PREDICTING PUBLIC LIBRARY WEBSITE INTERACTIVITY USING TRADITIONAL MEASURES OF LIBRARY RESOURCES AND SERVICES

by

Sharon M. Foster

Submitted in fulfillment of the requirements for ILS 680, Evaluation and Research, a required course for the degree of Master of Library Science

at

Southern Connecticut State University

Fall 2008
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Sharon M. Foster

Under the supervision of Professor Chang Suk Kim

at Southern Connecticut State University

Abstract

This study examined forty-eight public library websites in Connecticut and assessed their level of interactivity with users. Each website was assigned a “Library 2.0” score based on the presence or absence of certain features that are usually mentioned when the subject of “Library 2.0” is discussed. Seven hypotheses state that the library 2.0 score will correlate positively with traditional measures of library resources (time, money, and personnel) and services (cardholders, circulation, reference transactions, and visits). Each hypothesis was tested through zero-order correlation using SPSS 17.0. Results of the data analysis showed that six of the seven hypotheses were supported by the data.

The results of this study suggest that most public libraries in Connecticut have begun to devote some of their limited resources into developing a more interactive Web presence. In particular, public libraries are reaching out to the...
“born digital” generation, for whom sharing of information, collaboration, and
creation of their own Web content are the norm. (Palfrey).
# Table of Contents

Chapter 1 - Introduction to the Study ................................................................. 6  
I. Introduction.................................................................................................. 6  
   A. Is there a relationship between a library’s financial resources and its  
      “library 2.0” score? .................................................................................. 8  
   B. Is there a relationship between a library’s personnel resources and its  
      “library 2.0” score? .................................................................................. 8  
   C. Is there a relationship between a library’s time resources and its “library  
      2.0” score? ............................................................................................... 8  
   D. Is there a relationship between traditional measures of library services  
      and the “Library 2.0” score? .................................................................... 8  
II. Statement of the Problem .......................................................................... 8  
III. Delimitations............................................................................................ 9  
IV. Glossary ..................................................................................................10  
V. Assumptions .............................................................................................11  
VI. Significance of the Study.........................................................................11  

Chapter 2 - Literature Review ........................................................................13  
I. Introduction.................................................................................................13  
II. Web 2.0 in the Commercial World..........................................................13  
III. Library 2.0 for Public Libraries ...............................................................13  

Chapter 3 - Methods .........................................................................................16  
I. Introduction.................................................................................................16  
II. Research Hypotheses...............................................................................16  
   1. Hypothesis One .......................................................................................16  
   2. Hypothesis Two ......................................................................................16  
   3. Hypothesis Three ...................................................................................16  
   4. Hypothesis Four ....................................................................................17  
   5. Hypothesis Five ....................................................................................17  
   6. Hypothesis Six ......................................................................................17  
   7. Hypothesis Seven ..................................................................................18  
III. Independent Variables...............................................................................18  
   A. Resources .................................................................................................19  
      1. Money ..................................................................................................19  
      2. Time ..................................................................................................20  
      3. People ................................................................................................20  
   B. Services ...................................................................................................20  
      1. Circulation ..........................................................................................20  
      2. Registered borrowers ........................................................................21  
      3. Library visits ....................................................................................21  
      4. Reference transactions ......................................................................21  
IV. Dependent Variables...............................................................................22  
   A. Blogs ........................................................................................................22  
   B. Email Reference ....................................................................................24  
   C. Chat Reference ......................................................................................24
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Photo/Video Sharing</td>
<td>24</td>
</tr>
<tr>
<td>E. Social Networking</td>
<td>25</td>
</tr>
<tr>
<td>F. Events Calendar</td>
<td>25</td>
</tr>
<tr>
<td>G. Site Search</td>
<td>25</td>
</tr>
<tr>
<td>H. Teens</td>
<td>25</td>
</tr>
<tr>
<td>I. Webmaster</td>
<td>26</td>
</tr>
<tr>
<td>J. Library 2.0 Score</td>
<td>26</td>
</tr>
<tr>
<td>V. Sample Size Analysis</td>
<td>26</td>
</tr>
<tr>
<td>VI. Data Collection Procedures</td>
<td>27</td>
</tr>
<tr>
<td>VII. Statistical Analysis Procedures</td>
<td>28</td>
</tr>
<tr>
<td>Chapter 4 - Results</td>
<td>30</td>
</tr>
<tr>
<td>VIII. Introduction</td>
<td>30</td>
</tr>
<tr>
<td>1. Is there a relationship between a library’s financial resources and its “library 2.0” score?</td>
<td>31</td>
</tr>
<tr>
<td>2. Is there a relationship between a library’s personnel resources and its “library 2.0” score?</td>
<td>31</td>
</tr>
<tr>
<td>3. Is there a relationship between a library’s time resources and its “library 2.0” score?</td>
<td>31</td>
</tr>
<tr>
<td>4. Is there a relationship between traditional measures of library services—circulation, cardholders, reference transactions, and visits—and the “library 2.0” score?</td>
<td>31</td>
</tr>
<tr>
<td>IX. Data Analysis</td>
<td>31</td>
</tr>
<tr>
<td>A. Descriptive Statistics</td>
<td>31</td>
</tr>
<tr>
<td>B. Hypotheses Testing</td>
<td>36</td>
</tr>
<tr>
<td>1. Hypothesis One</td>
<td>37</td>
</tr>
<tr>
<td>2. Hypothesis Two</td>
<td>38</td>
</tr>
<tr>
<td>3. Hypothesis Three</td>
<td>38</td>
</tr>
<tr>
<td>4. Hypothesis Four</td>
<td>39</td>
</tr>
<tr>
<td>5. Hypothesis Five</td>
<td>40</td>
</tr>
<tr>
<td>6. Hypothesis Six</td>
<td>40</td>
</tr>
<tr>
<td>7. Hypothesis Seven</td>
<td>41</td>
</tr>
<tr>
<td>C. Summary of Hypothesis Testing</td>
<td>41</td>
</tr>
<tr>
<td>D. Additional Statistical Analysis: Exploring the Factors of the Library 2.0 Score</td>
<td>42</td>
</tr>
<tr>
<td>Chapter 5 - Conclusions</td>
<td>47</td>
</tr>
<tr>
<td>I. Introduction</td>
<td>47</td>
</tr>
<tr>
<td>II. Findings of the Study</td>
<td>47</td>
</tr>
<tr>
<td>III. Discussions and Interpretations of the Research</td>
<td>47</td>
</tr>
<tr>
<td>IV. Contributions of the Study</td>
<td>48</td>
</tr>
<tr>
<td>V. Limitations of the Study</td>
<td>48</td>
</tr>
<tr>
<td>VI. Recommendations for Further Research</td>
<td>49</td>
</tr>
<tr>
<td>VII. Conclusions of the Study</td>
<td>50</td>
</tr>
</tbody>
</table>

References | 51 |
Chapter 1 - Introduction to the Study

I. Introduction

The focus of this study is on public library websites and the degree to which they implement a set of interactive features that have come to be known collectively as “Library 2.0,” and the relationship, if any, to traditional measures of public library services and resources.

The term “Library 2.0” is derived from the term “Web 2.0,” which was first used by Tim O’Reilly and Dale Dougherty of O’Reilly media in 2004 to describe the characteristics that enabled certain companies to survive the “dot-com collapse” in the fall of 2001. (O’Reilly, 2005). In the earliest days of the World Wide Web, websites were relatively static, and the roles of producers and consumers of information were rigidly defined: the webmaster was the producer, and everyone else was a consumer. The term “Web 2.0” was coined to highlight the change in perspective that took place when the boundary between producers and consumers of information became blurred—when, for example, book lovers started giving books ratings and writing their own book reviews at Amazon.com. Perhaps the most well-known example of Web 2.0 is Wikipedia, the on-line encyclopedia whose content is entirely user-generated.

Library 2.0 is the umbrella term that we use to describe the next stage in the natural evolution of libraries. Library 2.0 is completely user-centered and user-driven. (Maness, 2006) Library 2.0 may be broadly defined as the interactive on-line library, and includes any and all features of a library’s website and catalog that facilitate patron participation and collaboration. Library 2.0
includes blogs, wikis, chat reference, Facebook, Flickr, MySpace, patron and staff book reviews, reference by email, inter-library loan requests by email, feedback options, integration of the website with the on-line catalog view, access to databases, interactive events calendar, online paying of fines, and overall usability of the website.

We librarians [mostly] convinced ourselves of the value of pursuing Library 2.0. It is a natural outgrowth of traditional librarianship, and is in keeping with Raganathan’s Five Principles of delivering the proper information to its proper user. But public libraries generally get the majority of their funding from local governments that are not staffed by librarians. We annually must justify our existence to the voters and their elected representatives.

Developing a Library 2.0 presence on the World Wide Web does not always require a physical building, but that does not mean that it is without cost. At the very least, Library 2.0 requires regular updates of the library’s website to keep it fresh and up-to-date. Services such as chat reference require that a librarian is monitoring the chat widget for customers. The librarians who do chat reference require some training, and procedures need to be in place to help them deal with the competing demands of the chat widget, the telephone, email reference questions, and real-life patrons who require assistance. Supporting Library 2.0 may even require an additional full-time staff position.

Implementing Library 2.0 is not without a price. At what point does a public library start to make that move? If it is successful in providing what its users need using traditional library services, and being rewarded with adequate
funding and staffing, will it divert resources into services that its users may not think they need right now? Or will a library wait until it becomes obvious that its traditional library services are no longer fully serving its community? Do public libraries which have incorporated Library 2.0 features into their website inspire their patrons with a feeling of investment in their library, and does that emotional investment manifest itself in the form of increased (or at least not decreased) resources and services used? Teens—the “born digital” generation—do not vote on funding issues, but they do influence their parents’ support of the public library, so the degree to which the library website meets their expectations could influence resources and services.

In order to justify devoting staff time and resources to developing a Library 2.0 presence, we need to know what the payoff is in concrete terms. Patron satisfaction is nice to have, but does it translate into measurably increased use of the library? Specifically, we would like to answer the following questions:

A. Is there a relationship between a library’s financial resources and its “library 2.0” score?
B. Is there a relationship between a library’s personnel resources and its “library 2.0” score?
C. Is there a relationship between a library’s time resources and its “library 2.0” score?
D. Is there a relationship between traditional measures of library services and the “Library 2.0” score?

II. Statement of the Problem
For the purpose of this study, the term “Library 2.0” refers to observable features on a library website that allow patrons to interact with and contribute content to the library website.

This study will assign a numeric (scalar) value to each library’s website that represents the degree to which each website incorporates Library 2.0 features. This value will then be correlated to the resources available to each library in terms of money, time, and personnel, and to the level of service provided by each library as measured by the number of registered borrowers, circulation figures, the number of reference transactions, and the number of in-person visits to the library.

III. Delimitations

This study will not attempt to determine cause and effect in the Library 2.0-public support relationship. It may be that an increase in funding from a generous community is what enables a public library to upgrade its website to incorporate Library 2.0 features. Many other factors affect a community’s support for its public library and it may be that an enhanced Web presence and increased circulation, attendance, and funding have a common cause, such as a new director. Or it may be that the town’s wealth is the overriding factor in its commitment to and implementation of Library 2.0 features. Darien Library recently unveiled SOPAC 2.0, a “social” OPAC (on-line public access catalog) that seamlessly integrates the library’s catalog with its website, and allows for patron reviews, ratings, tags, and comments on the library’s holding. It is surely no
coincidence that Darien ranks third in the state in AENGLC (Adjusted Equalized Net Grand List Per Capita).

IV. Glossary

The terms defined in this glossary are taken directly from the glossary published by the Connecticut State Library in conjunction with the annual statistics. The 2007 glossary is available at

http://ct.webjunction.org/510/articles/content/1094344?printable=true.

This glossary does not include terms that refer to the independent variables in this study. The independent variables are defined, along with the dependent variables, in Chapter 3, Methods.

Circulation - The count of all library materials, regardless of format, that are charged out for use outside the library including renewals.

FTE - The number of full time equivalent staff positions the library has, calculated on the basis of 40 hours per week.

Library Visits - The total number of persons entering the library and its branches for whatever purpose. This number includes persons attending activities, meetings, and those persons requiring no staff services.

Population Served - The total number of persons residing in the town in which the library is located and any other towns for which the library provides contract services. Town populations used in the 2006-2007 statistics are from the estimates made as of July 1, 2006, by the State Department of Public Health.
Public Library - Any library that serves its residents through its outlet or outlets without charging a borrower's card fee and which receives its financial support in whole or in part from local tax funds. A public library has a facility, a collection, hours open to the public, and staff.

Reference Transaction - An information contact that involves the knowledge, use, recommendations, interpretation, or instruction in the use of one or more information sources by a member of the library staff. It includes information and referral services.

Town - Any of the 169 Connecticut towns listed in the Connecticut State Register and Manual issued annually by the Secretary of the State.

V. Assumptions

The first assumption is that funding, circulation, and door counts are reliable and valid proxies for the more intangible quality of public support and public “buy-in.”

The second assumption is that patrons who are involved with their interactive library will show their support by visiting the physical building and not just the library’s website.

The third assumption is that the people who make funding decisions for a particular library are residents of the community and have a vested interest in the success of their library.

VI. Significance of the Study
All public libraries work with limited resources; those in smaller or less affluent communities do not always have the freedom to experiment with new technologies that libraries in larger or more affluent communities enjoy. Data showing that incorporating Library 2.0 elements into the library’s web presence can be accomplished without negatively impacting either resources or traditional services would enable more libraries to justify the time and expense of updating their websites and their total web presence, including the ILS.
Chapter 2 - Literature Review

I. Introduction

This section gives an overview of some of the efforts that have been made to define Web 2.0 and Library 2.0 in terms of observable website features.

II. Web 2.0 in the Commercial World

Tim O’Reilly, founder of the line of computer books that bear his name, introduced the term “Web 2.0” and describes it as a set of principles and practices and core competencies that include trusting users and co-developers, harnessing collective intelligence, services (as opposed to packaged software), and data resources that get richer as more people use them and contribute new content of their own. (O’Reilly). Yet years after the term Web 2.0 was first used, many commercial businesses are still slow to develop what John R. Patrick, former Vice President of Internet Technology for IBM, calls “net attitude.” Patrick talks and writes about companies that embark on e-commerce without considering the 24-hours a day, 7-days a week nature of the Web, and offers the example of commercial websites with “Contact Us” pages that offer an 800 number that is only answered during “normal business hours.” (Patrick). If libraries have been slow to adopt Web 2.0 features, it’s not because they are lagging behind the business world.

III. Library 2.0 for Public Libraries

Many attempts have been made to define the term “Library 2.0.” One of the most thorough examinations of the term can be found in Walt Crawford’s
Cites & Insights for Midwinter 2006. (Crawford, 2006). Crawford identifies “Sixty-Two Views and Seven Definitions” for “Library 2.0,” not all of which are helpful, and some of which even contradict each other. He reviews the definitions and explications offered by a number of the most vocal proponents (and a few opponents) of Library 2.0, including what has been written on blogs as well as in more traditional formats. Crawford does not believe that adding Library 2.0 services necessarily requires reducing other successful services, but points out that not all libraries have the resources to develop their own Web services independently. He concludes that the term “Library 2.0” encompasses some new and not so new software methodologies and concepts about library service that “will continue to make libraries more interesting, more relevant, and better supported” if properly tracked and used.

What Web 2.0 services are libraries adopting first, and which ones should be included in a “Library 2.0 score”? Jennifer Boxen reviews the Library 2.0 literature in terms of four Web 2.0 services: blogs, wikis, podcasting, and multi-user virtual environments such as Second Life. (Boxen). A study similar to this one was just concluded by the Library Research Service. From the results of a survey of the websites of all 115 public libraries in Colorado, it was estimated that a majority of public libraries in the U.S. have a web presence (82%), on-line access to their catalog (62%), and on-line access to patron accounts (56%). Other features examined included blogs, email reference, chat reference, RSS feeds, MySpace account, on-line card signup, a Flickr account, a Facebook account, and catalog tagging. The results were presented at the 2008 Internet Librarian Conference. (Lietzau).
Birdsall discusses Web 2.0 as a social movement brought about by the interaction of improved data communications technology and a human rights social movement that expresses a “right to communicate.” (Birdsall). Libraries, of course, have traditionally been more than just a place to get books and periodicals; libraries also provide a community forum for intellectual and cultural social events, and Richard Wallis shows how the physical library as a social networking locale has evolved into a provider of on-line social networking services. (Wallis). Kevin Curran, et al, focuses on involving the user through services such as RSS feeds, podcasts, and tagging. (Curran).
Chapter 3 - Methods

I. Introduction

This chapter reviews the hypotheses, data, and methodologies used in this study.

II. Research Hypotheses

1. Hypothesis One

The first hypothesis relates a library’s financial resources to its library 2.0 score.

Hypothesis One: There is a positive correlation between a library’s per capita operating income and its L2.0 score.

Null Hypothesis One: There is no or negative correlation between a library’s per capita operating income and its L2.0 score.

2. Hypothesis Two

The second hypothesis relates a library’s time resources to its library 2.0 score.

Hypothesis Two: There is a positive correlation between the number of hours per week that a library is open and its L2.0 score.

Null Hypothesis Two: There is no or negative correlation between the number of hours per week that a library is open and its L2.0 score.

3. Hypothesis Three
The third hypothesis relates a library’s personnel resources to its library 2.0 score.

Hypothesis Three: There is a positive correlation between the number of FTEs per 1000 in the population served and its L2.0 score.

Null Hypothesis Three: There is no or negative correlation between the number of FTEs per 1000 in the population served and its L2.0 score.

4. Hypothesis Four

The fourth hypothesis relates a library’s circulation services to its library 2.0 score.

Hypothesis Four: There is a positive correlation between the number of circulations per capita and its L2.0 score.

Null Hypothesis Four: There is no or negative correlation between the number of circulations per capita and its L2.0 score.

5. Hypothesis Five

The Fifth hypothesis relates a library’s cardholders to its library 2.0 score.

Hypothesis Five: There is a positive correlation between the number of cardholders per capita and its L2.0 score.

Null Hypothesis Five: There is no or negative correlation between the number of cardholders per capita and its L2.0 score.

6. Hypothesis Six

The Sixth hypothesis relates a library’s total visits to its library 2.0 score.
Hypothesis Six: There is a positive correlation between the number of visits per capita and its L2.0 score.

Null Hypothesis Six: There is no or negative correlation between the number of visits per capita and its L2.0 score.

7. Hypothesis Seven

The Seventh hypothesis relates a library’s reference services to its library 2.0 score.

Hypothesis Seven: There is a positive correlation between the number of reference transactions per capita and its L2.0 score.

Null Hypothesis Seven: There is no or negative correlation between the number of reference transactions per capita and its L2.0 score.

III. Independent Variables

The independent variables used in this study are traditional measures of library resources and services. The data has been obtained from the 2006-2007 public library statistics published by the Connecticut State Library, based on self-reported data from Connecticut’s 169 public library systems. In order to compare very large and very small towns in a meaningful way, most of the independent variables are not used as absolute totals, but are expressed as “per capita” or “per 1000 of the population served,” and are calculated by SPSS from the raw data for population served, total operating income, circulation totals, reference transaction totals, registered borrowers, and library visits.
No attempt is made by the Connecticut State Library to verify any of the figures that each library reports. Furthermore, there is no guarantee that each library uses the same methods to arrive at its annual totals. For example, reference transactions may not be tallied the same way at every library; some libraries may count helping a patron find information on the Internet as a reference transaction, and some may count it as computer help. It is assumed that with a large enough sample, such discrepancies will tend to average out and meaningful results may be obtained.

The following independent variables were compiled from pre-existing data:

A. Resources

A number of measures of public library resources are reported to the Connecticut State Library each year. Three of those measures were selected for us in this study: money, time, and people.

1. Money

Each library's financial resources are represented by the library's net total operating income. Because the largest libraries in this study have an operating budget that is orders of magnitude larger than that of the smallest libraries, the absolute figure for net total operating income is normalized by dividing by the total of the population served. This produces a figure for net total operating income per capita, a scalar. This value is available directly from the state library statistics, but for purposes of this study it was recalculated by SPSS from the reported figures for operating income and population served.
2. Time

Each library’s time resource is measured by the number of hours per week that the library is open.

3. People

Each library’s personnel resource is measured by the number of FTEs, or full-time equivalents. For reporting purposes, the number of FTEs is based on a 40-hour workweek, even though in many towns a full-time staff member may work 35 hours. FTEs are further normalized to full-time equivalents per 1000 of the population served, in order that the largest and smallest libraries in the study may be fairly compared. (“FTEs per capita” would be a very small number in all cases, hence the factor of 1000.) This value is available directly from the state library statistics, but for purposes of this study it was recalculated by SPSS from the reported figures for number of FTEs and population served.

B. Services

Several traditional measures of public library services are reported to the Connecticut State Library each year. Four of those measures were selected for use in this study: circulation, registered borrowers, visits, and reference transactions.

1. Circulation

Circulation includes all item types, not just books. The total annual circulation is divided by the total population served to arrive at a value for total circulation per capita. This value is available directly from the state library
statistics, but for purposes of this study it was recalculated by SPSS from the reported figures for circulation and population served.

2. Registered borrowers

The total number of registered cardholders is divided by the total population served to arrive at a value for total number of registered borrowers per capita. This value is available directly from the state library statistics, but for purposes of this study it was recalculated by SPSS from the reported figures for registered borrowers and population served.

3. Library visits

The total number of library visits is divided by the total population served to arrive at a value for the total number of library visits per capita. Some libraries report an estimate for their total attendance, and some libraries have an automated mechanism that counts the number of people passing through their doors. It is assumed that any errors will average out over a large enough sample. This value is available directly from the state library statistics, but for purposes of this study it was recalculated by SPSS from the reported figures for number of visits and population served.

4. Reference transactions

The total number of reference transactions is divided by the population served to arrive at a value for number of reference transactions per capita. Each library may have a different method for categorizing and counting reference transactions. It is assumed that these discrepancies will average out over a large
enough sample. This value is available directly from the state library statistics, but for purposes of this study it was recalculated by SPSS from the reported figures for reference transactions and population served.

IV. Dependent Variables

A single dependent variable was defined for this study. The “Library 2.0 score,” or “l2score” as it is shown in the tables in the Results chapter, is the total of the number of features found on a particular library website that are generally considered to be essential or important “Library 2.0” features. Each of the following features was scored as either “present” (1) or “absent” (0). The sum of all the features is the website’s ‘l2score.’ The minimum l2score is 0 (no Library 2.0 features) and the maximum l2score is 15 (all the features). The individual features that were examined are as follows:

A. Blogs

For purposes of this study, a blog is defined as any webpage directly linked to the library’s website that features short “news” items in chronological order, with the newest items at the top of the page. Only the first blog received a point and no additional points were awarded for additional blogs. No point was awarded if a blog did not exist or could not be found.

If a blog exists, is it current? The purpose of a library blog is to keep patrons up-to-date on library news and events. Ideally a new blog posting appears at least once or twice each week; less than that and patrons may start to lose interest. If the blog has been updated within the last two weeks, a point was awarded.
If a blog exists, is there an RSS feed for new posts? Various suggestions have been put forth to explain what “RSS” stands for—Really Simple Syndication and Rich Site Summary, among others. RSS defines rules for listing information about new content added to a website, such as the title, link and a short description (or in some cases the full body of the content), which the site publishes as an XML file at a specific URL. This file can then be read and combined with feeds from other sites by news aggregators, which display the consolidated information either on a user's desktop or on a website. Instead of the user having to visit each of his or her favorite websites to see if there is any new content, new content is “pushed” to the user. Blog services such as Wordpress and Blogger automatically generate an RSS feed. An RSS feed can also be generated “manually” by editing the XML file. One point was awarded if the blog had an RSS feed; no point was awarded if the blog did not have an RSS feed or if one could not be found.

A blog is a social networking device that offers two-way (actually many-way) communication between the blog’s author and the blog’s readers, who in turn become authors when they write comments to the blog which can then be read by the blog’s author and all the other readers of the blog. The blog owner may choose to disable comments, but doing that tends to defeat the purpose of the blog. One point was awarded to the website if the blog had one or more comments within the last six months. The lack of comments on a library blog can mean many things, and this study makes no attempt to interpret the meaning of either the presence or absence of comments.
B. Email Reference

Does the library offer reference services via email? A point was awarded either if the website stated an email address to which reference questions could be addressed or if a form was provided for submitting reference questions. No point was awarded if an email address or a form could not be found.

C. Chat Reference

Does the library offer reference services via IM (Instant Messaging)? The availability of instant messaging may be signaled in two ways: IM addresses may be prominently displayed or a chat widget (such as a Meebo widget) may be provided, usually, but not always, on the contacts page. A point was awarded if chat reference of any type was offered.

Providing a chat reference service is a labor-intensive feature of a library website. It requires a reference librarian to monitor the chat “rooms” while at the same time serving patrons in person and on the telephone. Some training is usually required and procedures need to be in place to define who gets priority. An additional point was awarded if a reference librarian was online and monitoring the chat room during normal library hours.

D. Photo/Video Sharing

A point was awarded if the library website had a link to Flickr, PhotoBucket, YouTube, or any other photo- and/or video-sharing service that allows users to contribute content and to comment on each other’s creations. The
purpose of the photo- or video-sharing could be anything from pictures of the latest programs to tutorials on using the catalog.

E. Social Networking

A point was awarded if the library had a presence on a social networking service such as MySpace or FaceBook. An additional point was awarded if the library’s account was current; that is, if an update had been posted within the last week.

F. Events Calendar

Patrons won’t come to library programs that they don’t know about. A point was awarded for the presence of an up-to-date events calendar, whether in the form of a traditional calendar page, or a chronological list of coming events, or any other form.

G. Site Search

Of course we try to design library websites so that information is easy for the user to find. And Library 2.0 is all about the user. But no website architecture can satisfy all of the users all of the time, so we have site search. There are numerous free site search services, and after the initial setup there is no additional effort required to keep it current. A point was awarded if a site-wide search function was found.

H. Teens

A point was awarded if the library website included a Teen page. This was not in the original list of factors that comprised the Library 2.0 score, but was
added after the examining the first ten websites and noting with surprise that several had no mention of teens at all. Teenagers are members of the “born digital” generation, and it seemed likely that omitting them from the website could predict a lower Library 2.0 score, so this was a way of capturing that data, even though it seems a little self-referential to include it in the Library 2.0 score.

For the same reason, the presence or absence of a teen librarian, identified by name and given contact information such as an email address or a telephone number, was also included in the Library 2.0 score.

I. Webmaster

A point was awarded for the presence of contact information for reporting problems with or questions about the website, whether that person was identified as the “webmaster” or not. Library 2.0 as defined in this study is about being patron-centered, which includes being responsive to patrons, whether that means fixing a broken hyperlink or answering a question about using the subscription databases.

J. Library 2.0 Score

The dependent variable referred to as the “Library 2.0 score” is calculated by SPSS, and is the total of all the “present” features that were discussed in this section.

V. Sample Size Analysis

Connecticut has 169 towns, each of which has its own independent library system. Of those 169 libraries, 46 were sampled for this study, or about 27%. The
46 library websites that were examined were selected as follows. Twenty-six libraries were selected for this study because they belong to the same consortium: Library Connections, Inc. Ten libraries were selected because they were rated the top ten towns in Connecticut in terms of AENGLC rank (Adjusted Equalized Net Grand List Per Capita, a measure of town wealth calculated annually by the State Department of Education, Grants Management Division), which factors in the level of adult education, health services, school construction, and transportation. The final ten libraries were selected because they are stand-alone libraries—not belonging to a consortium—and ranked high in terms of total operating budget.

For purposes of this study, no distinction has been made between public libraries that are operated by an association, and municipal public libraries that are a unit of the town government.

When there is more than one library in a town, the statistics used are those that have been reported for the principal library.

VI. Data Collection Procedures

Data for the independent variables was pre-existing data obtained from the 2006-2007 annual summary reports issued by the Connecticut State Library and published on WebJunctionCT.org.

Data for the dependent variable was obtained by examining the website of each library in this study and comparing it to a checklist of Library 2.0 features. While no time limit was set or tracked, generally each website was visited for no more than 10 minutes. The following checklist was used to score each website.
Checklist for Scoring “Library 2.0” Score

Name of Library: ______________________________
URL of Library Website: _________________________
Date and time observed: __________________________

<table>
<thead>
<tr>
<th>Feature</th>
<th>Present/True</th>
<th>Absent/False</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blog current?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSS feed for blog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments from patrons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chat reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chat widget online</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo/video sharing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social networking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Events calendar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site search</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teen page</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teen librarian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webmaster</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VII. Statistical Analysis Procedures

Analysis of the data gathered was done using a 30-day trial edition of SPSS Statistics 17.0 (Statistical Package for Social Sciences).

A zero-order correlation matrix was calculated using the independent variables to determine whether any significant correlations exist among them.
A zero-order correlation matrix was calculated to determine the relationships between the dependent variable and each of the independent variables.

The distribution of the Library 2.0 scores was calculated in order to look for any patterns or clusters.

The frequency of each factor that comprises the Library 2.0 score was charted in order to determine what Library 2.0 features were deemed to be most important to the majority of Connecticut libraries. A future study may use this information to assign a weighting factor to each Library 2.0 feature.
Chapter 4 - Results

VIII. Introduction

This chapter reviews the results of the study. This section is organized as follows:

- descriptive statistics of the independent and dependent variables;
- a zero-order correlation matrix showing the correlations among the independent variables;
- a zero-order correlation matrix to test the L2score hypotheses; and,
- the results and discussion of the hypotheses testing.

The purpose of this study was to examine the relationship between measures of a library’s resources in terms of time, money, and personnel, and the library’s implementation of various interactive and collaborative features that have come to be known by the term “Library 2.0.” A quantity called “l2score” was constructed for each library in the study by examining the library’s website and awarding a point for each of several features such as: a blog that patrons can respond to with their comments; chat (instant message) reference; e-mail reference; and an e-mail address for comments about the website itself, usually, but not always, the address of the “webmaster.” Because the involvement of teens is vital to most libraries’ continued existence, and because teens are “digital natives,” additional points were awarded to libraries that had a separate and distinct area of the website devoted to teens, and that identified a teen librarian by name.
The following research questions, initially posed in Chapter 1, are examined in this chapter.

1. Is there a relationship between a library’s financial resources and its “library 2.0” score?
2. Is there a relationship between a library’s personnel resources and its “library 2.0” score?
3. Is there a relationship between a library’s time resources and its “library 2.0” score?
4. Is there a relationship between traditional measures of library services—circulation, cardholders, reference transactions, and visits—and the “library 2.0” score?

IX. Data Analysis

A. Descriptive Statistics

Table 4.1
Summary Statistics: Library Resources
(Independent Variables; n=46)

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per week</td>
<td>25</td>
<td>72</td>
<td>57.39</td>
<td>10.398</td>
</tr>
<tr>
<td>Income per capita</td>
<td>25.52</td>
<td>182.20</td>
<td>61.9767</td>
<td>34.07436</td>
</tr>
<tr>
<td>FTE per capita</td>
<td>.34</td>
<td>1.87</td>
<td>.8251</td>
<td>.36330</td>
</tr>
<tr>
<td>I2score</td>
<td>0</td>
<td>14</td>
<td>5.72</td>
<td>3.494</td>
</tr>
</tbody>
</table>

Table 4.1 reports the summary statistics for the independent variables that represent library resources of time, money, and personnel. The hours per week
that a library is open varies from a minimum of 25 hours to a maximum of 72 hours, with an average (mean) of 57 hours and a standard deviation of 10. The total operating income per capita varies from a minimum of $25.52 to a maximum of $182.20, with a mean of $62 and a standard deviation of $34. The number of FTEs (Full-Time Equivalent positions, normalized to a 40-hour week) per 1000 persons in the population served varies from 0.34 to 1.87, with a mean of 0.83 and a standard deviation of 0.36.

Table 4.2
Summary Statistics: Library Services
(Independent Variables; n=46)

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cards per capita</td>
<td>.26</td>
<td>1.06</td>
<td>.5209</td>
<td>.19414</td>
</tr>
<tr>
<td>Circ per capita</td>
<td>2</td>
<td>36</td>
<td>11.97</td>
<td>7.007</td>
</tr>
<tr>
<td>Ref per capita</td>
<td>.00</td>
<td>7.30</td>
<td>1.3473</td>
<td>1.21958</td>
</tr>
<tr>
<td>Visits per capita</td>
<td>1.73</td>
<td>22.34</td>
<td>8.3623</td>
<td>4.75157</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2 reports the summary statistics for the independent variables that represent traditional measures of library services. The number of registered cardholders per capita varies from a minimum of 0.26 to a maximum of 1.06 (someone out there has more than one library card!), with a mean of 0.52 and a standard deviation of 0.19, so only about half of all eligible Connecticut residents hold a current library card. The number of circulations per capita varies from a minimum of 2 to a maximum of 36, with a mean of 12, and a standard deviation of 7. Circulation totals include all materials. The number of reference transactions per capita varies from 0 (some libraries did not report reference
transaction figures) to 7.3, with a mean of 1.3 and a standard deviation of 1.2. The number of library visits per capita varied from a minimum of 1.73 to a maximum of 22.34, with a mean of 8.36 and a standard deviation of 4.8. The data reported for total number of library visits may be actual counts or estimates.

Table 4.3
Summary Statistics: Library 2.0 Score
(Dependent Variable; n=46)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>46</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>5.72</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>3.494</td>
</tr>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 4.3 shows the summary statistics for the dependent variable in this study, the “Library 2.0” score. Out of a possible 15 points, the L2.0 score ranged from 0 to 14, with a mean of 5.7 and a standard deviation of 3.5.
Table 4.4 shows the frequency for each of the values of l2score that were obtained from the 46 library websites that were examined. Eight websites exhibited a score of 9; six websites earned a score of 1, 3, or 6; and five six websites earned a score of 5. Six websites scored 10 or more points: Westport, Fairfield, Farmington, Cheshire, Stratford, and Darien, which tops the charts at a score of 14. Darien recently rolled out their new website, which is based on the SOPAC 2.0 framework and which incorporates all of the Library 2.0 features that were examined for this study, and more that were not, such as patron reviews and ratings. Darien’s website failed to score a perfect 15 in this study only because the
chat reference widget showed that no one was currently logged into the IM account to monitor it.

Table 4.5a
Zero-Order Correlation Matrix of Independent Resource Variables

<table>
<thead>
<tr>
<th></th>
<th>Income per capita</th>
<th>Hours per week</th>
<th>FTE per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income per capita</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.172</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td></td>
<td>.127</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Hours per week</td>
<td>Pearson Correlation</td>
<td>.172</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.127</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>FTE per capita</td>
<td>Pearson Correlation</td>
<td>.834**</td>
<td>.024</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.000</td>
<td>.436</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>46</td>
<td>46</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (1-tailed).

Table 4.5a reports the zero-order correlation matrix of the independent resource variables. The hours per week that a library is open appears to have little or no relationship to either total operating income per capita or FTEs per capita. However, total operating income per capita and FTE per capita are seen to be positively inter-correlated, probably reflecting the fact that the majority of most libraries’ operating expenses can be attributed to personnel costs.
Table 4.5b reports the zero-order correlation matrix of the independent service variables. All the library services measurements correlate with each other at a significant level, indicating that all but one can be eliminated and still produce valid results. Two libraries did not report figures for the number of library visits in 2006-2007.

B. Hypotheses Testing

There were seven hypotheses as stated in Chapter 3. Each hypothesis was tested by a zero-order correlation to determine the relationship between the independent and the dependent variable. Table 4.6a displays a matrix of zero-order correlations between the three independent variables related to library
resources and the single dependent variable. Table 4.6b displays a matrix of zero-
order correlations between the four independent variables related to library
services and the single dependent variable.

**Table 4.6a**  
Zero-Order Correlations of Independent Resource Variables and Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Income per capita</th>
<th>Hours per week</th>
<th>FTE per capita</th>
<th>I2score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income per capita</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.172</td>
<td>.834**</td>
</tr>
<tr>
<td>Sig. (1-tailed)</td>
<td></td>
<td>.127</td>
<td>.000</td>
<td>.001</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Hours per week</td>
<td>Pearson Correlation</td>
<td>.172</td>
<td>1</td>
<td>.024</td>
</tr>
<tr>
<td>Sig. (1-tailed)</td>
<td></td>
<td>.127</td>
<td>.436</td>
<td>.003</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>FTE per capita</td>
<td>Pearson Correlation</td>
<td>.834**</td>
<td>.024</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (1-tailed)</td>
<td></td>
<td>.000</td>
<td>.436</td>
<td>.104</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>I2score</td>
<td>Pearson Correlation</td>
<td>.429**</td>
<td>.399**</td>
<td>.189</td>
</tr>
<tr>
<td>Sig. (1-tailed)</td>
<td></td>
<td>.001</td>
<td>.003</td>
<td>.104</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (1-tailed).

1. **Hypothesis One**

The first hypothesis related a library’s financial resources to its library 2.0 score.

Hypothesis One: There is a positive correlation between a library’s per capita operating income and its L2.0 score.
Null Hypothesis One: There is no or negative correlation between a library’s per capita operating income and its L2.0 score.

The null hypothesis is rejected. Per capita operating income correlated positively with L2.0 score. This finding confirms the expectation that a library with more operating income would be able to afford to devote more resources to maintaining an active web presence.

2. Hypothesis Two

The second hypothesis related a library’s time resources to its library 2.0 score.

Hypothesis Two: There is a positive correlation between the number of hours per week that a library is open and its L2.0 score.

Null Hypothesis Two: There is no or negative correlation between the number of hours per week that a library is open and its L2.0 score.

The null hypothesis is rejected. The number of hours per week that a library is open correlated positively with its L2.0 score. This finding confirms the expectation that a library with more hours of operation would be able to devote more personnel resources to maintaining an active web presence.

3. Hypothesis Three

The third hypothesis related a library’s personnel resources to its library 2.0 score.

Hypothesis Three: There is a positive correlation between the number of FTEs per 1000 in the population served and its L2.0 score.
Null Hypothesis Three: There is no or negative correlation between the number of FTEs per 1000 in the population served and its L2.0 score.

The null hypothesis cannot be rejected. The number of FTEs per 1000 of population served is not very highly correlated with the L2.0 score. This finding challenges the expectation that a library needs additional personnel in order to maintain an active web presence.

Table 4.6b
Zero-Order Correlations of Independent Service Variables and Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Cards per capita</th>
<th>Circ per capita</th>
<th>Ref per capita</th>
<th>Visits per capita</th>
<th>L2 score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cards per capita</td>
<td>Pearson Correlation</td>
<td>.484** (1-tailed)</td>
<td>.304* (1-tailed)</td>
<td>.573** (1-tailed)</td>
<td>.272** (1-tailed)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>46</td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Circ per capita</td>
<td>Pearson Correlation</td>
<td>.484** (1-tailed)</td>
<td>1</td>
<td>.469** (1-tailed)</td>
<td>.880** (1-tailed)</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.000</td>
<td>.020</td>
<td>.000</td>
<td>.034</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>46</td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Ref per capita</td>
<td>Pearson Correlation</td>
<td>.304* (1-tailed)</td>
<td>.469** (1-tailed)</td>
<td>1</td>
<td>.513** (1-tailed)</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.020</td>
<td>.001</td>
<td>.000</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>46</td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Visits per capita</td>
<td>Pearson Correlation</td>
<td>.573** (1-tailed)</td>
<td>.880** (1-tailed)</td>
<td>.513** (1-tailed)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>L2 score</td>
<td>Pearson Correlation</td>
<td>.272** (1-tailed)</td>
<td>.409** (1-tailed)</td>
<td>.359** (1-tailed)</td>
<td>.417** (1-tailed)</td>
</tr>
<tr>
<td></td>
<td>Sig. (1-tailed)</td>
<td>.034</td>
<td>.002</td>
<td>.007</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>46</td>
<td>46</td>
<td>46</td>
<td>44</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

4. Hypothesis Four
The fourth hypothesis relates a library’s circulation services to its library 2.0 score.

Hypothesis Four: There is a positive correlation between the number of circulations per capita and its L2.0 score.

Null Hypothesis Four: There is no or negative correlation between the number of circulations per capita and its L2.0 score.

The null hypothesis is rejected. The number of circulations per capita correlated positively with its L2.0 score.

5. Hypothesis Five

The Fifth hypothesis relates a library’s cardholders to its library 2.0 score.

Hypothesis Five: There is a positive correlation between the number of cardholders per capita and its L2.0 score.

Null Hypothesis Five: There is no or negative correlation between the number of cardholders per capita and its L2.0 score.

The null hypothesis is rejected. The number of cardholders per capita correlated positively with its L2.0 score.

6. Hypothesis Six

The Sixth hypothesis relates a library’s total visits to its library 2.0 score.

Hypothesis Six: There is a positive correlation between the number of visits per capita and its L2.0 score.
Null Hypothesis Six: There is no or negative correlation between the number of visits per capita and its L2.0 score.

The null hypothesis is rejected. The number of visits per capita correlated positively with its L2.0 score.

7. Hypothesis Seven

The Seventh hypothesis relates a library’s reference services to its library 2.0 score.

Hypothesis Seven: There is a positive correlation between the number of reference transactions per capita and its L2.0 score.

Null Hypothesis Seven: There is no or negative correlation between the number of reference transactions per capita and its L2.0 score.

The null hypothesis is rejected. The number of reference transactions per capita correlated positively with its L2.0 score.

C. Summary of Hypothesis Testing

The relationships between seven reported measures of a library’s resources and services, and an observed measurement of the degree that it maintains an active presence on the Web, were examined through correlations between seven independent variables and one dependent variable. Out of the seven hypotheses tested, six correlations were found to be significantly positive. In this section, the results are summarized in light of the purpose of the study, and as a foreword to the additional analysis of the data.
• Two independent variables measuring library resources—total operating income per capita and FTE per capita—were found to be highly correlated positively, such that either variable could be substituted for the other without affecting the results of the zero-order correlation with the dependent variable.

• Four independent variables measuring library services were found to be highly correlated positively, such that any one of the four variables could be substituted for the other three without affecting the zero-order correlation with the dependent variable.

• Six independent variables were found to correlate positively with the dependent variable such that any one of the six variables could be used to predict an L2.0 score.

D. Additional Statistical Analysis: Exploring the Factors of the Library 2.0 Score

**Frequencies of Factors Comprising the Dependent Variable**

**Table 4.7a**

<table>
<thead>
<tr>
<th>Webmaster</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>19</td>
<td>41.3</td>
<td>41.3</td>
<td>41.3</td>
</tr>
<tr>
<td>absent</td>
<td>19</td>
<td>41.3</td>
<td>41.3</td>
<td>41.3</td>
</tr>
<tr>
<td>present</td>
<td>27</td>
<td>58.7</td>
<td>58.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.7a shows that contact information for the webmaster was identified on 59% of the websites.
Table 4.7b shows that a teen librarian was identified on 52% of the websites.

Table 4.7c shows that 67% of the websites had pages devoted to teen activities.

Table 4.7d shows that 28% of the websites have a site search feature.
Table 4.7e shows that 83% of the websites have an up-to-date events calendar. In many cases, an online events calendar even allowed for patrons to sign up online rather than calling, emailing, or signing up in person.

Table 4.7f shows that 13% of the websites have some kind of social networking feature, or offer a link to a library account on an external social networking service.
Table 4.7g shows that 26% of the websites have some kind of photo or video sharing feature, or offer a link to a library account on an external photo/video sharing service.

<table>
<thead>
<tr>
<th>Table 4.7h</th>
<th>Email Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Valid</td>
<td>Absent</td>
</tr>
<tr>
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<td>present</td>
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<tr>
<td>Total</td>
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</table>

Table 4.7h shows that 63% of the websites offer reference services by email. In reality that number is probably higher, but only the websites that explicitly stated that reference questions could be submitted by email were given a point for this factor.

<table>
<thead>
<tr>
<th>Table 4.7i</th>
<th>Blog</th>
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<td>Frequency</td>
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<td>Valid</td>
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Table 4.7i shows that 46% of the websites have some kind of blogging feature, or offer a link to a library account on an external blogging service.
Most of the libraries sampled do not have accounts at photo/video sharing or social networking sites, or else they are not linking to it from their website. This may reflect the fact that these features require a high degree of staff participation in order to keep them current.

The majority of library websites examined: had a link to a webmaster, or to someone to whom comments about the website could be addressed; listed a teen librarian by name and gave contact information; and devoted one or more pages on the website just for teens, teen events, teen book reviews, and other teen-centric activities. A visual scan of the dataset suggests that websites that have these three elements also have a higher overall L2.0 score.
Chapter 5 - Conclusions

I. Introduction

This chapter concludes this report with a summary of the findings of the study, discussions and interpretations of the research, discussions of the contributions and limitations of the study, recommendations for further research, and some final conclusions.

II. Findings of the Study

There is a significant positive correlation between six of the seven independent variables and the computed dependent variable “Library 2.0 score.”

Two of the three independent variables measuring library resources are highly correlated, which suggests that one of the variables can be omitted without invalidating the test results.

All four of the independent variables measuring traditional library services are highly correlated, which suggests that all but one can be omitted in future studies without invalidating the test results.

III. Discussions and Interpretations of the Research

While it may often be thought that implementing a Library 2.0 presence on the Web will divert resources from traditional library services, the data suggests otherwise. Resources are not being diverted from services such as in-person reference, and library visits, the number of cardholders in the population, and the total circulation do not seem to be negatively impacted by high Library
2.0 scores. Libraries are finding ways to integrate the Library 2.0 services into their traditional work.

The presence or absence of a Teen page on the website, and of an identifiable teen librarian, appears to be a good predictor of whether the library website will have a good Library 2.0 score. While cause and effect cannot be determined with this data, we may speculate that library directors who recognize the importance of the “born digital” generation to the continued existence of the public library will also approve of and encourage the use of social networking tools.

IV. Contributions of the Study

V. Limitations of the Study

This study represents only a snapshot in time. The Web, by its very nature, is always changing, and one of the tautologies of Web 2.0 is that everything is in a perpetual state of beta testing. Library websites are no exception, and the same study conducted six months from now could yield significantly different results.

The Library 2.0 features being looked for may be present but the researcher could not find them. Some Library 2.0 features may not be evident to non-card-holders.

The features may be present, but they are so well integrated into the website that the researcher did not recognize them.

No cause and effect relationship can be deduced from the data. This would require a more extensive study that included surveying the directors and
webmasters, and possibly other personnel, at the subject libraries to find out why they made the choices that they have made with regard to their websites.

VI. Recommendations for Further Research

Several topics for further research suggest themselves. Indeed, in hindsight the present study was merely a pilot study for a number of further studies.

- Add more libraries to the study—ideally all 169 Connecticut public library websites should be surveyed.

- This study looked for specific features such as blogs and chat reference. A future study should recognize that there may be more than one way to implement the same kind of interactivity. For example, the website may not directly allow patrons to review and rate books that they have read, but the library may subscribe to a service such as BookPage which will offer those features.

- Survey the libraries to find out if they have begun to collect statistics on their website usage. If so, find out which statistics they are monitoring. Develop a standard for measuring website usage and promote the introduction of these statistics into the annual Connecticut State Library reports.

- Finally, conduct a survey of library webmasters—or library directors, if no webmaster is identified—to find out why things are the way they are and what direction they are going in. If the library has not yet
stepped out into the world of Library 2.0, is it because of lack of resources, lack of interest from the community, lack of technical expertise, or is there some other reason? What is their vision of the role of their library 5, 10, and 20 years from now?

VII. Conclusions of the Study

Library 2.0 correlates to traditional measures of library service, and may be seen as the natural evolution of what libraries have always done, which is to be responsive to their users.

Acknowledgement of teens as library users seems to go hand in hand with the implementation of Library 2.0 features.

The majority of Connecticut libraries are experimenting with tools for offering their patrons an interactive experience.

The library has always been a community gathering place, and will continue to be so. In addition to its physical manifestation, it will also have a virtual presence in the lives of its patrons and users.

“It does not require much imagination to begin seeing a library as a social network itself. In fact, much of libraries' role throughout history has been as a communal gathering place, one of shared identity, communication, and action. Social networking could enable librarians and patrons not only to interact, but to share and change resources dynamically in an electronic medium [...] Of all the social aspects of Web 2.0, it could be that the social network and its successors most greatly mirror that of the traditional library. Social networks, in some sense, are Library 2.0. The face of the library's web-presence in the future may look very much like a social network interface.” (Maness, 2006).
References


