible for resolution. Enoch concluded that the creation of this troubleshooting workflow helped "to educate public service librarians about web-scale discovery and how problems encountered are more complicated than they might first appear" (Enoch, 2018, p. 239). Clear communication between public service librarians who report errors and the units responsible for troubleshooting the errors means that problems can be solved in a more timely manner resulting in a better experience for users in the long run.

Kornblau, Strudwick, and Miller (2012) discussed how Summon had been implemented at Florida Atlantic University (FAU). The Summon implementation team at FAU comprised staff from the Technical Services Department, the Electronic Resources Unit, and the Systems Department. Working groups which included staff from public service areas were temporarily formed to integrate Summon into other services, but these groups were dissolved when the specific tasks were completed. At FAU, the electronic resources librarian became ultimately responsible for managing Summon. The electronic resources librarian communicated frequently with technical services staff and worked with reference and instruction staff when investigating changes to Summon. Acknowledging that managing a discovery service required regular interdepartmental communication, the authors suggested that a standing committee might be a solution to share the workload for evaluating enhancements and analyzing problems related to the service (Kornblau et al., 2012, p. 155).

Somerville (2013) documented a case study on revitalizing technical services at the University of Colorado, Denver, within a larger program of reinventing the library to operate more collaboratively. Her case study included a section on evaluating, selecting, and implementing a web-scale discovery service through teamwork, collaboration, and shared leadership. She outlined the significant contributions made by technical services staff throughout the process. At Somerville's library, the Resource Discovery Task Force included three librarians from Technical Services out of five task force members. Staff from the library's information technology and public service areas were the other members of the task force. After selecting Summon as their web-scale discovery service, a Summon Technical Services Implementation Team was formed to set up the service, as well as a separate Summon Public Services Implementation Team to customize the interface. The Public Services Implementation Team included a member from Technical Services who served as a "thought leader and boundary spanner"(Somerville, 2013, p. 237). Somerville emphasized that technical services staff functioned as "active collaborators" operating in an environment of shared leadership and evidence-based practice. Somerville stated "the Web-scale discovery service lifecycle required a new way of working that no longer depended on top-down decision-making. In addition, success depended on evolving new ways of thinking and working together among formerly silo-ed colleagues throughout the organization" (Somerville, 2013, p. 238).

McKinnon, Enoch, Kornblau et al., and Somerville's case studies reveal the need to work collaboratively within and with other units outside of their functional homes.

Competencies

Yue and Beisler (2014) stressed that the management of discovery services required broad understanding of many library systems in addition to the discovery service, such as the knowledge base, the link resolver, and the ILS. This understanding was in addition to the public service duties assigned to their new Knowledge Access and Discovery Librarian position.

Ellero (2014) listed common duties for discovery job descriptions that included managing metadata, fostering user experience, and collaborating.

Other authors outlined the complexity of working in a web-scale environment where solving problems and troubleshooting became a significant activity. These authors highlighted the complexity of the work and described the functional areas responsible.

As mentioned earlier, Enoch (2018) described a workflow for managing discovery-related trouble tickets in the Serials and Electronic Resources Unit. McKinnon (2016) stressed the need for staff to have a full appreciation for the entire life cycle of electronic resources to solve discovery-related issues and the need to break down the silos that existed within a single functional area.

Carter and Traill (2017) from the University of Minnesota published a study that offered advice on the skills and knowledge needed by staff to effectively resolve electronic access problems in a web-scale environment. The E-Resource Management Unit and the Data Management and Access department were both responsible for troubleshooting electronic resources. Troubleshooting involved navigating the complexities of many library systems in a web-scale environment. Carter and Traill recognized a need to train additional staff to respond to the "growing numbers of problem reports and a much higher level of complexity" (Carter & Traill, 2017, p. 2). The authors created a training checklist that described some of the common problems encountered and outlined the concepts that staff would need to know to troubleshoot effectively. Having broad and deep knowledge of the library's various systems and how they were related provided a baseline for solving problems. Carter and Traill concluded their article by stating that "improving library user experience" was the primary purpose of "building solid high-level troubleshooting skills among staff" (Carter & Traill, 2017, p. 14).

This literature review seems to indicate that technical services areas often end up with web-scale discovery responsibilities. However, a common feature from the literature is that the person, team, or unit responsible for their web-scale discovery service never works in isolation. Teamwork, collaboration, and a user-oriented outlook were frequent themes.

Methodology

To investigate how Canadian academic libraries supported and administered a web-scale discovery service, an online survey was created to solicit insights and observations related to web-scale discovery services from academic library staff in Canada. The online survey focused on organizational structure, human resources, and staff competencies to learn how Canadian academic libraries managed and maintained their web-scale discovery service. At the end of the survey, respondents could volunteer to participate in semi-structured interviews so that the author could gain a clearer picture of a library's organizational structure and the human resources devoted to web-scale discovery service administration and maintenance.

The survey was created using the author's institutional instance of SurveyMonkey hosted on a Canadian server. Survey respondents who agreed to an interview were directed to an entirely separate service to provide their contact details so that their survey responses would remain anonymous. Contact details for interview participants was collected via the author's institutional WebSurvey service, hosted on Simon Fraser University Information Technology servers in Burnaby, British Columbia. Once interviews were scheduled, the author deleted their information from WebSurvey.

Personally identifying information was not collected via the online survey. Profile data for respondents was restricted to library type and web-scale discovery service product so that responses from individuals could not be indirectly identified. In cases where a respondent inadvertently included identifying information in an open-ended question, their response was edited and replaced with a generic non-identifying equivalent. For example, if the respondent included the name of their institution, the name was replaced with a generic descriptive equivalent. The online survey contained a mix of multiple choice and open-ended questions.

Following approval from the author's research ethics board on August 8, 2019, survey participation requests were sent to collections-oriented email lists operated by several Canadian consortia in late September 2019 and again in November 2019. To qualify for ethics approval, the author obtained permission in advance from all the email list administrators to solicit survey participants. The consortia email lists included:

- British Columbia Electronic Library Network.
- Council of Atlantic University Libraries.
- Council of Prairie and Pacific University Libraries.
- Canadian Research Knowledge Network.
- Ontario Colleges Library Service.
- Ontario Council of University Libraries.

Where she was already a member of the email list, the author sent the recruitment message herself with permission from the email list administrator. When the author was not a member of the email list, the administrator sent out the recruitment message on the author's behalf. According to SurveyMonkey, 71 respondents filled in the survey and six respondents volunteered to be interviewed. However, upon review of the online survey data, the author discovered that one respondent selected "no" to the very first question which asked the user to agree to participate. If the user selected "no", the survey ended. Fourteen other respondents stopped entirely at question four which asked them to name their integrated library system. Several other respondents skipped some questions. Thus, the number of responses for each question in the survey varies. Survey responses were analyzed by the internal tools provided by SurveyMonkey and exported into Microsoft Excel for further examination by the author.

Six semi-structured interviews were conducted between October 2019 and January 2020 which gave the author a more fulsome picture of library organizational structures at each interview participant's respective library. The semi-structured interview questions allowed participants to explain in detail how the administration of their web-scale discovery service was organized and whether a single unit or department provided oversight for the service or if the administration was distributed. Each interview participant received in advance a copy of the informed consent text and the semi-structured interview questions. The interviews were recorded using Voice Memos on the author's home computer over Skype, with one interview conducted over the phone instead of Skype. The author transcribed the interviews herself and then deleted the recordings from her home computer once the transcription was complete. Any personally identifying information was anonymized during the transcription process wherever the interview participant included specific names or institutions. Interview participants represented a variety of institution types. There were three primarily undergraduate institutions, two comprehensive universities, and one college represented by the interview participants. As well, each of the four web-scale discovery services available on the market were represented among the interview participants. The author analyzed the content of the transcripts without the use of any special software. The semi-structured format of the interview allowed the author to compare responses from each interview participant.

The survey instrument is included in Appendix A. Links to the survey instrument and the responses as well as the transcripts from the semi-structured interviews are also included in Appendix A. They were deposited with the Federated Research Data Repository (FRDR), a Canadian multi-institutional repository for research data.

Results

Organizational structure

In terms of organizational structure, the results were quite diverse. Survey respondents were asked to identify the unit or department which had overall responsibility for the operations and maintenance of their library's web-scale discovery service. Only one of the 55 respondents who filled in this question indicated that their library had a formal discovery department. Library systems was the most frequently named department representing 18% of the respondents (*n* = 10), followed by electronic resources with 11% (*n* = 6) and web or digital services at 9% (*n* = 5). Twenty-nine percent of the respondents (*n* = 16) indicated that responsibility was distributed either through a formal committee dedicated to the discovery service or via multiple departments. Indeed, 22% of the respondents (*n* = 12) selected "other" and offered a variety of explanations: their consortia managed the service, their library had no formal departments, overall responsibility was shared between two librarians or by the sole librarian at their institution. One survey respondent explained:

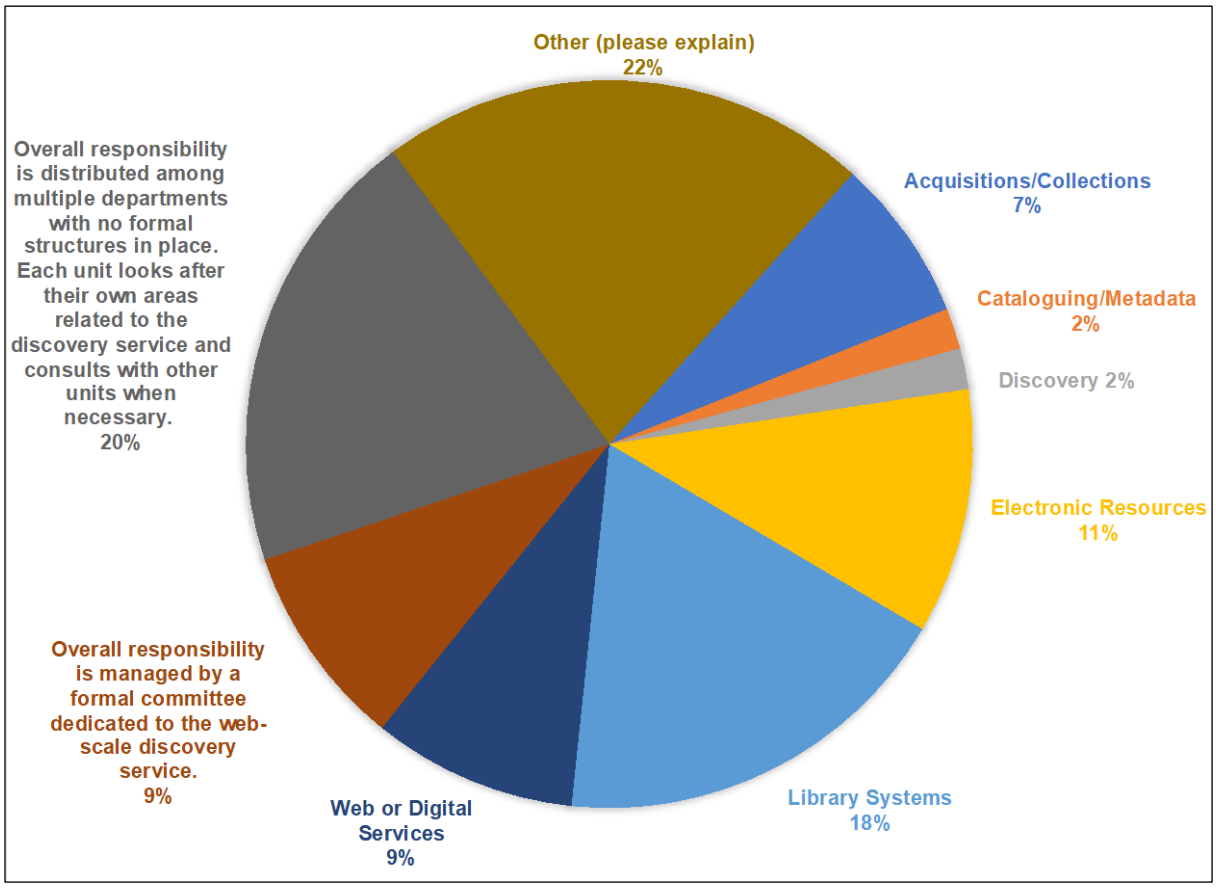
> It's complicated. There is a position and a team and they (sometimes just the individual; sometimes just the team) have responsibility for day-to-day operations (i.e. keeping the lights on). When changes need to be made, the UX [user

> experience] team usually leads and then staff in the systems or collections services department do the implementation work.

As Figure 1 demonstrates, overall responsibility for the operations and maintenance of web-scale discovery is diverse. There is no obvious trend for where web-scale discovery responsibilities have been placed within a library's organizational structure amongst the Canadian institutions who participated in the survey.

Figure 1

Library Department with Overall Responsibility for the Operations and Maintenance of the Web-scale Discovery Service



Although responsibility for web-scale discovery service varies across functional areas, 21 survey respondents identified a single position responsible for administering and managing their library's discovery service. When asked to provide the title of that position, respondents supplied many different titles. Only two position titles contained the word "discovery". There were five electronic resource position titles, four web-related titles, three systems-oriented titles, and two collections-related titles. Seven titles did not fit any specific functional category or were ambiguous. The department or unit names associated with the position titles gave further direction as to their functional home. Some respondents did not provide a unit/department name or stated "Library," an indication that their library did not have formal departments. Tables 1.1–1.3 list the 21

position titles given along with their corresponding unit or department name grouped by main function.

Table 1.1

Electronic Resources and Collections-oriented Position Titles and Unit/department Names

Position title	Unit/department name
eResources Librarian	Library
Electronic Resources and Archives Librarian	[blank]
E-resource librarian	Collections
Electronic Resources Librarian	Acquisitions
ER Discovery and Access Librarian	Collections
Collections Librarian	Technical Services
User Experience & Collections Librarian	Collections

Table 1.2

Systems and Web Service-oriented Position Titles and Unit/department Names

Position title	Unit/department name
Systems Librarian	IT
Systems Librarian	[blank]
Head, Libraries Systems	Library Systems
Web & Discovery Librarian	Learning Resources/Library
Digital & Web Services Librarian	Digital Library Services
Web Services Librarian	Technical Services
Web Services Librarian	Library Technical Services

Table 1.3

Ambiguous Position Titles and Unit/department Names

Position title	Unit/department name
Coordinator	Library Systems & Technical Services
Librarian, Online Services	Library
Library and Learning Commons Technology Coordinator	Library and Learning Commons
Associate Director	[blank]
Librarian	Research Services
Academic Librarian	Library
Regional Librarian	Library

Based on the titles and department names for these positions, responsibility for discovery services seem to reside mostly in either technical service areas with a concentration on electronic resources or in library systems/web services. Interview participants confirmed this trend. Five out of the six interview participants who indicated that they had primary oversight for managing their library's web-scale discovery service were in technical service areas. The sixth interview participant indicated that their systems librarian provided the lead for their discovery service.

In addition, managing the discovery service is just one responsibility among a list of other duties and responsibilities for the individuals in these positions. When asked to list their general responsibilities, respondents included many other duties associated with their position, including managing digital content, library systems, the library's website, electronic resources, database licensing, collection development, and so on. One respondent wrote:

> Wear many hats: reference, research, acquisitions, manage all electronic subscriptions and licenses, direction to 5 staff & other duties.

When asked how discovery service management came to belong to this position, the answers included:

- Position already managing ILS at the time of discovery adoption.
- Position initially took care of ILS with other responsibilities and discovery layer seemed a natural fit.
- Lumped in with electronic resources.
- The position was already managing the online catalogue when the web scale discovery service was adopted.

- This position was the result of a redefining of library functional responsibilities.
- Fit well due to position's other management requirements (databases, e-resources access, website, etc.).
- The Regional Librarian managed all electronic subscriptions and programs; this was just one more addition.
- I was already doing database administration at the time, so the [web-scale discovery service] was a logical extension of that work.

Only one respondent indicated that "a new position was created to respond to organizational needs." Although the survey neglected to ask whether discovery responsibilities replaced or displaced other duties, several of the interview participants indicated that existing staff roles had changed over time to accommodate the increase in electronic resources which eventually led to managing the discovery service. One interview participant stated, "no new staff members have been added to the library to accommodate the change or the increase in work around electronic resources or discovery services," but "we did lose positions around print. We had a staff member retire. And she was not replaced." Another interview participant commented on the creation of a library technician position because of a growing need to manage discovery and electronic resources and the transformation of work in technical services: "a lot of the traditional work that they had been doing was beginning to decline in volume and people were receptive really to looking at what new opportunities might be available for their roles."

Thus, despite the absence of the word "discovery" in position titles, these Canadian academic libraries delegated responsibility for managing their web-scale discovery service to an existing position, but no significant changes were made to their library's organizational structure as a result.

Collaborative work

Interview participants and the survey results revealed that staff often worked collaboratively to perform their discovery-related duties. When survey participants were asked to identify the specific library department or unit responsible for certain activities related to managing their web-scale discovery service, many respondents selected "other" and provided comments that combined the multiple-choice options that corresponded to traditional library functions. These "other" comments from respondents included:

- Collections Services (a mixed unit of acquisitions, collections, metadata, and electronic resources).
- Team that combines several of the listed groups.
- Acquisitions/Collections; Cataloguing/Metadata; Library Systems.

- Collaboration of the UX and e-resources teams with support from library systems as required.
- Both Electronic Resources and Web/Digital Services.
- Electronic Resources is primary, but also Cataloguing/Metadata, and Systems as well.

The interviews further elaborated on these collaborative and team-oriented environments. One interview participant who identified as the head of technical services stated that the management and administration of their discovery service was “pretty much divided by the two departments: Library Systems and Technical Services.”

Another interview participant emphasized that even though the systems librarian had the lead for discovery at their institution, they worked collaboratively with their eresources and elearning librarian. Another interview participant identified their unit as the Library Systems Group, but not in the traditional sense, as the group included the eresources and scholarly communications coordinator, the collections coordinator, the library automation coordinator, and a library technician for electronic resources. At their institution, traditional technical services and library systems units were merged and they all worked together in a team environment. This interview participant further elaborated on sharing and delegating discovery-related issues to purposely avoid silos:

> We’ve been really careful to build in redundancy in recent years. So, where I might have lead on discovery and ERM [electronic resources management], I’m also careful to involve others in problem solving around those things and to share work so that we don’t find ourselves in a position where others can’t pick it up when they need to.

Another interview participant indicated that “teamwork is important because we’re always working with other units in the library.” This interviewee further elaborated that he and another staff member responsible for discovery were both members of their library’s Web and Electronic Resources Committee. At their institution, the Web and Electronic Resources Committee managed the library’s website and access to electronic resources, thus an important strategic library committee. In addition, this participant stated:

> It’s definitely important to have communication with other committees, like our Library Instruction Committee, it’s really critical for us to have good communication with them to let them know when a major change is upcoming so they can prepare their instruction plans.

Having the organizational awareness to communicate across functional areas of the library was an important skill for successful discovery service management identified by this interview participant.

The survey results and the interviews reinforced the finding from the literature review that individuals and departments often work collaboratively within and across functional areas when administering and managing a web-scale discovery service.

Competencies

Several interview participants stated that they performed public service duties and considered such activities an asset for responsible discovery management. Three of the interview participants had formal public service duties as a part of their existing roles, while a fourth had it in their background. One of the interview participants' formal title was Collections & User Experience Librarian. This participant stressed the importance of user experience in successfully managing the discovery service: "it's very valuable… that I have both public and technical service not just in my background but also literally still in my job." When elaborating on what was unique about the staff or librarians with responsibilities related to managing a discovery service, another interview participant stated: "it's really important to always have the user in mind."

In addition, every interview participant identified problem-solving and troubleshooting as a significant skill. As one interview participant described it:

> so many weird problems we run into are unique one-offs because you've got this interconnectedness of so many related products and when something breaks down, there's like links in a chain, which link is it, where it's breaking, is it breaking at step one, step two ... so there is a lot of that kind of analysis.

As described in the literature review, interview participants stressed that the individuals and units responsible for their discovery service often had broad and sometimes deep knowledge of various library systems. This knowledge included metadata and local cataloguing practices, the ILS, knowledge bases, and a general understanding of how things worked at their library to properly troubleshoot issues around the discovery service. One interview participant stated:

> knowledge of different knowledge bases and how knowledge bases fit together, as well as the more in-depth information on indexing; how data is harvested, whether it can be harvested … knowledge on how search systems work, the algorithms behind them, in order to have that understanding of why certain things are showing up and other things are not.

Wide understanding of the multiple systems in place at their libraries, a strong user-centred focus, a high degree of analytical problem solving, and organizational awareness are some of the competencies of the staff responsible for their library's discovery service.

Limitations of the research

The author discovered that the design of the online survey was inadvertently guided by the author's own organizational structure and did not account for libraries with flat

hierarchies and merged functional areas. Thus, some respondents did not complete the entire survey and may have been confused by the choices presented that did not make sense for their library. In addition, some of the multiple-choice questions that were designed to find out which functional unit performed a particular discovery-related activity did not allow the survey respondents to choose more than one unit in the list, which may have led respondents to skip questions in the survey. With the relatively small sample size of survey respondents, these results do not provide generalizable data about Canadian post-secondary institutions.

Due to the design of the survey, which assumed that institutions would have clearly defined functional areas, the author suggests allowing for more open-ended answers over multiple-choice questions for anyone wishing to replicate this study.

Conclusion

As evidenced by the interviews and the survey results, library organizational structures around web-scale discovery services are varied in the survey and interview participant institutions. Academic libraries can manage their discovery service from a technical services unit, a library systems or a web services department, or a committee. However, there is consensus that a discovery service requires collaboration and cooperation among many functional areas. Discovery service leaders need to have organizational awareness to break down the silos between traditional library functions to perform the various duties related to managing and administering their web-scale discovery service. These discovery service leaders work collaboratively both within their functional home areas as well as across their library. A strong user-centred focus was a recurring theme even though none of the interview participants identified public services as a functional home department.

To manage and administer a complex system like a web-scale discovery service, individuals responsible for the system often work collaboratively with staff in many different areas. Staff who manage web-scale discovery services push the boundaries of library organizational structures by breaking down the silos that were built over decades of traditional library operations. These individuals lead from the middle and perform their duties strategically across their organizations.

While some participant libraries have put the oversight for their web-scale discovery service under the domain of electronic resources, others have their library’s systems or web services department managing the service. Survey respondents and interview participants indicated that appropriate management of web-scale discovery services required a holistic and strategic view of numerous library operations with an increased focus on meeting user expectations regardless of their functional home department.

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Appendix A

Links to Survey Responses and Interview Transcripts and a Copy of the Survey Instrument

A copy of the survey instrument and the responses as well as the transcripts from the semi-structured interviews are deposited with the Federated Research Data Repository (FRDR), a Canadian multi-institutional repository for research data.

URI: https://doi.org/10.20383/103.0786

A copy of the survey instrument including the informed consent preamble begins on the next page.

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Library staffing impacts of adopting web-scale discovery services in Canadian academic libraries.

1. Informed Consent Form

You are invited to participate in this survey to share your insights and observations related to web-scale discovery services in academic libraries. The questions in this survey will focus on organizational structure, human resources, and competencies to learn how libraries manage and maintain web-scale discovery services, and to determine if there are common skills among the library staff who manage and support the service.

Principal Investigator: Sandra Wong, Electronic Resources Librarian, Simon Fraser University, Vancouver, BC. swongj@sfu.ca

- **Your participation is voluntary and you may withdraw from the survey at any time.**
- **The survey should take about 30 minutes to complete.**
- **The last survey question will ask if you are willing to participate in an interview with the Principal Investigator about web-scale discovery. If yes, you will be given a link to a separate and independent webform to add your name and email address for follow up by the Principal Investigator. Your responses to the survey will not be associated in any way with the interview.**

Confidentiality:

- **Survey responses are stored on a secure server located in Canada and is compliant with BC's Freedom of Information and Protection of Privacy Act (FIPPA).**
- **No personal, identifying information about you will be collected.**
- **Steps to protect your identity will be taken should you include indirect information in your responses that can be used to identify you.**

Data storage:

- **Final survey data will be exported and stored in SFU Vault, a secure server, accessible only to the Principal Investigator for up to five years.**
- **When the data is no longer needed, the data will be deleted and erased from SFU Vault in its entirety.**

Study results:

The main study findings will be published in academic journal articles and presented at library conferences. Data from the survey will be reported out in aggregate form. Anonymized quotations from open-ended survey questions may be published.

Consent to participate:

By completing and submitting the survey, your free and informed consent is implied. You understand the above conditions of participation in this survey and give your permission to the Principal Investigator to use the data gathered in the manner described.

* 1. **I agree to participate in the survey. I understand the purpose and nature of the survey and I am participating voluntarily. I understand that I can withdraw from the survey at any time.**

- ◯ Yes, I would like to participate in the survey
- ◯ No.

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Library staffing impacts of adopting web-scale discovery services in Canadian academic libraries.

2. Library profile data

2. Which web-scale discovery service does your library subscribe to?

- ◯ EBSCO Discovery Service
- ◯ Encore Duet (EBSCO Discovery Service with Innovative's public interface)
- ◯ Ex Libris Primo (with the Primo Central Index)
- ◯ Ex Libris Summon
- ◯ OCLC Worldshare Discovery

Other (please specify)

3. Does your library participate in a consortia agreement for your web-scale discovery service?

- ◯ Yes
- ◯ No

4. Name your integrated library system.

- ◯ Evergreen
- ◯ Ex Libris Aleph
- ◯ Ex Libris Alma
- ◯ Ex Libris Voyager
- ◯ OCLC Worldshare
- ◯ Sierra (Innovative)
- ◯ Sirsi Dynix Symphony

Other (please specify)

5. Please select your type of institution.

- ◯ College
- ◯ Institute. A post-secondary offering specialized programs or training.
- ◯ University. Primarily undergraduate.
- ◯ Comprehensive University. Offering advanced degrees but without a medical school.
- ◯ Medical/Doctoral University. A post-secondary with a medical school.

Other (please specify, eg: Private college, Private university). Please **DO NOT** include the name of your school.

6. Student FTE

- ◯ Less than 1000
- ◯ Between 1000 and 5000
- ◯ More than 5000 but less than 10 000
- ◯ Between 10 000 and 20 000
- ◯ More than 20 000

7. Collection budget

- ◯ Less than $100 000
- ◯ Between $100 000 and $500 000
- ◯ More than $500 000 but less than $1 million
- ◯ Between $1 million and $5 million
- ◯ More than $5 million but less than $10 million
- ◯ $10 million or more

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3. Library organizational structure

8. Which library department or unit has **overall responsibility** for the operations and maintenance of the web-scale discovery service?

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ Overall responsibility is managed by a **formal committee** dedicated to the web-scale discovery service.
- ◯ Overall responsibility is distributed among multiple departments with no formal structures in place. Each unit looks after their own areas related to the discovery service and consults with other units when necessary.
- ◯ Other (please explain)

9. Do you have a **single person/position** dedicated to providing oversight for managing and administering the web-scale discovery service? Choose the answer that **best fits your library's situation**.

- ◯ Yes. Managing all aspects of the web-scale discovery service is **the primary responsibility of one person/position.**
- ◯ Yes. Managing the web-scale discovery service is among **several primary responsibilities for one person/position.**
- ◯ No. Managing the web-scale discovery service is **distributed among several persons/positions** at my library. [By choosing this answer, you will skip to section 5].

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4. Library Organizational Structure (person/position details)

10. Please provide the position title for the person responsible for managing/administering the web-scale discovery service, the name of the unit/department, and a list of his or her general responsibilities in addition to discovery (if applicable).

Position title

Unit/department name

General responsibilities

11. Is this a new position?

- ◯ Yes
- ◯ No

12. Describe how discovery service management came to belong to this**single person/position.** For example:

- A new position was created to respond to organizational needs.
- Responsibility was delegated to the person/position following a process of re-evaluating or re-organizing tasks/duites.
- Position/person was empowered to assume or adopt the responsibility by library management.
- The position/person was already managing a similar, related service when the web scale discovery service was adopted.

13. How long has your library had discovery service management added to this position?

- ◯ Less than 2 years
- ◯ Between 2 and 5 years
- ◯ More than 5 years but less than 10 years
- ◯ 10 or more years

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5. Organizational Structure - department/unit responsibilities

On this page you will be asked to identify the library department or unit that is primarily responsible for each activity.

14. Selecting content **to be indexed** in the web-scale discovery service.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

15. Managing **holdings for direct linking or link resolving** from the discovery service.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

16. Managing **metadata to contribute** to the discovery service.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

17. **Delivering metadata** to the discovery service.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

18. **Configuring public views** for the discovery service.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

19. **Training end-users or creating help pages** for the discovery service.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

20. **Troubleshooting questions from end-users** about content, results and linking from the discovery service.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

21. **Communicating** with the discovery service vendor for support for discovery-related issues. If more than one, please choose "Other" and list the departments as appropriate.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

22. Integrating web-scale discovery results into other library services.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

23. Creating or analyzing statistical reports related to the discovery service.

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ A discovery committee
- ◯ Other (please specify)

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6. Troubleshooting in a web-scale environment

The questions in this section will attempt to find out how problems related to the discovery service are reported.

24. Which library department or unit is **primarily responsible** for troubleshooting web-scale discovery service problem reports?

- ◯ Acquisitions / Collections
- ◯ Cataloguing / Metadata
- ◯ Discovery
- ◯ Electronic Resources
- ◯ Library Systems
- ◯ Public Services
- ◯ Web or Digital Services
- ◯ Discovery Committee
- ◯ Other (please specify)

25. How many staff and/or librarians in the chosen department are dedicated to responding to such web-scale discovery service problems?

Number of librarians: _____

Number of support staff: _____

26. Is the chosen troubleshooting department/unit more public services oriented or technical services oriented (behind the scenes)?

- ◯ Public services oriented. Staff **regularly interact** with students and faculty at a public service point.
- ◯ Technical services oriented. Staff **do not normally interact** with students and faculty at a public service point.
- ◯ **Both**. Staff in this department perform both public services and technical services as a part of their regular duties.
- ◯ Other (please specify)

27. How are discovery problems usually reported to the department? Choose all that apply.

- ☐ A webform (or email address) specifically dedicated to discovery or electronic access related issues.
- ☐ A referral from a general public service point (such as a reference desk).
- ☐ A referral from a subject/liaison librarian or other library department.
- ☐ By email from a general public services webform, forwarded by another staff member.
- ☐ In person (staff responsible for troubleshooting provide service at a public information point).
- ☐ By phone (staff responsible for troubleshooting answer a phone line for public services).
- ☐ Other (please specify)

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7. Competencies, skills and knowledge

On this page, you will be asked to identify the competencies, skills and knowledge of staff or librarians in each department or unit that are most important for managing and administering a web-scale discovery service.

28. **Acquisitions/Collections**. Rank the competencies, skills and knowledge by importance for staff and librarians in this department or unit related to **managing and administering the web-scale discovery service**.

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Metadata tools and schema	○	○	○	○	○
Integrated library system or library services platform	○	○	○	○	○
Discovery service platform	○	○	○	○	○
Link resolving or knowledge bases	○	○	○	○	○
Technical skills (XML, APIs, HTML5, scripting...etc…)	○	○	○	○	○
Problem solving / analytical skills	○	○	○	○	○
Teamwork / collaboration	○	○	○	○	○
Project management / organizational skills	○	○	○	○	○
Communication	○	○	○	○	○

Please add any comments about your answers (optional).

29. **Cataloguing / Metadata**. Rank the competencies, skills and knowledge by importance for staff and librarians in this department or unit related to **managing and administering the web-scale discovery service**.

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Metadata tools and schema	○	○	○	○	○
Integrated library system or library services platform	○	○	○	○	○
Discovery service platform	○	○	○	○	○
Link resolving or knowledge bases	○	○	○	○	○
Technical skills (XML, APIs, HTML5, scripting...etc…)	○	○	○	○	○
Problem solving / analytical skills	○	○	○	○	○
Teamwork / collaboration	○	○	○	○	○
Project management / organizational skills	○	○	○	○	○
Communication	○	○	○	○	○

Please add any comments about your answers (optional).

30. **Discovery**. Rank the competencies, skills and knowledge by importance for staff and librarians in this department or unit related to **managing and administering the web-scale discovery service**.

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Metadata tools and schema	○	○	○	○	○
Integrated library system or library services platform	○	○	○	○	○
Discovery service platform	○	○	○	○	○
Link resolving or knowledge bases	○	○	○	○	○
Technical skills (XML, APIs, HTML5, scripting...etc…)	○	○	○	○	○
Problem solving / analytical skills	○	○	○	○	○
Teamwork / collaboration	○	○	○	○	○
Project management / organizational skills	○	○	○	○	○
Communication	○	○	○	○	○

Please add any comments about your answers (optional).

31. **Electronic Resources.** Rank the competencies, skills and knowledge by importance for staff and librarians in this department or unit related to **managing and administering the web-scale discovery service**.

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Metadata tools and schema	○	○	○	○	○
Integrated library system or library services platform	○	○	○	○	○
Discovery service platform	○	○	○	○	○
Link resolving or knowledge bases	○	○	○	○	○
Technical skills (XML, APIs, HTML5, scripting...etc…)	○	○	○	○	○
Problem solving / analytical skills	○	○	○	○	○
Teamwork / collaboration	○	○	○	○	○
Project management / organizational skills	○	○	○	○	○
Communication	○	○	○	○	○

Please add any comments about your answers (optional).

32. **Library Systems.** Rank the competencies, skills and knowledge by importance for staff and librarians in this department or unit related to **managing and administering the web-scale discovery service**.

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Metadata tools and schema	○	○	○	○	○
Integrated library system or library services platform	○	○	○	○	○
Discovery service platform	○	○	○	○	○
Link resolving or knowledge bases	○	○	○	○	○
Technical skills (XML, APIs, HTML5, scripting...etc…)	○	○	○	○	○
Problem solving / analytical skills	○	○	○	○	○
Teamwork / collaboration	○	○	○	○	○
Project management / organizational skills	○	○	○	○	○
Communication	○	○	○	○	○

Please add any comments about your answers (optional).

33. **Public Services.** Rank the competencies, skills and knowledge by importance for staff and librarians in this department or unit related to **managing and administering the web-scale discovery service**.

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Metadata tools and schema	○	○	○	○	○
Integrated library system or library services platform	○	○	○	○	○
Discovery service platform	○	○	○	○	○
Link resolving or knowledge bases	○	○	○	○	○
Technical skills (XML, APIs, HTML5, scripting...etc…)	○	○	○	○	○
Problem solving / analytical skills	○	○	○	○	○
Teamwork / collaboration	○	○	○	○	○
Project management / organizational skills	○	○	○	○	○
Communication	○	○	○	○	○

Please add any comments about your answers (optional).

34. **Web or Digital Services.** Rank the competencies, skills and knowledge by importance for staff and librarians in this department or unit related to **managing and administering the web-scale discovery service**.

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Metadata tools and schema	○	○	○	○	○
Integrated library system or library services platform	○	○	○	○	○
Discovery service platform	○	○	○	○	○
Link resolving or knowledge bases	○	○	○	○	○
Technical skills (XML, APIs, HTML5, scripting...etc…)	○	○	○	○	○
Problem solving / analytical skills	○	○	○	○	○
Teamwork / collaboration	○	○	○	○	○
Project management / organizational skills	○	○	○	○	○
Communication	○	○	○	○	○

Please add any comments about your answers (optional).

35. **Discovery Committee.** Rank the competencies, skills and knowledge by importance for staff and librarians in this department or unit related to **managing and administering the web-scale discovery service**.

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Metadata tools and schema	○	○	○	○	○
Integrated library system or library services platform	○	○	○	○	○
Discovery service platform	○	○	○	○	○
Link resolving or knowledge bases	○	○	○	○	○
Technical skills (XML, APIs, HTML5, scripting...etc…)	○	○	○	○	○
Problem solving / analytical skills	○	○	○	○	○
Teamwork / collaboration	○	○	○	○	○
Project management / organizational skills	○	○	○	○	○
Communication	○	○	○	○	○

Please add any comments about your answers (optional).

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8. End of survey - interview participant request.

36. If you are interested in participating in an interview about the staffing impact of web-scale discovery services - please select **yes** and fill in the separate form.

- ◯ Yes
- ◯ No [end of survey]

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9. Interview participant - Yes

Please fill in this separate SFU webform (link will open a new window) to add your contact information.

Then please come back to this page and select "Done" to submit your survey responses.

Thank you for participating in this survey.