

Reference Services Review

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Introduction

Virtual reference services are ubiquitous in academic and public library settings, serving local and distant populations, making these services one of the great equalizers when it comes to accessing help from the library. With the increasing complexity of searching for, accessing, evaluating, and using information, it is essential that libraries focus on providing convenient reference services from qualified information professionals, willing and able to guide users, regardless of which channel they use to make inquiries at the library. Following a record year in 2017 of virtual reference activity, McGill University Library saw an opportunity to effectively respond to the rising demand by offering more developed information literacy instruction within the virtual reference services environment. Gaining insight into when and how reference librarians teach research skills during live chat interactions has the potential to improve virtual reference services, affording all users the chance to benefit from information literacy instruction whether in person at the reference desk or online. The Reference and User Services Association, a division of the American Library Association, provides “Guidelines for Behavioral Performance of Reference and Information Service Providers” (2013) which can and should be applied to remote or virtual reference interactions. “Searching” is a “behavioral attribute” listed in the guidelines and suggests teaching patrons to search for, evaluate, and use information is the job of the virtual reference librarian. This study reports the results of a qualitative assessment of our live chat transcripts, evaluated for instances of virtual information literacy instruction, and explores information literacy instruction opportunities within our chat system, while also identifying students’ needs for additional digital literacy support.

Institutional Context

The McGill University Library serves a population of 40 000 students including undergraduate and graduate students, as well as the university’s faculty and staff members. It is a research-intensive institution that offers programs in the humanities and social sciences, agricultural and environmental sciences, as well as biological and physical sciences, music, and management. The university also includes a faculty of medicine, dentistry, and law. The library system counts 8 branch libraries as well as a curriculum resources center and employs over 60 librarians. The virtual reference service launched in 2006 and has seen a significant increase in its use since then. It is available to all members of the university community and is also open to members of the public. The library uses the QuestionPoint platform to deliver the chat service which is open for 35 hours per week during the academic year and 25 hours per week during the summer. Virtual reference is provided by 31 liaison librarians from all disciplines who each staff the service for one or two hours per week. During the 2017/2018 academic year, two library science masters’ students worked as Virtual Reference Assistants and provided virtual reference for 21 hours per week. A 2016 publication authored by McGill librarians provides a more in-depth look at the institutional context of the service and also examines the specific disciplinary areas of the questions received via the virtual reference service. The authors found that 31% of questions were related to the humanities and social sciences and 42% were related to the agricultural, biological or physical sciences. The remaining questions pertained to management and business (8%), education (8%), law (3%), music (3%) and the university’s various archives and rare materials collections (5%) (Côté, Kochkina and Mawhinney, 2016).

Literature Review

Studies about information literacy instruction at both the physical reference desk, and in a virtual reference setting, are few compared with studies on information literacy instruction in the classroom. However, one of the earliest publications looking at reference in an academic library as a form of teaching is a paper by James K. Elmborg (2002). Elmborg's paper has been heavily cited over the years by researchers trying to trace the steps of when and how academic librarians began to acknowledge teaching as one of their primary roles. Elmborg argued that by listening and asking questions, as opposed to just giving answers during a reference interaction, librarians can strengthen a student's ability to learn, ultimately allowing the student to take control of the research process. Of course, this notion predates Elmborg, and as Woodard (2005) points out, librarians have been preoccupied with finding that "teachable moment" that leads to a student's ability to effectively conduct independent research, since the nineteenth century. It is not surprising then that several studies have followed, those evaluating whether teaching in a virtual reference setting is taking place, what methods are employed, and how librarians and users respond to giving and receiving information literacy instruction during virtual reference transactions.

A systematic review of the literature about live chat service was published less than ten years ago. Matteson, Salamon and Brewster (2011) set out to "identify and integrate the collected empirical research findings on chat reference since its inception" (p. 173). The authors excluded articles like case studies or descriptive reports of chat services at a single library. These types of articles are easily found and provide some excellent insight into the value of providing instruction during chat scenarios (Ellis, 2004; Johnston, 2003; Taddeo and Hackenberg, 2006; Woodard, 2005). Offering library instruction through live chat is one of the themes that emerged during their review of the available empirical research from 1995 to January 2010. These studies asked the following questions: "Is instruction provided through chat? What techniques are used to provide instruction? Do users want instruction? Do they ask for instruction? Do they believe they can learn through chat?" (p. 181). The authors of the review concluded that future research should focus more heavily on trying to understand the most effective techniques for learning through live chat interactions.

Building upon their previous presentations and publications on instructional strategies for online reference, Oakleaf & VanScoy (2010) exemplify research that did just that. They conducted a study to analyze the presence of instructional strategies that would ideally lead to increased student learning. First, the authors identified eight instructional strategies deriving from three educational theories: metacognition, constructivism and active learning, and social constructivism. They then coded live chat transcripts. The researchers concluded that librarians were employing some instructional strategies but there was significant room to improve teaching techniques during virtual reference transactions. Professional development and training activities were identified as ways in which librarians could increase their instructional strategies during chat reference. Dempsey (2016) also conducted a chat transcript analysis, applying conversation analysis theory and technique, to try and find out what factors lead to an effective teaching and learning dynamic between a librarian and a student. Putting aside concerns about instructional strategies, Dempsey narrowed the focus to how librarians open an exchange with, and "talk" to students, in the first moments of a chat interaction. Dempsey explained that a librarian's "service

identity” and “teacher identity” are asserted differently based on how they frame chat “transactions as conversations to promote student growth and discovery” compared to “when information is offered without engaging the student’s topic or process”. The latter is efficient and makes students happy “but it also might give student’s the impression that the librarian’s role is to provide relevant articles rather than to teach research skills” (p.465).

Another important area to consider is the question of how librarians and students feel about teaching and learning in a virtual reference setting. Understanding student and librarian perceptions of instruction during chat reference can ground and direct researchers’ analyses of chat interactions, wherein they hope to gain insight into how to improve instructional strategies and develop the most effective ways to reach students and deliver information efficiently while building up students’ information literacy skills. Practitioners benefit from these analyses as they endeavour to improve their virtual reference service or integrate instruction into their chat practice. A recent study by Jacoby, Ward, Avery and Marcyk (2015) used an innovative method eliciting qualitative feedback from students, instructors, and librarians after using chat reference to support an assignment. The researchers were interested to see if instruction was taking place during the chats and how much value the participants placed on such instruction. Student participants valued attentiveness, detailed explanations or rationale for database and term selection, and sharing search strategies, and they noticed when these things were absent from the interaction. Librarians involved in the study placed great emphasis on pacing the instruction and not going too quickly for the student; taking them step-by-step through the search process. Gronemeyer and Deitering (2009) surveyed close to 300 librarians, the majority from academic institutions, on their attitudes about providing instruction in a virtual reference setting. The researchers’ concluded that librarians are ambivalent about offering instruction during chat, and that “overall, there is an impression that they do not want to discredit patrons, nor devalue instruction, but they are not willing to say that librarians have made the jump to effective instruction in virtual reference” (p. 428). Some comments indicated that librarians want more practice and training aimed at teaching and learning in the virtual reference transaction and while librarians place value on virtual instruction, they consider the technology and time pressure as barriers to delivering good service. However, the authors firmly state that there really is no substitute for an “instruction-focused attitude” to make instruction during chat more common or more effective.

More recent studies have considered factors such as changes in virtual reference staffing models, reference policies, and the service model itself, that might influence the frequency and effectiveness of teaching and learning in virtual reference settings. Interested in the complexity of virtual reference questions and how this impacts staffing models, Maloney and Kemp (2015) investigated whether a proactive chat system would increase volume and complexity of questions. They found that questions through the proactive chat system did increase in complexity, a finding which not only influenced how they staffed the service, but revealed the fact that professional librarians were imparting key information literacy concepts during these interactions, requiring excellent knowledge of the research process and other core librarian competencies. Dempsey’s study (2017) compared two libraries with different staffing models and reference policies and proposed that those policies and models may have an impact on whether or not librarians incorporate teaching into chat interactions, how long they spend on chat interactions, and what materials and links they refer users to.

The existing literature does not take up the question or explicitly address the fact, according to the data from this study, that many of the questions users ask using chat reference, do not provide an opportunity for information literacy instruction. What are the implications of this in terms of supporting the other literacies that are underdeveloped in students, defining the nature of virtual reference service, staffing the service, and even marketing it?

Methodology

The researchers evaluated transcripts from the 2017-2018 academic year (September to April) for this study. The total number of virtual reference transcripts was retrieved from the QuestionPoint software and totalled 3395 interactions. Given the high volume of chat reference questions received over the course of an academic year, it was decided that sampling would be a more viable option to analyze transcripts. All the transcripts received in the second full week of each month were coded manually by one of the librarians and tabulated using Excel. To avoid bias, the transcripts were manually anonymized to remove the identifying information about the librarians who answered the users' questions. A total of 590 transcripts were sampled and 553 were coded. Lost chats, doubled interactions, and practice chats were removed from the sample. The authors defined lost chats as interactions where the patron either left the conversation or the conversation ended before or immediately after the patron asked their question. Doubled chats happened when the same patron asked the same question twice in a row and received the same answer. These could indicate a misunderstanding of how the service works. Given that practice chats are interactions between librarians intended to test the system or used for training purposes and that they are simulated interactions, they were removed from the sample. Overall, 48 chat interactions were excluded from the sample which represents less than 8% of all interactions coded. The sample distribution can be seen in Table 1.

Table 1

Month	Total Number of Chat Transactions	Number of Chat Transactions Sampled and Coded (includes excluded chats)
September	540	88
October	475	64
November	450	64
December	265	62
January	448	84
February	428	84
March	477	86
April	312	58

Total	3395	590
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The coding was based on Desai and Graves's study (2008) and was adapted to reflect emerging themes in the transcripts. Their coding included six possible types of interactions and five possible types of instruction. The types of interactions were modified to include direct referrals to a subject specific librarian (I6).

- I1: User asked for instruction and it was given by the staff member.
- I2: User asked for instruction but the staff member did not provide it.
- I3: User did not ask for instruction but it was given by the staff member.
- I4: User did not ask for instruction and it was not given by the staff member. Instruction would have been possible given the question.
- I5: The question did not make information literacy instruction possible.
- I6: User asked for instruction and was directed to a subject specialist.

In order to avoid misunderstandings and errors in coding instances of instruction, the authors agreed that only information literacy instruction would be coded as such. Instances of technological instruction were coded as I5. The authors used ACRL's definition of information literacy which defines it as "the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning."

The authors defined asking for instruction as the user using specific vocabulary such as "can you help me", "can you show me" or "how do I" (Desai and Graves, 2008). If the user did not use these phrasings, the interactions were coded as not asking for instruction.

The types of instruction correspond to the ones identified by Desai and Graves (2008).

- T1: Modeling. Librarian gives the required information by outlining the steps to find it but does not check if the patron is following along or replicating their actions.
- T2: Resource Suggestion & Explanation. Suggesting a resource and explaining how it can be used. Ex: research guide use, catalogue or database link and searching.
- T3: Terms Suggestion. Librarian suggests keywords, subject headings, Boolean operators or limits to help the patron create a search strategy.
- T4: Leading. Librarian outlines the steps and leads the user to finding the information needed. The librarian checks if the patron is following along.
- T5: Lessons. Librarian provides instruction on library specific terminology or research concepts. Ex: peer-review process, open access.

Additionally, given the number of interactions that provided no opportunity for information literacy instruction (I5), coding was developed to identify the nature of those interactions.

Technological issues: Interactions related to technological issues such as problems accessing online resources or incorrect/broken links in the library catalogue.

Circulation: Interactions related to circulation questions such as placing holds or asking for library account information.

Policy: Interactions related to library policies such as guest access to resources or visitor permissions.

Branch information: Questions about the different branch libraries such as hours, contact information or book drop location.

Interlibrary loans: Interactions about the inter-librarian loans service including how to submit a request or renew a loaned item.

Collection: Interactions centered around the library's collections such as book purchase requests or donations.

General McGill: Questions about McGill University such as admissions information or building locations.

Transcripts received a unique code for the type of interaction but could potentially receive more than one code to identify the types of instruction used by the librarian or the nature of the interactions where no instruction occurred (I5). In order to verify the reliability of the coding, ten transcripts from each month were coded by both librarians. Problematic transcripts were flagged and coded by both librarians.

Research Limitations

Limitations of this study include the sample size which represents 17.4% of all virtual reference interactions during the period between September 2017 and April 2018. Previous studies also used similar methods and drew conclusions from samples (Desai and Graves, 2008; Dempsey, 2017; Dempsey, 2016; Maloney and Kemp, 2015; Smyth and Mackenzie, 2006), which seems normal given the nature of content analysis.

The process of assigning codes to describe the types of interaction, the type of teaching methods used, and the nature of the interactions not suited to information literacy was subjective. However, the coding was based on previous studies done in this field, and the inter-coder reliability protocols described in the methodology should have limited personal biases (Desai and Graves, 2008).

The virtual reference service is staffed by both student Virtual Reference Assistants and professional Liaison Librarians. All transactions were coded without differentiating between these two categories. Doing so could reveal meaningful differences between how students and professionals teach during live chat, ultimately informing live chat training for both staff levels.

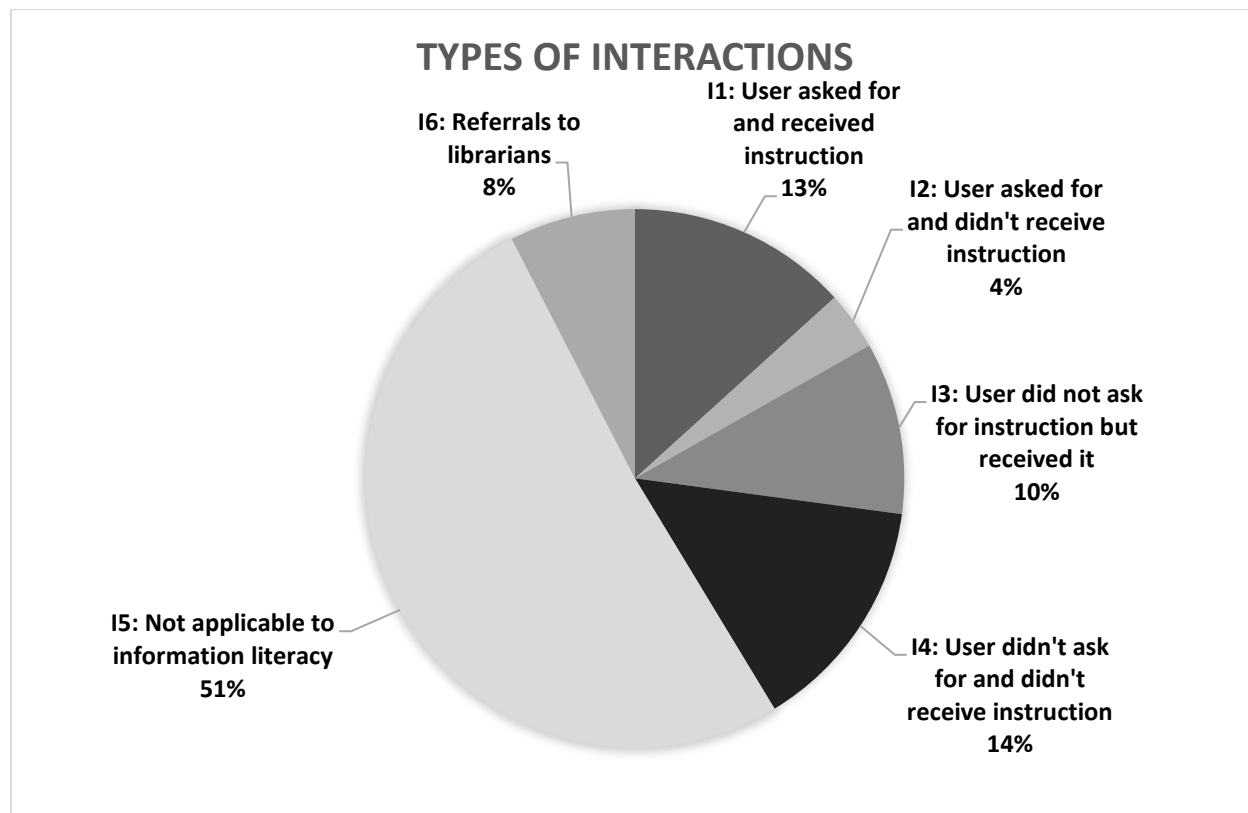
Findings

Overall Findings

The results of the qualitative analysis for the entire academic year shows that a little over half of the interactions are not conducive to information literacy instruction. The remaining 49% of interactions could have led to instruction, however, in only 23% of these did instruction actually occur. The remaining 26% of interactions were either missed opportunities for instruction (18%)

or required the more in-depth knowledge of a subject specialist (8%). The distribution of the types of interactions for the entire academic year can be seen in Figure 1.

Figure 1.

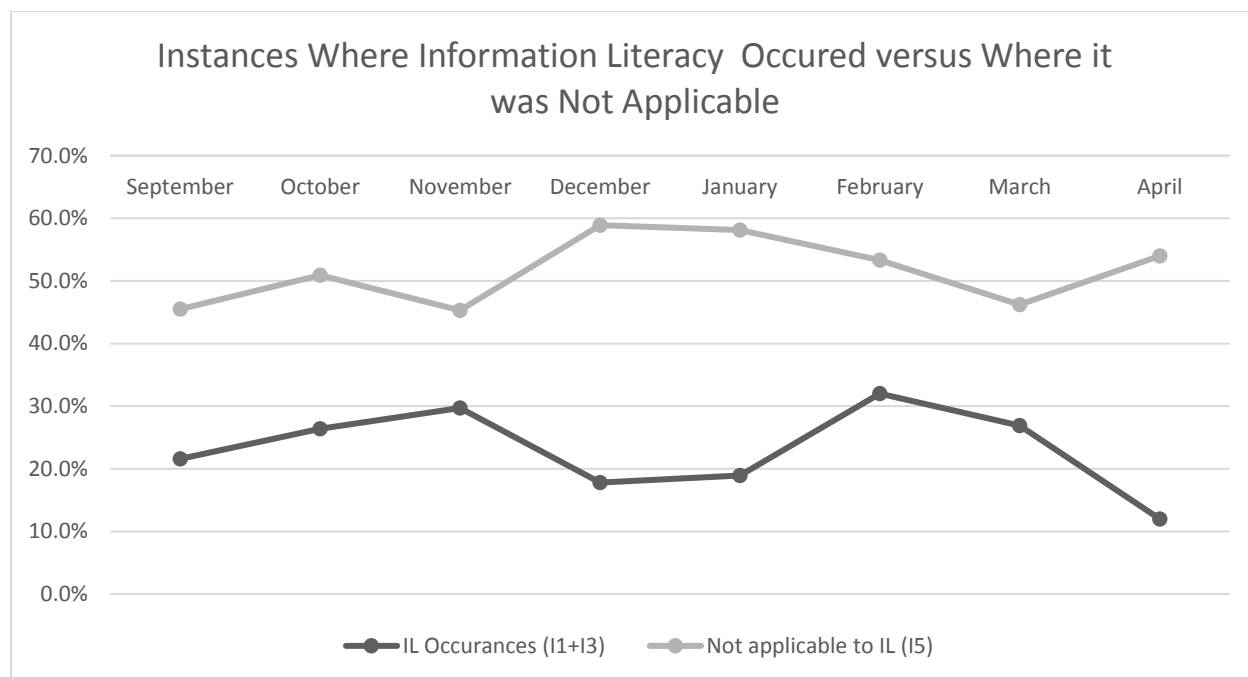


In the chat interactions where instruction did occur, resource sharing was used 63 times and modeling was used 58 times, making these two methods the most popular among librarians offering chat reference. Leading, lessons, and terms suggestions were the least popular methods of instruction with 19, 15, and 9 occurrences respectively. It is interesting to note that some interactions showed the use of more than one method of instruction used by the librarian. For example, some interactions started with the librarian suggesting a resource to the user and continued with them modeling its use.

Given the fact that 51% of interactions were coded as not favorable for information literacy, the researchers were interested in determining the exact nature of the users' questions. A large number of interactions centered around circulation, with 82 occurrences, and technological issues, with 65 occurrences. Policy questions and interlibrary loan queries came in third and fourth place with 48 and 35 occurrences each. Conversations about the libraries' collections such as purchase suggestions totalled 19 occurrences and general inquiries about McGill university not related to the library saw the lowest number of occurrences at 17. Similarly to the methods of instruction used, some interactions started with one type of question and then led to another type of query. For example, a question about circulation that led the user to asking about a branch library's specific opening hours and location.

The researchers were interested in seeing the correlation between interactions where information literacy happened, whether requested by the patron or not, and the interactions that were not conducive to it. Figure 2 shows the percentages of both types of interactions over the course of the sampling period.

Figure 2.



Interactions with Instruction (I1 and I3)

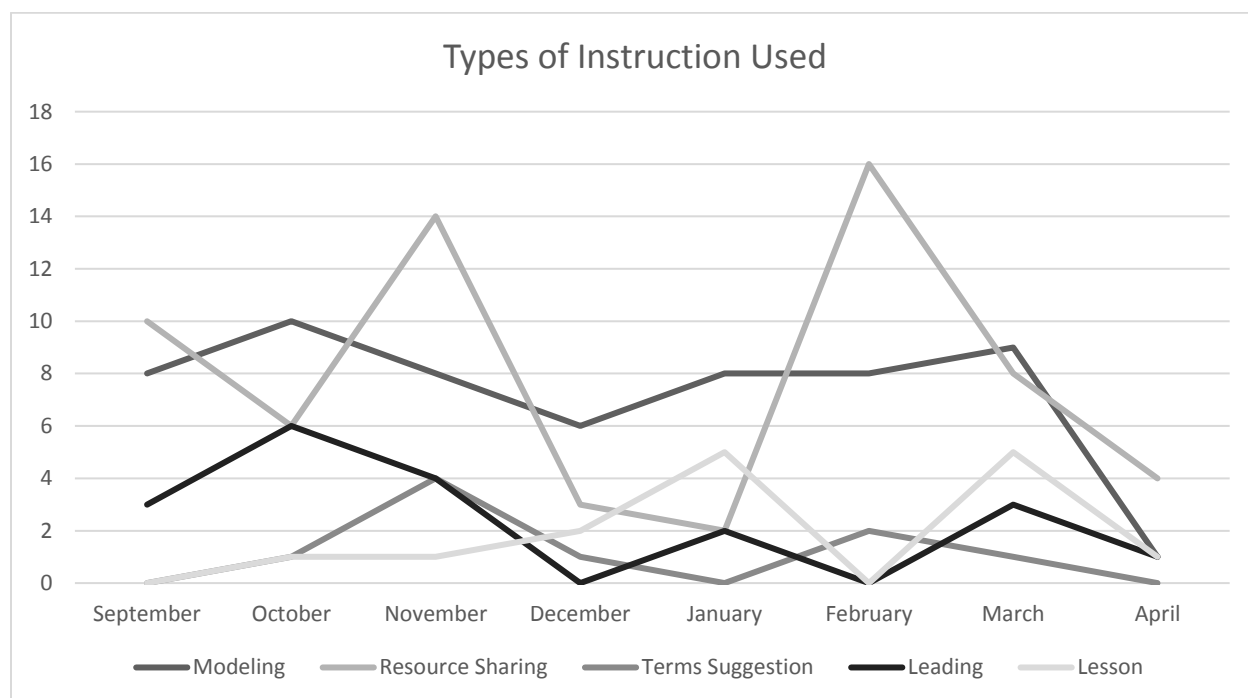
In the fall semester, the number of transactions where users requested instruction and received it (I1) increased from 8% in September, to 21.1% in October, 26.6% in November and decreased significantly to 7.1% in December. The number of transactions where users did not request instruction but received it (I3), showed the opposite pattern. They represented 13.6% of transactions in September, 5.3% in October, decreased to 3.1% in November and significantly increased to 12.5% in December.

In the winter semester, the number of I1 interactions followed the same pattern as in the fall. January saw 10.8% of I1 instances, in February and March they increased to 16% and 11.5% respectively and in April the number of interactions where users requested instruction and received it decreased to 6%. The instances of I3, where users did not request instruction but received it, followed a different motif than in the fall semester. In January, they totalled 8.1% of interactions but instead of decreasing in the following months, the number of I3 interactions increased to 16% in February and 15.4% in March, and then decreased again to 6% in April.

Methods of Instruction Used

The methods of instruction used by the librarians showed different trends for all four methods coded. They are illustrated in Figure 3. Modeling was used consistently throughout the academic year by librarians while resource sharing saw great peaks and lows. Leading was used mostly in the month of October and on a smaller scale in January and March. The method lesson had an opposite pattern to leading in the fall with very few uses but then mirrored it with peaks in January and March. Terms suggestion was the least used method of instruction and its application remained relatively consistent during the fall and winter semesters.

Figure 3.



Interactions without Instruction (I2, I4 and I6)

The number of I2 interactions where users requested instruction but it was not provided averaged to 2.9% in the fall semester. The highest instance of I2 transactions was in the month of December with 5.4%. The rest of the semester shows a low instance of those interactions with 1.1% in September, 3.5% in October, and 3.1% in November. The number of I4 interactions, where the user did not request instruction and it was not provided, shows an opposite pattern. The average number of I4 interactions was 16.4% with the highest value in September at 25%. The instances of I4 then go down to remain relatively stable at 12.3% in October, 15.6% in November and 12.5% in December. Interestingly, the I6 interactions, during which users were referred to a subject specialist, followed a completely different trend than the I2 and I4 transactions. The average of I6 was 6.8% with the highest values in October at 7% and November at 7.8% September and December are either representative of the average or below it with 6.8% and 5.4% respectively.

In the winter semester, the average number of I2 interactions increased to 4.5% with the highest percentages in the months of January, with 6.8%, and April, with 6%. February and March were relatively low in comparison with 4% and 1.3% respectively. The average number of I4, on the other hand, decreased to 11.3%. The lowest percentages of instances of I4 were in January (5.4%) and February (8%) with a marked increase in March (17.9%) and April (14%). The instances of referrals (I6) showed a small increase with a 8.8% average for the winter semester. January and April have the highest number of instances of I6 with 10.8% and 14% respectively. It is interesting to note that February had the lowest number of referrals for the winter semester and the complete year with 2.7%. March then showed an increase to 7.7% of I6 interactions.

Transactional Interactions (I5)

The trends for the interactions that were not conducive to information literacy (I5) can be seen in Figure 2. The fall semester remained fairly stable for the first three months with I5 interactions at 45.5% in September, 50.9% in October, and 45.3% in November. The highest percentage of I5 interactions was in December with 58.9%.

January showed similar results to December with 58.1% of I5 interactions. The instances of what can be deemed more transactional questions that were not conducive to information literacy decreased steadily after the month of January to reach 53.3% in February and 46.2% in March. A significant increase can be seen in April with 54% of the total questions being coded as I5.

Types of Transactional Interactions

The yearly trend that was discovered by the researchers regarding the types of transactional questions (I5) received by librarians can also be seen when the results are grouped by month. Circulation inquiries, technological issues, and policy questions are usually the most present in the fall and winter semesters. Figure 4 and 5 illustrate the division of the I5 types by month.

Figure 4.

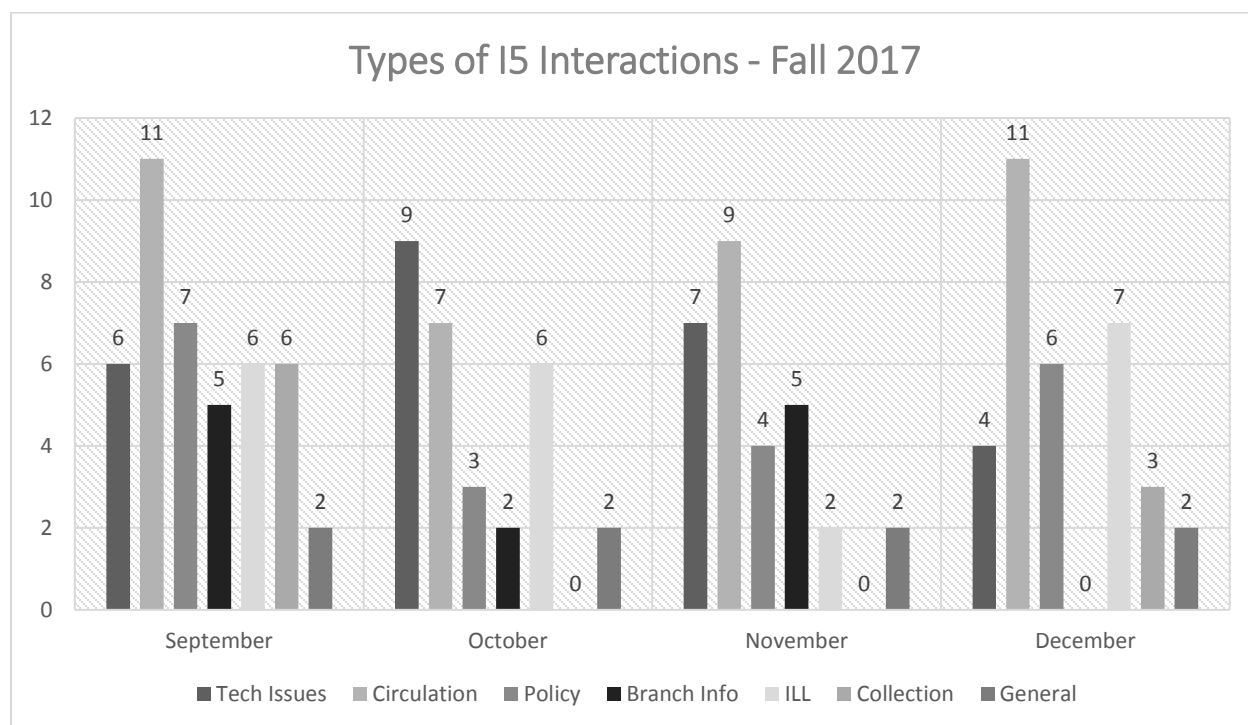
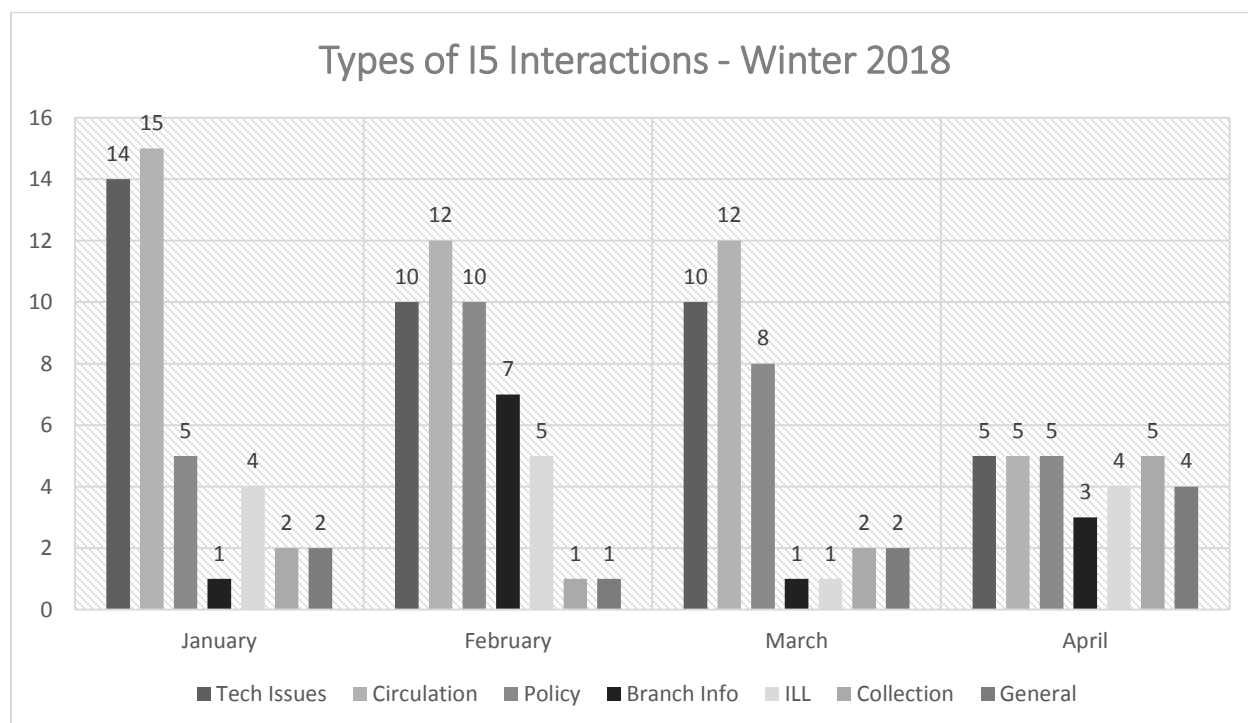


Figure 5.



Discussion

Given the fact that this study is loosely based on the one conducted in 2008 by Desai and Graves, the researchers compared their results to the ones collected in the 2008 study. It is important to note that Desai and Graves compared three different types of reference: IM, chat, and in-person reference, while this study only evaluated chat reference. The overall percentages of instances of instruction vary greatly since Desai and Graves removed all the interactions that could not have led to instruction (I5) which changed the overall sample distribution. It is interesting to note that the percentage of I5 they removed from virtual interactions was much lower than ours, averaging at 12.5% compared to 51%. Instances that did not lead to instruction but where it could have been possible (I2 and I4) show comparable results to the ones compiled by Desai and Graves. The higher percentage of I4 in both studies supports this study's conclusion that "patron-question format affected the likelihood of instruction" (p. 248). A few other factors could also explain the lack of instruction in those transcripts. For one, the time when the chat inquiries were received were not examined; it is possible that some of those interactions happened at the end of a virtual reference shift or at the end of the daily service hours, therefore making it difficult to provide an in-depth answer to the question. Another explanation could be that multiple virtual reference interactions were happening at the same time. It frequently happens that one librarian must respond to multiple simultaneous questions which could impact the length of the response given. Gronemyer and Deitering (2009) discussed how time constraints were viewed by librarians as barriers to providing information literacy. Another way to strengthen the instances of information literacy instruction in a virtual reference setting would be to provide more training for librarians and increase their comfort levels which was previously discussed by Gronemyer and Deitering as well as Oakleaf and VanScoy (2010). Another similarity between this study and the Desai and Graves study can be seen in the type of instruction most commonly used by librarians. Resource sharing was the method preferred by librarians who responded to chat reference questions in both studies. This finding implies that librarians are willing and well-equipped to effectively introduce users to more tailored and valuable resources than the ones already being considered. However, more investigation into the phrasing of questions received would be needed to draw significant conclusions as to why this instructional method was preferred by librarians in a virtual reference setting.

One of the most surprising discoveries of this study is that a large number of questions received in chat, and analyzed for evidence of teaching, were not conducive to information literacy instruction. A large percentage of questions were actually related to circulation and policy inquiries as well as technological issues. This finding is similar to the one outlined by Maloney and Kemp (2015) who identified 49% of the chat questions as nonprofessional. This has interesting implications with regards to how users view the virtual reference service. More than half of the interactions centered around transactional questions which were related to obtaining information that is located on the library's website or performing a task on the website, such as creating an interlibrary loan request or reporting a broken link. This would indicate that the users of the service require more support and training in digital literacy, which is defined in the ALA Standards for Distance Education as the "effective knowledge, skills, and behaviors utilized to learn, live, work, communicate, adapt, and play; and to find, evaluate, utilize, share, and create content in the dynamic networks of information technologies" (2008). Given the nature and quantity of transactional questions, a case could also be made for having students and supporting

staff members offer virtual reference services. Keyes and Dworak (2017) outlined the success of a tiered staffing model for chat where more complex questions were referred to librarians. The McGill University Library has begun experimenting with a similar model and hiring graduate students as Virtual Reference Assistants to staff some hours of the virtual reference service.

Another interesting pattern that emerged from this study has to do with the months during which information literacy instruction peaked in chat transcripts. October, November, February, and March had the highest percentages of instruction (I1 and I3) for the whole year which corresponds to McGill University's midterm periods. Interestingly, those months also saw the highest percentages of resource sharing and referrals to subject specialists. It is not surprising that what has been observed as the busiest times of the year for assignments results in a high number of instruction instances and referrals.

Implications for Practice

Based on the results of this study, the researchers believe they have solid evidence for moving forward with initiatives at their library and for developing priorities for the Virtual Reference Committee, of which they are both standing members:

- This analysis, along with the existing expert studies, will heavily inform the development of training materials, for professional librarians and student virtual reference assistants, on providing effective information literacy instruction in live chat;
- As a more official set of local best practices for the virtual reference service evolves, the insights into teaching behavior gained from these results will be integrated, ideally motivating librarians to employ more and effective instructional strategies during chat;
- Based on this study and also Dempsey's study (2017), which considers the role of LibGuide referrals in chat, there is potential, using this data, to create specific information literacy LibGuides or more online learning objects that can be pushed out during a chat session;
- Considering the high percentage of questions that do not require information literacy instruction, but do require assistance and support (interlibrary loan, circulation, library policy, etc.), library orientation programming and video content will have more of a focus on how to do online transactions and where to find important and practical information about the library;
- Library website design and content should be responsive to the revelations in the data, informing decisions about navigation and design choices, making it easier for users to find answers to their interlibrary loan, circulation, and policy questions.

Conclusion

This study provides insight into the instances of virtual information literacy instruction, specifically instruction via chat, in the McGill University Library. With an aim to get a better sense and a clearer picture of the modes and quality of chat reference being offered, the authors conducted an analysis of live chat transcripts and uncovered that 51% of chat interactions were of a transactional nature and did not lead to information literacy instruction. The interactions that did lead to information literacy instruction were of very high quality and included a variety of methods for enhanced student learning, favoring step-by-step modeling and resource

recommendations. By sharing this knowledge locally, the library can develop training guides and best practices that help librarians reflect upon and improve their virtual reference practice, as well as adjust orientation programming, website design, and marketing efforts. This study will be useful to library professionals who wish to analyze their own live chat transcripts for evidence of information literacy instruction, implement or improve best practices, staff training, and overall library literacy orientation programs at their libraries. Better virtual reference services, including instruction, means everyone who visits the library for help, whether in person or online, can go beyond getting an answer to their question and begin to take control of the research process.

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