Needs and Results in Virtual Reference Transactions: A Longitudinal Study

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ABSTRACT

The authors analyzed a set of virtual reference transactions from a cooperative chat service, comprising transcripts from 2014 and 2006. Chats were categorized by type of library, length of time, type of question, and type of resolution. The article looks at the changes seen over time and how a change in the type of questions asked may be causing further changes in average length of time and resolution. The authors discuss what these changes imply for the future of librarianship and how accuracy can be improved.

Introduction

Virtual reference (VR), especially when done cooperatively, is often considered not as accurate as traditional, face-to-face reference. The authors, one of whom manages a statewide cooperative VR service, and the other who participates in the service, determined to test this belief by analyzing a series of transcripts in regard to answer quality, as well as the question type.

The questions considered were as follows:

1. What percentage of VR transactions are answered correctly for the patron within the chat? (Without an e-mail follow-up).
2. What types of questions are patrons asking, and how do these differ between patrons of public and academic institutions?
3. How long are VR transactions, and how does this differ between patrons of public and academic institutions?
4. How have these values changed between current VR transactions and older VR transactions?

Literature review

Much has been written about VR transcript analysis in the past decade. Radford (2006) coded transcripts for "relational facilitators" and "relational barriers" (p. 1049) exhibited by both the librarians and the patrons. The author reported that many interpersonal aspects important to face-to-face transactions were also present in VR transactions. Radford (2006) noted that rapport building was the most commonly exhibited facilitator observed in librarians, while relational disconnect/failure to build rapport, was the most commonly exhibited barrier observed in patrons.

Radford and Connaway (2012) coded transcripts according to question type asked, as well as the type of answer (correct vs. incorrect, and citation provided vs. no citation). The authors noted that in the 850 transcripts from 2005–2006, the most common types of questions were "subject search" (32%) and "ready reference" (27%), while in the 560 transcripts from 2010, the most common types of questions were "ready reference" (31%) and "procedural" (31%) (p. 5). The percentage of transactions with correct answers was 78% in 2005–2006 and 90% in 2010 (Radford & Connaway, 2012, p. 5)

In 2010, Maximiek, Rushton, and Brown analyzed multiple factors in academic VR transcripts, including user demographics, length, day of the week, time, question type, resource type, Reference & User Services Association (RUSA) guidelines for behavioral performance, and correctness/completeness of answer. The most frequent question types were "website navigation" (29%) and "instructional" (23%) (Maximiek et al., 2010, p. 365).

Ryan, Daugherty, and Mauldin (2006) analyzed academic transcripts for time, day of the week, question type, and the presence of various customer service performance indicators. The most common question types were "directional" and "known item" (Discussion section, para. 4).

Method and design of study

Similar to Radford and Connaway, we decided to conduct a qualitative content analysis of question types, as well as a longitudinal study to compare if, and how, these values changed over time.

The decision regarding which categories to assign to transcripts was based on those used by both Ryan et al. (2006) and McClure et al. (2002), as well as our own personal experience. The following is a list of the final categories:

1. Ready Reference—basic facts not requiring analysis (e.g., "What was Mark Twain's real name?")
2. Research by Topic Basic—information on a topic, requiring no analysis and few parameters (e.g., "I need information on the life of Mark Twain.")

3. Research by Topic Intermediate—information on a topic, requiring some analysis or containing more than a few parameters (e.g., "I need scholarly sources from the 1900s critiquing Huckleberry Finn.")
4. Research by Topic Advanced—information on a topic, requiring at least a moderate amount of analysis or several parameters (e.g., "How did Mark Twain's childhood influence his writing?")
5. Policies—questions relating to library services and policies (e.g., operating hours, borrowing procedures, and printer availability)
6. Citations—help needed in creating bibliographic citations
7. How-To—performing basic tasks such as checking a library account or finding a particular link on the library website
8. Known Item—seeking a specific book, article or other work
9. Technical Issues—logging into library databases, downloading eBooks, or nonlibrary-specific issues such as downloading software or opening e-mail attachments
10. Nonlibrary-Related—tests of the chat service, questions best handled by another organization (e.g., campus bookstore)
11. Reader's Advisory—seeking advice on what book to read for oneself or a child
12. Incomplete/Unknown—not enough of the chat occurred to know the nature of the question

In addition, the authors decided to also code based on the resolution of the question, and devised the following categories:

1. Answered by the librarian during the chat
2. The patron's library, or chatting librarian, followed up with the patron later
3. The patron would follow up with the library or other relevant agency at a later time
4. Unanswered/incomplete—the patron left before the question could be answered, and follow-up was not known to be conducted
5. Incorrectly answered by the librarian during the chat

The decision was made to code all transcripts from the patrons of Ask Us 24/7 (New York State's cooperative VR service) for a single month, October 2014. Transcripts from out-of-state patrons (i.e., transcripts where an Ask Us 24/7 participating librarian assisted a patron of a non-Ask Us 24/7 library), were eliminated. This resulted in a total of 1847 transcripts. For the longitudinal aspect of the review, all Ask Us 24/7 patrons' transcripts from October 2006, were coded, which is the earliest year that transcripts were available from the service. The total transcripts for this period was 212.

To test the validity of the categories, both authors analyzed 30 transcripts. On the basis of this initial analysis, the need to add, change or combine the categories, was discussed. It was also this initial analysis that led to the inclusion of codes for question resolutions to the study.

Limitations

Because of the large number of transcripts available for the selected month of October 2014 the coding process took longer than expected. Also, the authors neglected to ensure inter-rater reliability measures, such as coding the same transcripts (or at least some of the same transcripts). This omission may have skewed the data slightly because of the subjective opinion of the coders.

Results

In 2006, the most common question types for academic library patrons were "Research by Topic—Basic" (29.79%), "Citations" (8.98%), and "Policy" (8.78%). In 2014, the most common types were "Research by Topic—Basic" (28.28%), "Research by Topic—Intermediate" (21.28%) and "Known Item" (10.64%). Figure 1 shows all categories with their academic library percentages for both years.

In 2006, the most common question types for public library patrons were "Research by Topic—Basic" (23.73%), "Known Item" (19.49%), and "Policy" (16.95%). In 2014, the most common types were "Technical Issue" (27.12%), "Policy" (24.58%), and "Known Item" (16.38%). Figure 2 shows all categories with their public library percentages for both years.

Overall, the percentage of questions that were correctly answered during a chat session increased from 53.30% in 2006 to 68.87% in 2014. Although the academic libraries saw a large increase (48.94% to 73.73%) the public libraries saw a slight decrease (56.78% to 48.59%). The percentage of chats that were answered incorrectly was low for both library types in both years. However, this value may be artificially low; for a chat to be coded as incorrectly answered, it required the coder to be aware of the correct answer or source.

Figure 3 shows all chat resolution categories with their academic library percentages for both years. Figure 4 shows all chat resolution categories with their public library percentages for both years.

In general, the length of VR transactions for academic libraries has increased, while for public libraries have decreased (expressed here as mm: ss). Academic transactions increased from an average of 14:32 to 17:31, and the median increased from 11:42 to 13:38, as shown in Figure 5. Public chats decreased on average from 17:58 to 12:34, but the median saw a decrease from 14:40 to 10:13. Figure 6 illustrates these changes.
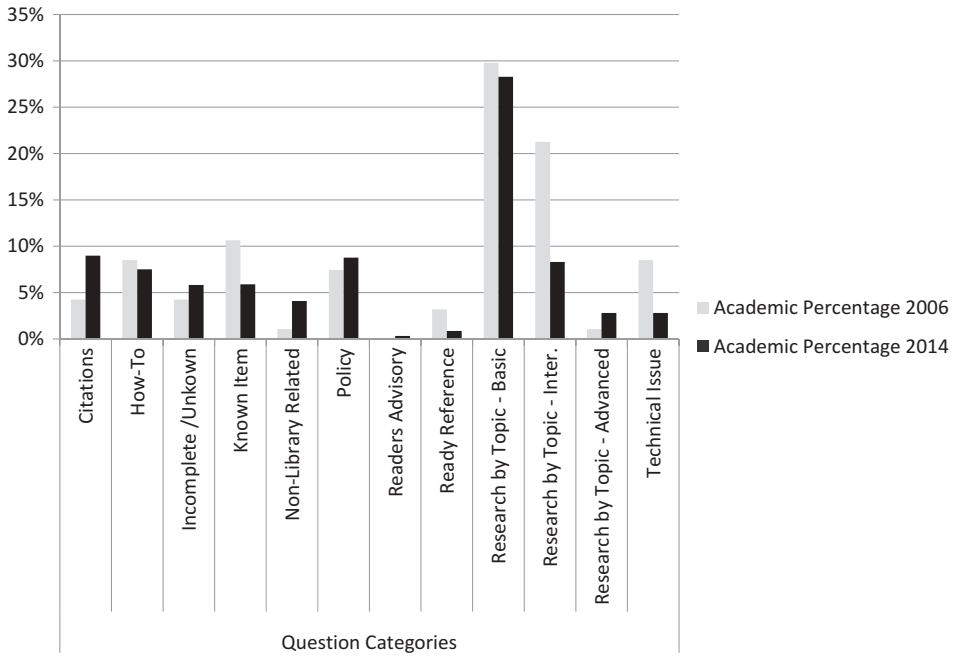
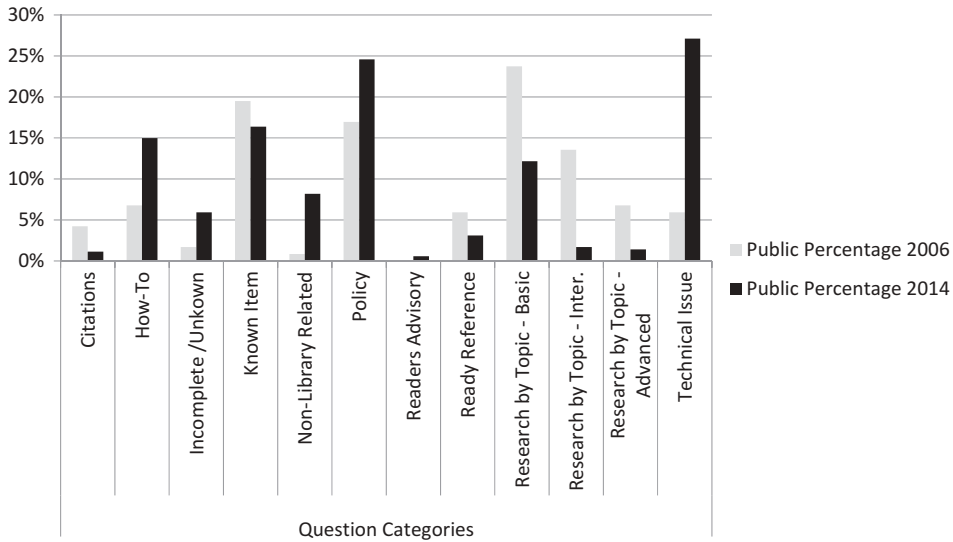**Figure 1.** Percentage of questions asked in each category, by academic library patrons, 2006 and 2014.

Figure 2. Percentage of questions asked in each category, by public library patrons, 2006 and 2014.

Discussion

The results reflect a decrease in ready reference questions from both public and academic patrons, along with some changes unique to each type. Public patrons asked an increasing number of policy questions, as well as technology-related
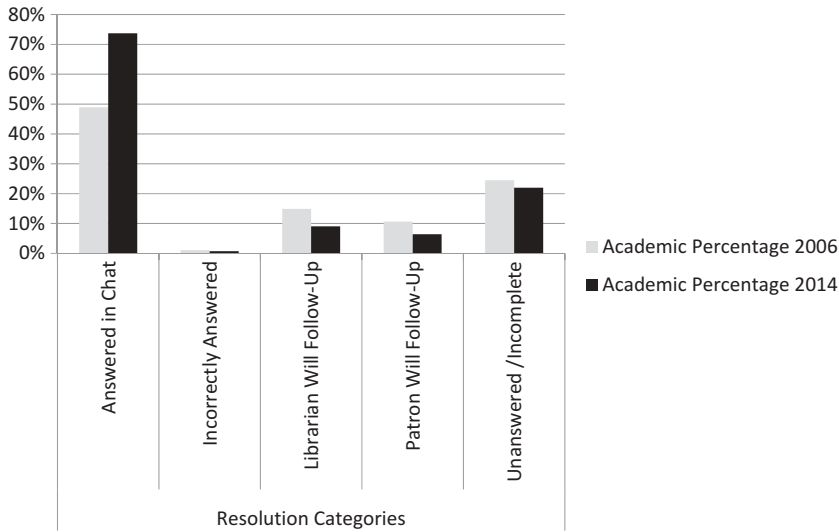
Figure 3. Percentage of chats concluded with each type of resolution by academic librarians, for both 2006 and 2014.
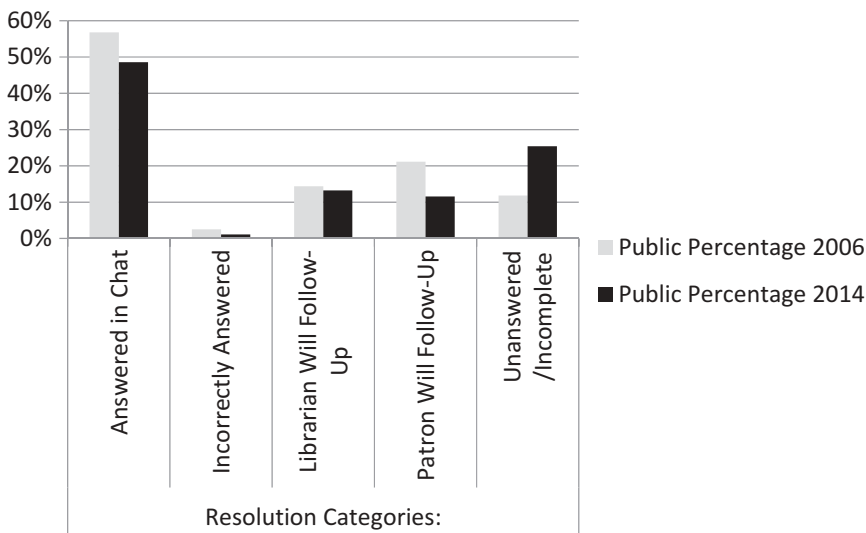

Figure 4. Percentage of chats concluded with each type of resolution by public librarians, for both 2006 and 2014.

questions. While academic patrons asked slightly fewer questions relating to "Research by Topic—Basic" and "Research by Topic—Intermediate," most other categories have marginally increased amounts of questions.

The decrease in ready reference questions in public and academic could be a result of the growth of internet usage. While both the World Wide Web and Google had been around for several years by 2006, it may be that by 2014, "Digital Natives" (Prensky, 2001, p. 1) made up a greater proportion of users, and that they
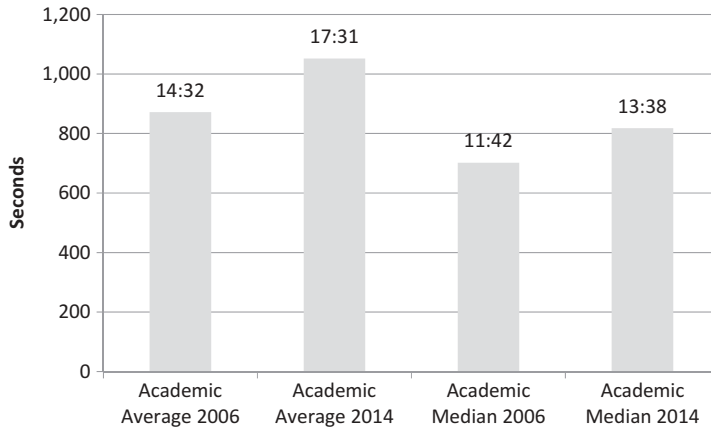
Figure 5. Mean and median length of chats from academic libraries, for both 2006 and 2014.
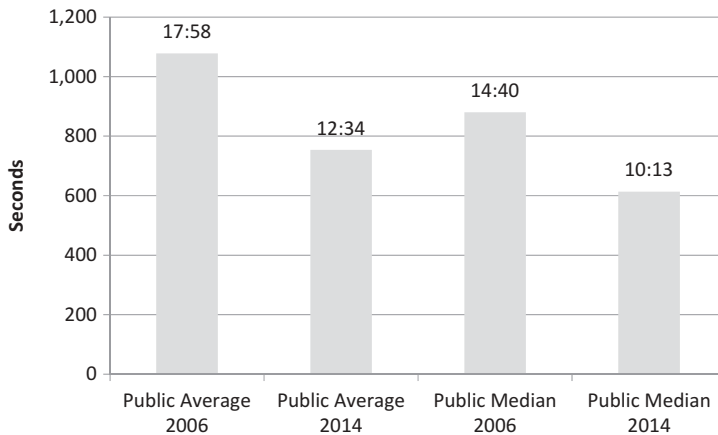

Figure 6. Mean and median length of chats from public libraries, for both 2006 and 2014.

would have greater skill in finding basic information on their own. Zickuhr, Rainie, and Purchell (2013) found that 48% of Americans ages 16–29 years have ever visited a library website, compared with 36% of those ages 30 years and older.

Figure 7 gives a further breakdown of the chats that were coded with the "Answered in Chat" resolution code, by question category for academic libraries in 2014. Figure 8 breaks down the "Answered in Chat" transactions by question category for public libraries in 2014. This allows us to draw some conclusions about the overall change in this resolution category over time.

The decrease in questions answered in the chat for public library patrons is disappointing. However, this seems to be due to the increase in policy, technical, and nonlibrary questions, which all had low rates of being answered in chat. Policy and technical questions cannot always be answered by the chatting librarian if he or she is from another institution. For librarians participating in Ask Us 24/7, this information can be displayed
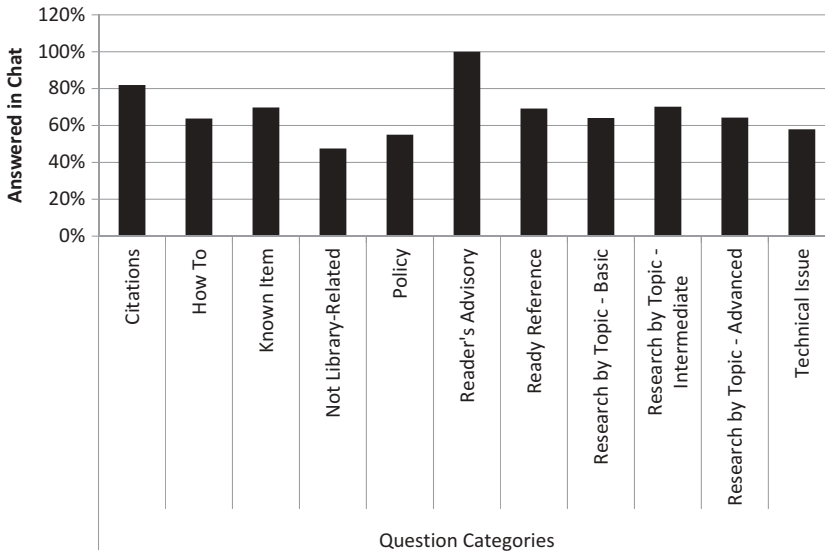
Figure 7. Percentage of each type of question that was correctly answered during the chat, for academic library patrons in 2014.
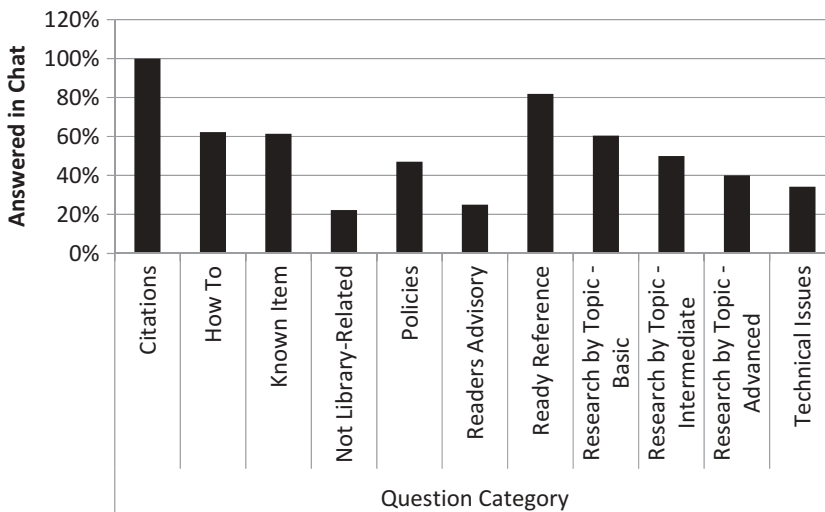

Figure 8. Percentage of each type of question that was correctly answered during the chat, for public library patrons in 2014.

in a library's "policy page," a document visible only to the chatting librarian that provides them with additional information to help answer patron questions. If the policy page does not have the specific information to answer the patron's question, chats can be submitted to the patron's home library for follow-up via e-mail.

Figure 9 breaks down the average chat transaction times by question category for academic libraries in 2014. The increase in length of academic
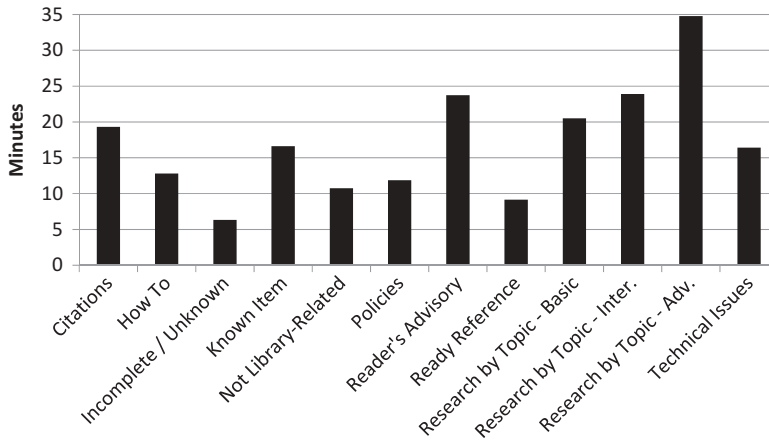
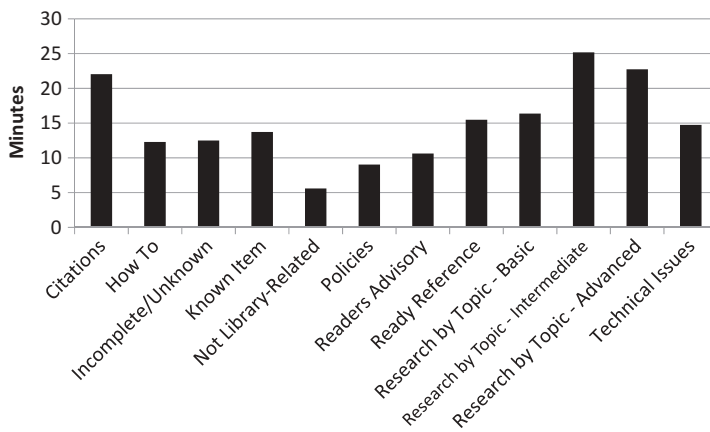**Figure 9.** Mean length of academic library chats by category for 2014.

Figure 10. Mean length of public library chats by category for 2014.

transactions over time could be seen as a sign of more advanced questions being asked, coinciding with the decrease in the "Research by Topic—Basic" and "Research by Topic—Intermediate" categories. "Research by Topic— Advanced," which saw a slight increase, had by far the longest average transaction time.

Figure 10 breaks down the average chat transaction times by question category for public libraries in 2014. This shows that the decrease in length of public (but not academic) transactions is due to the decrease in the three Research by Topic categories, as well as the increase of policy and nonlibrary-related questions. Policy questions are often fairly straightforward—either the chatting librarian can find an answer in the policies provided by the library, or they will refer the question for follow-up. In addition, nonlibrary-related questions can quickly be directed to the appropriate institution.

Conclusion

In the ever-changing environment of libraries, as we face budget concerns, staffing issues, and a myriad of other challenges, we often look for alternative methods of supporting our patrons. These methods include, for example, self-checkout stations as an alternative to a Circulation Desk, even VR as an alternative to the traditional Reference Desk.

Librarians who are not currently participating in a VR service, or have very limited experience, may assume that the types of questions being asked by patrons are limited to "Ready Reference," "Known Item," and "How-To," which may have been true during the initial implementation of VR at the turn of the 21st century; they may be rather shocked to discover that more recently a majority of questions are much more complex, focusing on "Research Topic—Basic," "Research Topic—Intermediate," "Technical Issue," and "Policy."

As the data clearly show, questions posed to librarians, both in academic and public settings, have evolved since the implementation of VR services. This not only includes question type, but more important, question complexity, which directly impacts the quality of the service provided, especially in a cooperative environment.

For those libraries considering providing your patrons with access to a VR service, you will need to consider several factors: cost, scheduling, librarian participation, and so forth. However, the one factor that stands out among all others, will this truly improve the patron's overall experience.

For those libraries currently providing your patrons access to a VR service, you do not need to consider as many factors as those considering participation in VR service. However, you should consider an evaluation of your service, in order to truly understand the needs of your patrons, and where improvements to your service, collections and overall library can be made.

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