



Article

Analyzing Public Library Service Interactions to Improve Public Library Customer Service and Technology Systems

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Abstract

Objective – To explore the types and nature of assistance library customers are asking library staff for in a large Canadian urban public library system.

Methods – A qualitative study employing transaction logging combined with embedded observation occurred for three-day sample periods at a selection of nine branches over the course of eight months. Staff recorded questions and interactions at service desks (in person, by phone, and electronically), as well as questions received during scheduled and non-scheduled provision of mobile reference service. In addition to recording interaction details and interaction medium, staff members were also asked to indicate briefly the process or resources used to resolve the interaction. Survey data were entered and coded through thematic analysis.

Results – The survey collected 6,099 interactions between staff and library customers. Of those 6,099 interactions, 1,920 (31.48%) were coded as pertaining to technology help. Further analysis revealed significant library customer need for help with Internet workstations and printing.

Conclusions – Technology help is a core customer need for Edmonton Public Library, with requests varying in complexity and sometimes resolved with instruction. The library’s Internet workstations and printing system presented critical usability challenges that drove technology help requests.

Introduction

Public libraries across North America face a great challenge and opportunity in redesigning public services to align with diverse and evolving customer needs – increasingly utilizing digital information sources and personal and social technologies.

In May 2010, Edmonton Public Library, an urban public library located in Western Canada, launched a study into the nature and types of questions received at service desks (in person, by phone, electronically) and while providing mobile reference service (“roving”). The principal and sole researcher for this study was a recently graduated intern librarian hired by Edmonton Public Library to explore future service directions for reference and readers services. The internship project was supervised by one of Edmonton Public Library’s directors of public services. Edmonton Public Library is a seventeen branch library system located in Alberta, Canada and serving a population of 728,349 (City of Edmonton, 2009). The purpose of this study was to discover and explore detailed information about the nature and types of questions customers were asking, with the goal of informing the redesign of public services to broadly improve customer service. This article describes methods, results, and conclusions of the study, with focus set tightly on the technology help data subset of the larger study.

Literature Review

Public Libraries and Technology

The literature speaks widely to the potential impact, challenges, and opportunity for technology use and technology learning in public libraries for library customers and library staff.

Scholars such as Aabø (2005) and Fox, Horne, King, Seely, and Walsh (2008) broadly address

the potential for public libraries to use information communication technologies to impact community and culture. Based on the results of a survey of Finnish library users and non-users about the value of public libraries in digital society, Aabø locates the public library’s points of technological access as possible sites for customers facing barriers, in terms of both physical access and a range of fluencies, to participate democratically and inclusively in the maintenance and formation of social and cultural identities. Fox et al. speak to the potential of emerging technologies to create rich opportunities for instruction that strengthen and bridge communities (including customers and for the library profession itself), while also providing a context where libraries can remain strategically innovative among customers and community stakeholders.

Lai (2011) used document analysis, observation, and focus group interviews to identify various methods and strategies in use by Canadian public libraries to improve the information literacy skills of both library customers and staff. Importantly, Lai identified that in a large urban public library an effective training program incorporated four structural characteristics: advanced information and communications technology (ICT) structure, provision of formal training, improvement of staff information literacy (IL) and instructional skills, and partnerships with local organizations. A key finding reported was that a significant barrier staff faced as providers of formal and informal information literacy instruction was a lack of “appropriate guidance in understanding the theories of IL and adult learning while teaching library patrons” (p. 87).

Bertot (2009) used a case study of 25 public libraries in the United States (combining interview, observation, and inventory) to explore the staffing, budgetary, and infrastructural requirements for supporting

public access technologies, and to identify factors underlying successful provision of public access technologies. Technologies that Bertot looked at included public workstations; wireless access; online resources, such as databases and downloadable content; as well as the library's more structural services – integrated library systems and digital reference services. Bertot found that by providing a combination of public access through hardware and software, public libraries became points of access supporting use of digital technology by the public. As Nagy (2011) illustrates in "Next-Generation Service in the Library," this use varies in focus and intensity, and is influenced by expectations and functions present in external web services. Supporting this range of use is crucially challenging when trying to accommodate the customer use of rapidly evolving personal devices within the library: USB sticks, mp3 players, mobile phones, and so on. Bertot found that public libraries in his case study experienced budgetary and planning pressures when addressing needs such the replacement and addition of equipment or systems, the lack of integration between existing and new systems, or the need for upgrading buildings and networks to support increasing public demand for power and bandwidth. Bertot noted that public libraries experienced success when library staff possessed the ability to lead by forming partnerships to extend access within the community and through the community's support. It was also beneficial when library staff could articulate a strong rationale for why the library was engaged in provision of these services and why it should be supported financially and politically. In looking at the provision of public access technologies from a public services perspective, Bertot found that a major factor in success was to have staff who could understand the spectrum of technologies involved and think creatively about problem solving across library and technology services.

Of particular interest within the literature of librarianship and educational technology are those studies that attempt to analyze customer experience with library services and spaces, whether through survey, interview, interaction

logging, or other methods of examining usage and experience.

From the academic library context one of the most interesting studies that encompasses, but also looks beyond technology services, is documented in the book *Studying Students: The Undergraduate Research Project at the University of Rochester*. Focusing on undergraduate users, this research team applied a wide range of ethnographic and anthropological techniques including interviews, a pilot service adjustment, diary mapping, photo surveys, and charrette-style workshops. In the process of conducting a diary mapping exercise with undergraduate students, the researchers found that students surveyed checked computers for communication and information several times throughout the day across campus and where computer access was provided. Given that the study was carried out in 2005, students in the survey opted not to bring bulky laptops along, but preferred to utilize laptops when several hours of work in one location was anticipated (Gibbons & Foster, 2007b).

A linked finding appeared in the research project's charrette-style workshops conducted with a small group of students, where students were asked to furnish an ideal library space. Students in this exercise frequently included workspace that would be suitable for extended work on a mobile device, with many power outlets available (Gibbons & Foster, 2007a).

Students in this exercise also revealed interesting perceptions in the *staff support* element of their designs:

Students rarely make distinctions between the types of staff needed in the library. Instead, they include a generic staff person who is expected to provide reference assistance, check out materials, answer IT questions, and brew a great latte. (Gibbons & Foster, 2007, p. 25)

Another interesting finding about student expectations in the use of library technology pertained to perceptions uncovered in the

diary mapping exercise about library computers:

It also was clear that students do not understand that the computer lab, which is housed in the physical library building, is not part of the library. It is obvious to library and computing staff that the two entities are different, but not to students. We now understand a little better why students are confused, surprised, and sometimes disappointed when the library computers do not have the same software and functionality as the workstations in the computer center. Because of this project, providing access to an identical desktop and suite of services became a top priority for the library . . . (Clark, 2007, p. 53)

Focusing on the library kiosk in the public library context, a study of usage and experience at Thunder Bay Public Library (TBPL) uncovered similar insights about customer confusion and frustration when trying to access technology services within the library (Aegard, 2010).

The 2009 study conducted by Thunder Bay Public Library aimed at understanding how library customers were using library kiosks and at improving that experience (Aegard, 2010). During a ten-day period, Aegard's team utilized a combination of kiosk usage statistics that revealed the most frequently accessed resources, staff survey to collect perceptions and experiences, and customer survey to determine customer satisfaction with and perceptions of the library's kiosks. The researchers found that the library's OPAC was overwhelmingly accessed (64.65%) on the kiosk, and the 'book a computer' service was the next most frequently accessed at 9.81%. Further, attempts to access unauthorized web sites (children's and adult together) comprised 8.73%. The findings led the team to remove some poorly utilized resources (such as a mouse tutorial), while in general maintaining the basic functionality for accessing OPAC and service-related functions. While mostly positive, TBPL's customer survey uncovered

some customer frustration with the lack of functionality of the kiosks, for example, the inability to print and the lack of access to web even when linked through a catalogue record. The researchers similarly noted some tension in maintaining that functionality and excluding open Internet access: "It has been challenging to communicate the function of the kiosks to customers. After all, people walk in, see a computer, and naturally assume they can use it to get on the web" (Aegard, 2010, p. 18).

Library literature speaks widely to the changing nature of reference services, but some studies of note look specifically at reference through using the method of transaction logging and analysis. Though small in numbers, these studies reveal interesting insights about how library customers and library staff interact around the delivery of technology services.

Cavanagh (2006) conducted an ethnographic study of four branches within an urban public library system to explore the library and reference activity as a knowledge-sharing and knowledge construction ecology. Though this study was not explicitly directed at examining technology use, in the course of observing reference transactions Cavanagh reported that the computer often "functions as an explicit knowledge container and as a prop in the interaction narratives" (p. 14) when customers ask questions such as "What does the computer say about this book?" Cavanagh located technology help in the sphere of relationship building activities shared by staff and library customers, when she related a customer question about access to digital photos on library computers that ended with personal talk between a customer and a staff member. Cavanagh's study provides a unique perspective that considers the user experience of library information services as a knowledge sharing and knowledge construction site, rather than focusing solely on staffing or resource design.

Wong (2009) conducted a study of technology help transactions at an information commons (IC) at Hong Kong University with the stated purpose to inform training design for IC staff.

By extracting a sample of questions from a larger dataset spanning four and a half years, Wong categorized technology questions and then performed further analysis probing at transaction complexity. Importantly, Wong categorizes questions based on what services library users needed help with, rather than the resources employed by library staff. Of 1,411 questions in the technology subset, Wong found that printing and computer assistance questions dominated, followed by questions regarding scanning and copying functions. Based on a system of tiering questions by complexity of staff skills required, Wong found that 82.6% of the technology questions required help that was manageable by a person without a formal technical background. The remaining 17.6% of technology questions required help that went beyond general computer literacy and required a more formal background in information systems to address.

At McNeese State University, Finnell and Fontaine (2010) used a reference transaction study to guide the development of subject study guides, instructional outreach efforts, and collection development. Based on 6 months of data collection and preliminary analysis through subject classification coding, the researchers created 11 study guides, purchased new materials, and created 19 new bibliographic instruction courses. The researchers also refocused program efforts to liaise with faculty in key subject areas based on patterns of help requested from students.

Two transaction logging studies attempted to apply analysis of desk transactions to the challenge of staffing services with at an appropriate level for skill and cost effectiveness.

Meserve, Belanger, Bowlby, and Rosenblum (2007) applied the Warner model for the categorization of reference transaction into tiers of complexity to transactions logged in Fall 2005 and Fall 2006 with the purpose of determining appropriate staffing (professional vs. paraprofessional) for services (in person, telephone, virtual) of a merged academic and public library. The researchers were able to adjust staffing based on analysis of frequency

of Level 1 (non-resource) and Level 2 (skill-based) questions in certain services in comparison with the frequency of Level 3 (strategy-based) and Level 4 (consultation) questions. The researchers also concluded that question classification and frequency had informed training design, as training was an important factor in maintaining the quality of service in a tiered environment.

Ryan (2008) applied content analysis to repurposed reference transaction data at Stetson University library to determine the cost effectiveness of staffing a reference desk with library professionals. During 4 collection periods, 6,595 questions were captured and considered in the study. Ryan found that 862 (12.4%) of the queries were information-oriented technology questions and estimated the dollar cost in staffing for each kind of question. Ryan found that 89% of the total questions were answerable by non-librarians, and suggested that staffing adjustments to desk service or alternative service delivery models should be explored along with further study of student needs through varying community consultation techniques. The unresolved complexity in Ryan's study is based in how the questions were mapped from type to staffing level.

The present study touched on areas examined by the literature: composition of transactions by type, the public library in relation to digital literacy and inclusion, user experience with library-provided technology, and service/staffing design implications. It approached the subject of technology interactions and service design implications by focusing on customer-staff interactions that center around technology within the public library's space.

Aims

This study attempted to address the following questions:

1. What is the nature and what are the types of help being requested by library customers?

2. What changes to service design are identifiable and actionable based on these requests?

Methods

A question logging form was used to capture the details of interactions between library staff members and customers. The principal researcher adapted the question logging form from one originally designed by Edmonton Public Library's Acting Manager of Assessment and Research for an internal question pattern study conducted within Edmonton Public Library to determine staffing levels for a specialized, permanent, "storefront" service point. The form was re-structured to capture the following details for each staff-customer interaction:

- Date of question (day, month)
- Question details . . .
- Answered with . . . (resource or process)
- Question location (on desk, roving, on phone, by chat)

The form was initially tested for four hours at one service point on a high traffic desk, and minor adjustments were made based on cell space requirements for fields and in consultation with Edmonton Public Library's Manager of Assessment and Research. The final version of the form retained all four data elements listed above and is included in Appendix B.

Twelve service points (9 branches in total, with 1 branch containing 4 service points) were selected from the library system by the principle researcher and the project supervisor in an attempt to get a varied sample of branch sizes and locations within the city, as well as variation in the types of communities served. Variety in size and location were the main factors by which the branches selected, but it was also decided that the study would include three service points that were heading into new building projects, the main branch (potentially heading to renovations), and one branch hypothesized to be impacted by the opening of a new service point in 2013. The researcher and supervisor decided on a three-

day sample range for collecting interactions based on the volume of data collected during the four-hour test run and time considerations to control the scale of the overall project.

Branch visits for data collection were scheduled in advance, and visit dates were staggered for each location so the lead researcher could be physically present to observe interactions. Dates were selected based on convenience and in consideration of an external requirement for all data collection and analysis to be completed within the one-year timeline of the internship.

In pre-visit staff meetings, the lead researcher briefed participating public services staff at each branch on the study's purpose and provided instructions on how to record survey interactions. Staff members were encouraged to share as much detail about each interaction as possible, but were asked to avoid applying any classification (e.g., "the customer asked a directional question"), and were instructed to exclude personally identifying information. The question logging form was distributed for staff use in paper format, primarily for the ease of use by staff during the flow of work. Although this public library has used web forms for other internal surveys, it was anticipated that staff might provide more detailed information on paper due to comfort and presence in mind. The lead researcher was physically present in the branches during data collection to observe a sample of the interactions between staff and customers.

Once the data collection stage at each location was completed, the lead researcher entered the form data into an Excel spreadsheet. Coding was approached by adapting from the analytical framework of grounded theory, as described in Charmaz's *Constructing grounded theory: a practical guide through qualitative research* (2006) and Corbin and Strauss' *Basics of qualitative research: techniques and procedures for developing grounded theory* (2008). The lead researcher coded the data to develop thematic descriptors (concepts), and sorted those thematic descriptors into larger categories as they emerged. Thematic descriptors were permitted to emerge organically in the coding

process, and were developed and applied by considering both what the customer was asking and how the interaction was apparently resolved, rather than using definitions from the literature.¹ The code book, which was developed to maintain consistency, is included in Appendix A.

Limitations

The data collected in this study has significant limitations:

- The data collection consisted of only three days at each location, and different days were sampled at each location. As a result, the findings are indicative of a snapshot understanding, rather than a comparative or longitudinal study of activity traffic patterns.
- Data elements were recorded by participating frontline staff. A follow-up interview was not conducted with customers, so there is some potential for the interactions as recorded to be an imperfect or incomplete reflection of the customer's actual information need.
- Although participating staff recorded diligently, the data does not reflect all of the activity happening in a given branch on a given day. Some interactions were not included due to factors such as desk volume, forgetfulness, and desk shift

¹ In the Katz (1997) classification scheme that was later modified by Arnold & Kaske (2005), as referenced by Radford and Connaway (2007), there seemed to be problematic assumptions, for instance with the classification of an interaction as ready reference. What assumptions are being made about the nature of customer information needs and the nature of (digital and print-based) information itself when it is proposed that there is a single, uncomplicated, and straightforward answer to the question "Who is the prime minister of Canada?" These assumptions potentially disrupt sensitivity to the customer's unstated and stated information needs by creating mental models about service where library staff are observed to substitute listening and asking probing questions as the first steps of an interaction with verbatim keyword searching.

transitions. The researcher observed that roving questions were misreported as desk questions on occasion.

- Chat data was found in two location datasets only, due to implementation of system-wide chat monitoring occurring after most of the selected locations had been surveyed.

Results

From June 2010 to February 2011 a total of 6,099 interactions were recorded by participating staff from 12 service points during the survey. Of those 6,099 interactions, 1,920 (31.48%) were coded in the Technology Help category. The Technology Help category became a strong focus of analysis in the study, and the key findings for this category are presented in these results.

Technology Help in Context

As can be seen in Figure 1 and Table 1, the codes and concepts that grouped to form the Technology Help category formed the largest cluster of interactions in the study at 31.48%. This category was second only to finding books, multimedia, and information at 25.23%, which included reference and readers services interactions.

Defining Technology Help

The technology help category included customer interactions involving computers, printing, photocopiers, wireless, library provided equipment (e.g., headphones), and mobile or personal devices. Interactions involving the self checkout stations and self check-in autosortation units, though strongly related to circulation, were also included in this category. These interactions were included as technology help because both systems presented a computer driven interface to the customer, and because the problem solving strategies in this area drew heavily upon instruction and technical skills.

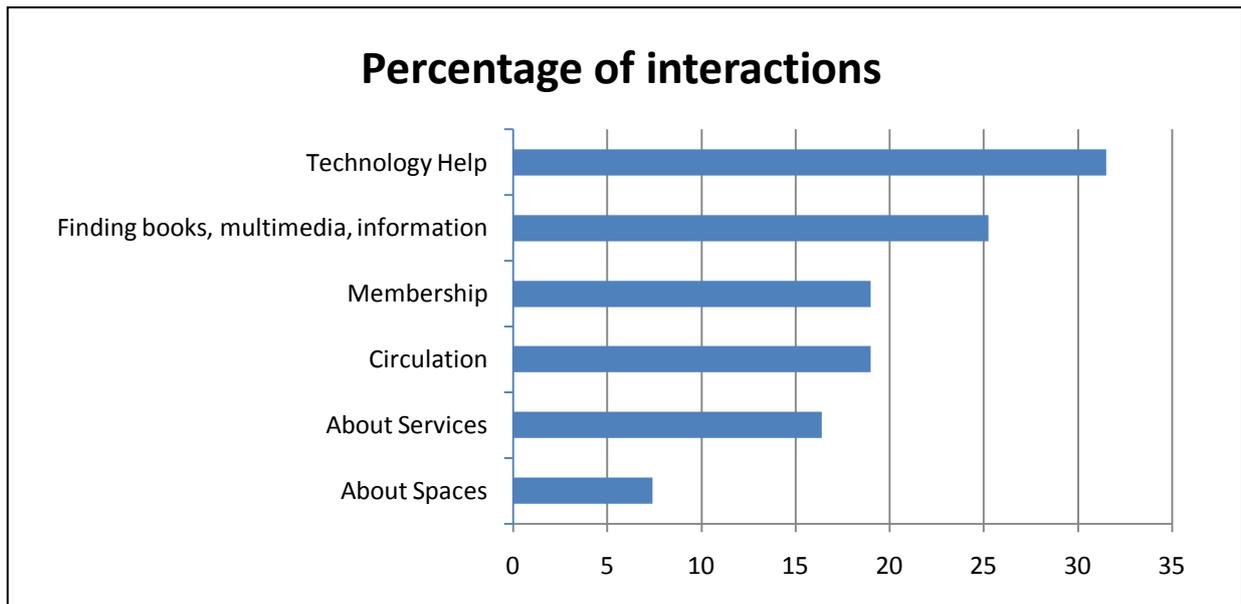


Figure 1
Percentage of interactions by category.

Table 1
Description of Figure 1 Category Codes with Breakdown by Raw Number and Percentage

Code Category	Description	Raw Number	Percentage
Technology Help	Help with computers, printing, wireless, photocopiers, website, devices, self checkout	1,920	31.48%
Finding books, multimedia, information	Help finding books, multimedia, and information (readers and information services)	1,539	25.23%
Circulation	Help checking materials in or out, checking item status, and using the holds system	1,159	19%
Memberships	Help with new cards, card renewals, fine payments, and account management	1,155	18.93%
About Services	Procedural or logical questions about how the library's services work	1,000	16.39%
About Spaces	Help locating library services and spaces (non-collection related)	453	7.42%

^aMultiple category codes have been applied to each interaction, resulting in percentages higher than the interaction total.

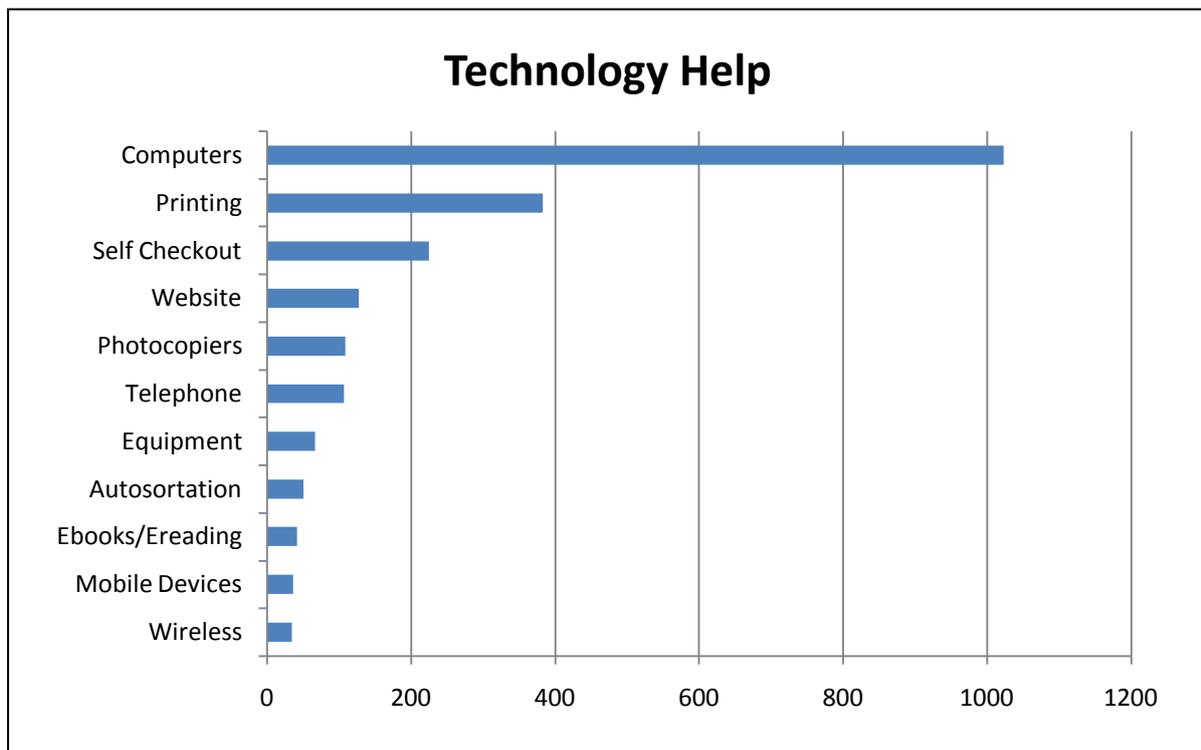


Figure 2
Technology help subcategories by number.

The technology help category is further broken down into subcategories coded for the object with which help was requested (Figure 2). Interactions involving computers (1,023), printing (383), and self checkout stations (224) were the most dominant topics in the technology help category.

Customers asked for help with connectivity and file management across a broad range of devices including laptops (21), USB (10), iPad (4), Kindle (3), iPhones (3), netbooks (2), Sony PSP (2), Kobo (1), Sony eReader (1), Blackberry (1), an unidentified cellphone (1), Palm device (1), and Nintendo Wii (1).

Defining Help: Instruction and Intervention

Textual analysis of the “Answered with...” portion of the question logging form provided an insight into how library staff members were resolving technology help interactions (Figure 3).

The researchers identified that 671 (35%) of the technology coded interactions were resolved using instruction, and 387 (20%) were resolved

(45%) technology coded interactions, too little detail was provided for the researcher to categorize the kind of help provided to the customer.

Technology instruction interactions ranged in complexity from simple device troubleshooting (e.g., customer wants to find a place where laptop can be plugged in to charge) to complex instruction in areas such as file management concepts, networking, document composition, and online etiquette. A number of technology coded interactions were blended with informational needs. Customers were in the library attempting to accomplish a set task layered with social meaning and technology instruction (e.g., applying for a job online). These interactions required staff to instruct in information literacy skills and to guide in reference mediation of the resource.

Help in Three Areas: Computers, Printing, and Self Checkout

A major finding of the study was that of 1920 technology questions (and of 6,099 questions in

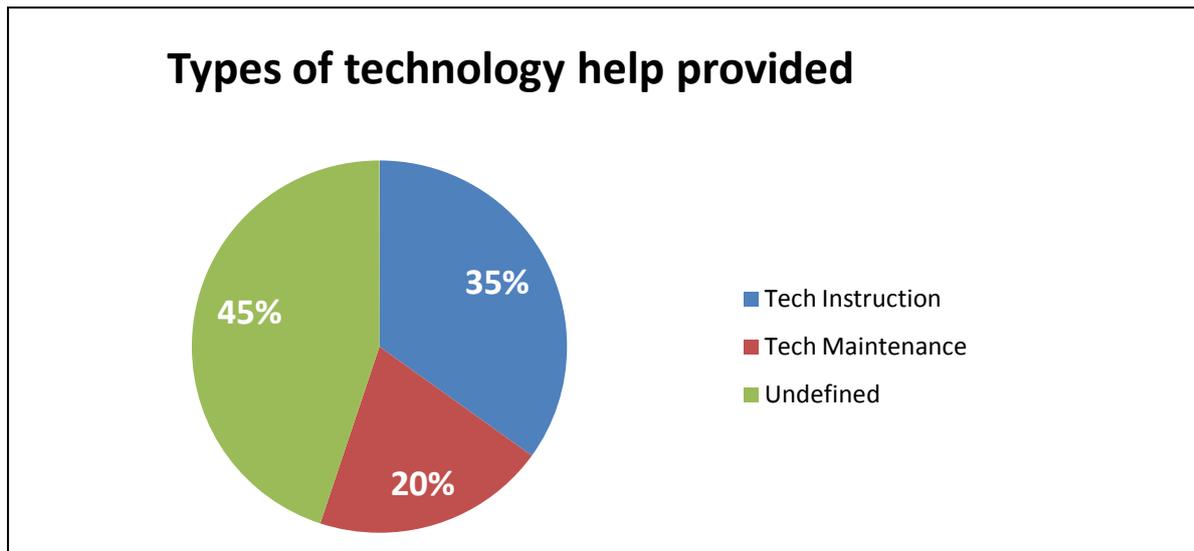


Figure 3
Types of help provided for technology coded interactions.

total), 1,032 pertained to assistance with computer workstations and a further 383 questions pertained to printing from the library's public workstations. As well, 224 customers requested help with the library's self checkout kiosks. It is important to examine why these three areas appeared so dominantly.

Textual analysis of the technology help data revealed that customers requested help that varied in complexity with computers, printing, and other key self service technologies such as the self checkout machines. Some of this help was due to the interplay of task complexity and gaps in computer or information literacy on the part of customers (e.g., a customer needed to apply for a job online, but first needed to receive instruction on email), but help requests were also physically observed to arise due to critical usability issues with key systems.

One of the most critical usability issues was located in the unfamiliar interface presented by software on the library's Internet workstations. This interface, while operating atop Windows XP, disrupted customer expectations for the Microsoft Windows "desktop metaphor" by omitting the Start Bar and Windows Explorer. Further, the interface forced customers through a third party

"application launcher" that appears in the middle of the screen and involves a vertical scrollbar for selecting applications. The restrictions applied through the software also forced customers to access removable media (memory sticks) through the Open File menu choice in common applications, a process that appeared to be idiosyncratic and unexpected for customers. Textual analysis and physical observation revealed this interface to be problematic for computer savvy customers who appeared to be familiar with the Windows environment. It was also observed to be problematic as a learning environment for customers who indicated, verbally or otherwise, inexperience or anxiety with computer use. This is particularly troubling to consider when it appeared that some of those customers were at the library for the very purpose of accessing digital literacy instruction in the form of one-on-one computer tutorials. Although the computer workstations stood out in the survey results, the self checkout machines were the third most reported object in technology help requests and all branch locations surveyed included at least one self checkout machine. Textual analysis and observation revealed two kinds of help requested with self checkout machines: the first type of help requested was when the self checkout would not perform a specific, expected, user-initiated task, such as checking

out an item or printing a receipt. Textual analysis revealed that this failure sometimes arose due to a system generated condition (e.g., library policy blocks checkouts at a \$10 fine count, with the idea that customers will approach a desk and resolve the bill). At other times, the interaction text spoke to problems where the failure was more mechanical in nature (e.g., a jammed receipt printer is easy for customers to diagnose and report to the desk).

The second kind of help requested most often was when customers were unable to intuit the steps required – or the messages presented – by the self checkout kiosks. For example, the self checkout will inform customers that an expired library card or a card that has reached a numerical checkout limit is “invalid.” From observation, customers would approach the desk, alarmed, thinking the card information might be “missing” from the system, when in reality the severity of the problem was far less than signaled by the vague message. Customers were similarly deprived of useful system messaging when attempting to check out an item with limitations imposed by type (e.g., reference) or items with an erroneous state (e.g., still discharged to another customer).

A third possibility that was observed by the researcher, but did not appear substantively in the text of the interaction data, may exist in how customers conceptually link the self checkout kiosks to account information needs. In the data, 300 instances were recorded in which customers asked the library for information about the contents or status of library memberships. Although question analysis revealed many possible causes for this question, it is notable that customers were, at times, observed to proceed directly from the self checkout to a service desk in order to obtain more detailed information about their accounts, or to confirm the status of an item when the machine messaging or functionality left that status in doubt. For example, at one branch two customers were observed asking staff members to verify that items were checked out properly when the number of items in hand did not match the number of

items listed by receipt. The title and author details on circulated items are not currently presented in a list format through the self checkout interface, but are instead accessible through library service “catalogue stations,” which are restricted in function. The researchers speculate that catalogue stations have a stronger conceptual link with searching than with account management, but further study is required.

Textual analysis revealed that the printing system (383) presented very comparable challenges to the problem types that customers encountered with the self checkout kiosks. Customers would approach when the document failed to print as expected, but this involved an added layer of complexity in troubleshooting for staff and customers because of the additional number of sources from which the issue could be arising. In some cases, customers struggled with the layer of print management software used by the library to release and coordinate payment for prints. The printing software appeared to disrupt the expectations of customers accustomed to home or office printing environments by presenting a series of vague messages and unclear confirmation steps in the form of pop-up dialog boxes. In some cases, customers approached the desk with a problem that turned out to be insufficient credit for printing (which is passively indicated by the software through an account balance or a pop-up dialog box, rather than as active item requiring immediate resolution and offering steps to proceed), but was sometimes misidentified by customers as a physical problem such as “the printer is out of paper.” In attempting to resolve this problem, some staff members indicated that they had checked the printer immediately, some indicated that they had accompanied the customer to his/her computer for a closer look at where the customer was in the process and possible instruction on the software, and some staff members indicated that they had performed administrative intervention by viewing the customer’s account details from a staff workstation. In some cases, the troubleshooting path involved more than one strategy and more than one trip

to a customer or staff workstation to identify and resolve the issue.

Technology in Library Space

Survey data revealed a small class of interactions in which customers asked for help in spaces impacted by the use of technology, but not with technology itself.

Textual analysis and observation revealed that differing activities located in library computing spaces created tensions among customers with respect to noise, concentration, and privacy. There were 11 interactions across 5 locations throughout the data in which customers asked where they could find quiet space for themselves or for a study group. There were also 16 noise complaints across 5 locations in computing contexts where customers who were engaged in an individual task requiring concentration (e.g., writing an email or resume) objected to noise generated by groups of customers also on computers but engaged in social activities such as viewing social media sites, streaming media, or playing games.

Among the category of interactions that included codes and concepts about the library's physical space, interactions in which customers asked about the location of Internet workstations ranked third (56) behind

questions about the washrooms (133) and questions about where to return materials (84). One potential reason why these interactions arose is because of the apparent visual similarity between the Internet workstations and some of the catalogue computers (that are restricted to OPAC and database access) at some locations (Figure 4).

Discussion

The survey results indicated that for the technology help interaction category, customer requests for help with the library's computer workstations dominated all other subcategories. Based on three significant areas of analysis arising from the results, the researcher recommended that the library conduct a thorough usability review of the Internet workstation interface.

In particular, the researchers recommended that the library aim to address five common customer tasks (logging on, launching applications, locating and opening a document, printing, and downloading/attaching a file with email) recorded in the survey data, through a change in configuration of the current software or through a search and evaluation of new software to implement. Further, the researchers recommended that the library,



Figure 4

At Edmonton's downtown Stanley A. Milner Library, the stand up catalogue station (left) appears ambiguous in function, but is at least distinctive in orientation in comparison to the Internet workstation (centre) and the sit down catalogue station (right).

upon any changes, follow up with a user study – including a focus group of customers familiar with a Windows operating environment and at least one webmail service – to test the changes.

The researchers recommended that the library should explore implementation of a solution for printing that is easier for customers to use, which requires minimal steps, presents clear language, and allows for self service payment. The researchers also recommended that the library conduct an audit of service messages that are commonly presented to customers by key technology systems, similar to the focus presented by Saarti and Raivo (2011). In that study, the scholars read one public library's OPAC as a text and analyzed the social and information literacies required to decode that text in the larger context of human-computer, human-information interactions.

Survey results, especially in regard to the confusing language presented by the self checkout stations, speak to the need for public libraries to present messages and language to customers that are friendly in that they are easy to understand, possibly graphically represented, concise and accurate, and instructive. These qualities serve to create a sense of choice and power for customers. Public libraries not only need to present friendlier and clearer messages where possible, but must also communicate that this kind of user experience is a requirement when they select vendor software and provide feedback to vendors about existing products. Where self service options necessarily eclipse in-person contact with staff (e.g., system generated holds and overdue notices), messages need to be evaluated with particular care. Does the tone, language, and visual design of system notices reflect the library's mission, vision, and values? Or does the tone and language shut down communication? System messages – like advocacy and marketing messages – must facilitate meaningful conversations and action between public libraries and communities. The researchers additionally recommended that the library adjust desk staffing strategies and mobile reference practices to increase staff awareness to “rove” the self checkout

machines and the autosortation units, which appeared extensively in the survey results. Follow up study is recommended on the question of co-existing spaces and digital workspaces that support individual and shared tasks. Interactions in this subcategory appeared in a limited way in the survey data, and appeared to require alternative methods of study – as in Gibbons and Foster's *Studying Students* project – to be captured in a systematic manner.

From a staffing perspective, the volume and complexity of technology instruction questions (671) and the prominence of technology questions as a whole (1,920) in the study, suggested that public library customers need public library staff who see technology as a foundational component of library work, who feel capable in attempting to help, and who have superb interpersonal skills. Crucially, given the rate of technological change, library staff members also require the skills to co-learn and co-instruct with a variety of different systems, devices, and problem classes. Co-learning, interpersonal, RUSA reference interview, and strong search skills remain key elements of any customer service strategy around technology training.

Conclusions

The study found that technology help is a central customer need within Edmonton Public Library, and that help requests vary in complexity and are frequently resolved with instruction. The study also found that technology help questions are sometimes blended with more complex information needs, and infused with evolving social meaning (e.g., job search). Internet workstations, printing, and self checkout are asked about in significant numbers and present critical usability challenges for library customers due to issues with interface design and workflow. The researcher recommends that the library focus on improving ease of use in key systems, on auditing service messages for clarity and accuracy, and on re-designing some staffing practices and structures to support technology assistance as a foundational component of library work.

Given the strong appearance of technology help in this study, the Edmonton Public Library has acted to address the need for digital literacy services at a strategic level in its business plan document: *The Way We Share: EPL Business Plan 2011 - 2013*. The library has resolved to position digital literacy services with customers through programming and partnerships, and to position digital literacy services with library staff by implementing new positions and training delivery models, with the ultimate goal of developing the skills and confidence to help customers with technology. Further, the library is resolved to address some user experience issues identified in the study (e.g., printing) by offering “online services [that] are easy to use – at home and on the go” and to become “[the] community’s digital workspace” (2011, pp. 14-15).

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Appendix A

Codes Used for Thematic Analysis

Code	Definition
<i>aboutempl-services</i>	<i>Questions about how the library's services or procedures function</i>
<i>aboutempl-spaces</i>	<i>Questions about where equipment, people, or areas are in the library</i>
<i>accountlookup</i>	<i>Staff retrieve customer account details</i>
<i>advisory</i>	<i>An advisory interaction between staff and customers</i>
<i>answered no</i>	<i>Declined a customer's request</i>
<i>arts and literature</i>	<i>Reference in the area of arts and literature (700 - 800s Dewey)</i>
<i>blocked</i>	<i>Customer's account is blocked due to status (fines, etc)</i>
<i>booking</i>	<i>Booking a computer</i>
<i>BTG</i>	<i>Request for Best Seller to Go item</i>
<i>card renewal</i>	<i>Privilege renewal</i>
<i>cdrequest</i>	<i>Customer requests material (music, spoken) in CD format</i>
<i>community reference</i>	<i>Question about Edmonton people, places, things, or organizations</i>
<i>complaint</i>	<i>A customer complaint</i>
<i>conversation</i>	<i>Staff and customer converse</i>
<i>circulation</i>	<i>Pertaining to checkins, checkouts, item renewal, holds</i>
<i>circ trouble</i>	<i>Customer encountered difficulty trying to circulate an item</i>
<i>directional</i>	<i>Where is...</i>
<i>DVDrequest</i>	<i>Request for material in a DVD format.</i>
<i>ebooks/ereading</i>	<i>Questions about ebooks, eaudiobooks, or ereading</i>
<i>equipment</i>	<i>Questions about headphones, disk drives, or other in-library equipment</i>
<i>eresourcerequest</i>	<i>Request for material in a digital format.</i>
<i>expiry</i>	<i>A membership was expired</i>
<i>family card</i>	<i>Indicates family management scenario - a parent managing one or more cards</i>
<i>fines</i>	<i>An inquiry about fines or fine payment</i>
<i>forgot card</i>	<i>Customer wants to use services or borrow, but lacks physical card</i>
<i>forgot PIN</i>	<i>Customer wants to use services, but needs PIN</i>
<i>formatting</i>	<i>Customer asks for assistance with document or text formatting on computer</i>
<i>FTTG</i>	<i>Request for a Flicks n Tunes to Go item</i>
<i>gamerequest</i>	<i>Request for material in game format</i>
<i>genre</i>	<i>Asking for a genre or topic area of materials</i>
<i>genealogy</i>	<i>A genealogy reference question</i>
<i>government and law</i>	<i>A reference question pertaining to government or law, at all levels</i>
<i>health reference</i>	<i>A reference question about health information</i>
<i>holds</i>	<i>Help locating holds that have already been placed</i>
<i>information services-catalogue</i>	<i>Staff use the catalogue with a customer</i>
<i>information services-reference</i>	<i>A reference question</i>
<i>internet pass</i>	<i>Request for a temporary Internet pass</i>
<i>interlibraryloans</i>	<i>Questions pertaining to or resolved with interlibrary loans</i>

<i>item renewal</i>	<i>Customer asks for borrowed material to be renewed</i>
<i>job seeking</i>	<i>Request for help searching or applying for a job</i>
<i>juvenile</i>	<i>Request pertains to Youth Services</i>
<i>language learning</i>	<i>Request for language learning material, resources, or programming</i>
<i>library instruction</i>	<i>Staff instruct a customer on library functions</i>
<i>lost card</i>	<i>Customer reports a lost card</i>
<i>lost and found</i>	<i>Requests for lost effects or for the lost and found specifically</i>
<i>membership</i>	<i>Pertaining to membership status or policy</i>
<i>mobile technology</i>	<i>Request for help using a mobile device</i>
<i>multimedia</i>	<i>Request for non-print material</i>
<i>new card</i>	<i>A new registration, new library card issued</i>
<i>pholds</i>	<i>Customer request that a hold is placed</i>
<i>printing</i>	<i>Help printing documents or using the print system</i>
<i>programs</i>	<i>Questions about program offerings, registration, or attendance</i>
<i>readers service</i>	<i>Questions about print materials</i>
<i>readers service- magazine</i>	<i>Questions about magazines</i>
<i>readers service- newspaper</i>	<i>Questions about newspaper</i>
<i>recruitment</i>	<i>Questions about EPL as an employer</i>
<i>referral</i>	<i>Staff refer a customer's question to another desk, service point, or external organization</i>
<i>resume help</i>	<i>Customer requests help composing a resume</i>
<i>security</i>	<i>Staff refer to security staff</i>
<i>science and technology</i>	<i>A reference question in the science or technology area (Dewey 500 - 600s)</i>
<i>snag</i>	<i>A missing disc or component of material is discovered or reported</i>
<i>specific title</i>	<i>Customer request for a specific title or author</i>
<i>stationery</i>	<i>Customer request for pens, pencils, papers, bags, staplers</i>
<i>tech instruction</i>	<i>Customers request or staff provide technology instruction</i>
<i>tech maintenance</i>	<i>Staff resolve a technical problem for a customer using admin software or other administrative intervention (reboot, etc)</i>
<i>technology services- asu</i>	<i>Autosortation unit</i>
<i>technology services- computers</i>	<i>Computer workstations</i>
<i>technology services- databases</i>	<i>Licensed databases</i>
<i>technology services- faxing</i>	<i>Request for fax service</i>
<i>technology services- laptops</i>	<i>Loanable laptops (SPW)</i>
<i>technology services- lending</i>	<i>Century Park Lending Machine</i>
<i>technology services- microfilm</i>	<i>Microfilm</i>
<i>technology services- notifications</i>	<i>ILS generated notifications on holds or overdues</i>
<i>technology services- phones</i>	<i>Request to use the library's telephones</i>

<i>technology services- photocopier</i>	<i>Photocopying help</i>
<i>technology services-sco</i>	<i>Self Checkout</i>
<i>technology services- viewing</i>	<i>DVD Viewing stations (CRA)</i>
<i>technology services- website</i>	<i>Website</i>
<i>technology services- wireless</i>	<i>Connecting to EPL's wireless</i>
<i>time extension</i>	<i>Request for more computer time</i>

