Serving Library Users from Low-income Communities: Promoting Digital Literacy to eSociety

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ABSTRACT
This study investigated the inclusion of low-income community users by surveying digital information literacy, in term of their attitudes toward electronic media and Internet-based reading. Two hundred thirty-eight public library users from ethnic diverse communities participated in this survey. Younger readers found reading online as easy as reading print books, while older library users preferred print media. Lower-income users were able to access the Internet mainly from libraries and reported slightly positively to online reading. Reading attitudes toward digital resources by residents of poorer urban communities did not vary by gender, contrary to common sense that women outread men. The implications of this result are explored; for example, being unemployed may allow underrepresented and minority users supplemental time for leisure reading. This study suggests approaches for iSchools and graduates to service diverse communities, promote digital information literacy, and bridge digital divide in information society.

Keywords
Digital literacy, online reading, information society, underserved users.

1. INTRODUCTION
Issues on eSociety drew attention from both professionals and researchers in recent years. For example, the International Conference on Information Society (http://www.i-society.eu/) sponsors an incoming track on eSociety which covers topics on social inclusion, intellectual property rights, computer-mediated communication, and social software.

One important area in eSociety research is the inclusion of underrepresented groups in information services, particularly promoting digital literacy to diverse users. Recent studies reported the influence of Internet to reading and literacy in the US. For example, the National Endowment of the Arts (2004, 2007) concluded that reading among the youth also dropped due to the possible influence of digital entertainment media. Several studies have reported similar trends globally. In the United Kingdom, annual book loans have been dropping since 1980, due mainly to the decrease in circulation of nonfiction and adult fiction (Grindlay and Morris, 2004). The widespread use of computers and of the Internet is likely a factor of the change of reading behavior (p. 609), considering the Internet facilitates reading as both a leisure activity and a source of information, and has become an alternative to print reading in the industrialized world.

While past research discussed how libraries championed and helped create digital resources to give users convenient access from a plurality of consoles and whereabouts (Bertot and McClure, 1999; McClure, Bertot, and Beachborad, 1996), few studies examined the changes in online reading by users from low-income communities. This study investigated how users from diverse demographic background reacted to ease of reading on the Internet. Research related to this topic can enhance knowledge of digital reading literacy, help to understand how information society evolve, and provide guidance on inclusion of underserved population to information society. This paper examined the concept of “ease of online reading,” which is defined as how accessible or inaccessible electronic-based text is to the reader. The following are the research questions:
1. Are library users’ perceptions of ease of online reading affected by demographic differences within low-income communities?
2. What is the influence of digital media on reading literacy in low-income communities?

2. REVIEW OF RELATED RESEARCH
2.1 Information Services to Diverse Communities
Reading literacy studies traditionally focused on reading cultures; while the core values of reference and information services include reader’s advisories and providing users a variety of feedback vehicles (Pawley, 2002; Wiegand, 1998). Previous research by librarians and library scholars indicated that public libraries helped users from low-income communities experience their initial and ongoing access to electronic resources. Libraries also fostered reading and provided community networking opportunities on site such as storytelling periods for children, book fairs, and author readings. Chatman (1985a) found low-income library users to be relatively low consumers of television and, therefore, to prefer print media. They perceived print as the most credible and television as the least credible of mass media formats. Pettigrew, Durrance, and Vakkari (1999) reviewed the role of public libraries in community information services and urged for increased research on how networked community information influences citizens’ daily lives, and how it affects their overall information-seeking behavior. Bishop and Bauer (2002) investigated what strategies (such as providing young
adults more food to eat and giving them inviting surroundings) and programs (such as an overnight slumber event: “Library Survivor”) bring child and teenage readers to public libraries. The authors identified availability of the Internet, opportunities to volunteer, and capability to support academic research as libraries’ most important attractants to users of youth (p. 42).

Bertot, McClure, and Ryan (2002) summarized the importance of implementing ideal technologies and training library staff to be able to assist patrons, so that public libraries can continue to function as key institutions for diminishing the digital divide. Accessing technology is only a first and relatively low-level step in the information literacy process. Once individuals gain access, they need then minimally to comprehend how to navigate the content in order to locate, retrieve, and evaluate useful information, and to synthesize this information in order to solve their information problem (Bertot, 2003). The digital divide was described by Bertot as multidimensional and complex, and extends beyond access to technology.

Researchers also reported strategies to engage people from lower-income communities in reading. Usherwood and Toyne (2002) surveyed both users and nonusers of public libraries and found that reading literature is a special activity that satisfies certain needs: escaping from reality, relaxing, bringing in knowledge, and assisting with personal development. McLoughlin and Morris (2004) examined the role of public libraries in advancing reading in adults having poor literacy, in a case study in the United Kingdom. They summarized strategies such as the use of reading groups, audio books, themed activities and events, and partnering with other libraries to offer rooms and spaces for “Pleasure of Reading” courses originating from local community colleges (p. 42). For example, Krashen and Shin (2004) detected that children from high-income families read more over the summer because of their access not only to public libraries, but also, in cases, to school and university libraries, as well as to their own or to their parents’ home bookshelves. They discovered that summer after summer, poorer children did not have that opportunity and, over several years, fell behind in reading level. They suggested that public libraries proactively invite families to the library during periods of school adjournment, as well as increase their collections and tailor their summer hours to keep their services available to children of poverty. Williams (2005) related her experience on serving the financially challenged in Columbus, Ohio, particularly “Spontaneous Reading,” in which librarians approach children or children do librarians, resulting in a librarian reading a book to children or even to one child. “Spontaneous Reading” attempts to be a model to families, showing parents and guardians how to engage in dialog with their children about books, all to help break the cycle of illiteracy and poverty.

### 2.2 Digital Media and Reading Literacy

According to the transaction theory, a person interacts with reading content like a river connects with its banks, each working its effects upon the other (Rosenblatt, 1986, 1994; Rosenberg, 1996). Digital media are different from print reading materials. McEnaney (2006) stated that users picture online documents as networks of nodes and links. This requires that readers define text structure by choosing links, which are based on readers’ internal knowledge structure rather than on an author-defined text-structure (McEnaney, 2003, 2006; Rosenberg, 1996).

Digital media, identified by the National Endowment for the Arts (2004) as “TV, Internet, and computer games,” have been recognized as important factors impacting leisure reading. Voluminous research points to how TV influences reading (Salomon, 1979; Reinking, 2001; van der Voort, 2001). Chatman (1985b) discovered that users from low-income communities usually do not have time for leisure activities, with reading being rated as one of the top leisure activities. She found low-income users’ time for avocations, such as reading or visiting the library, usually coincided with the day’s end, after other obligations had been met. Chatman and Pendleton (1995) disqualified mass media (TV and newspapers) as relevant information sources, considering them instead as sources of recreation, mere “escape and diversion” instead of “information” for the poor (p. 137). They concluded that economically disadvantaged members of society have a gap in second-level knowledge, or “knowledge about that which they do not know” firsthand, or are able to relate directly to personal or local circumstance (p. 143).

While watching TV and playing computer games might often amount to “learning,” each may have different purpose, procedure, or cognitive effect other than reading, of either Internet or print reading. Hughes-Hassell and Lutz (2006, p.41) reported that middle school students who do not enjoy reading would rather play video games (44%) or watch TV (56%). This may be because students today are technology savvy, spending significant hours surfing the Internet, watching TV, and playing video games. They are able to multi-task among several Web sites and technologies; browse online, search for information, chat, and email, while using the same computer to do homework, talking and/or text messaging or playing games with their digital phones. They also expect to receive information quickly and efficiently (Lacina, 2005, p. 119). The digital age has led to changes in how young people think, learn, give, receive and create information, and how they interact with resources. To accommodate such changes, authors, illustrators, editors, designers, and publishers have been producing books that integrate the digital-age characteristics of interactivity, connectivity, and accessibility (Dresang, 2002; Dresang and McClelland, 1999).

The Internet may already have changed readers’ attitudes towards presentation and format. Recently unveiled formats, such as online episodes/chapters of Internet-published books, or PDF files of articles and books, may have accustomed readers to viewing pages electronically. Also, the Internet is an operative tool for searching for information; however, concern is growing that the Internet might isolate people socially, and that youths may opt to converse electronically with their friends and to surf, rather than to use the Internet for reading. Schmar-Dobler (2003) found readers applied to their Internet reading previously-adopted
strategies for reading print text; at web pages one might read the
to determine information applicability and whether to read on for completion. She further recognized
that when reading on the Internet “guiding questions must be in
the forefront of the reader’s mind” or readers becoming “lost or
side-tracked is likely” (p. 84).

However, while the Internet bridges the gap of the digital divide,
recent studies signify that excessive use of the Internet might reduce
work efficiency. Using data from a national random
sample of American adults (N = 4,113), Nie and Erbring (2002)
discovered that the more time people spent using the Internet, the
more they lost contact with their social environment and the more
they watched TV. Digital media may have changed regular users’
reading behaviors by increasing “browsing/scanning,” increasing
“on-time reading,” and decreasing “in-depth,” “sustained” reading
(Liu, 2005).

Understanding how economically-disadvantaged patrons use the
Internet and whether digital media, especially the Internet,
impacts their leisure reading, is critical in advancing literacy; and
it is literacy that best generates a pathway for an individual to rise
out of poverty. Such digital literacy may help to counteract the
disparities in the Internet use among different social-economic
groups (Gui, 2007). Once a low-income resident gains
competence in reading, he or she can then decipher food labels,
follow written instructions and precautions, and write responses
on job and college applications. Then, once having become
strengthened readers, low-income residents’ can enjoy more
promising futures which could include careers or better-paying
occupations; enter into training programs or colleges; broaden
knowledge of community, municipality, nation, and world; create
or continue businesses; and practice reading to their children or
elders. Ross (2003) urged researchers to explore how readers
actually engage in different media, the reasons they choose one
format over another, and their preferences among formats.

Findings from such studies may help to secure public library
funding for reading materials and for promote reading literacy to
diverse and/or underprivileged communities. More reviews of
literature related to reading and literacy can be located in works
(2005), Mackey (2007), and Du (2009).

3. METHOD
Prior to this study, the author has conducted two preliminary
studies to refine the questionnaire used in this study. The
questionnaire allows respondents to rate each question item using
Likert scale (1 = strongly disagree, 5 = strongly agree). The scale
was created by Likert (Babbie, 2001) and is commonly treated as
an interval level measure in the social sciences (Gross & Saxton,
2006). The questionnaire generated a moderate reliable score in
previous studies (Cronbach alpha = .748).

This study surveyed library patrons from four of the twenty-three
branches of the in a mid-west urban library and the central branch
of a suburban library. Among the four public library branches,
one in the northwestern city had mostly Hispanic and Middle
Eastern users, while three in the southern and eastern regions
hosted African-American communities. The suburban library had
more low-income European Americans. The study’s limitation
was its stratified convenience sampling rather than random
sampling. The date of library visits and their locations were
chosen with the help of library administrators to best represent
multiple ethnic groups. Research assistants distributed
questionnaires directly to library patrons in library buildings.

After collecting the data, the research team calculated descriptive
statistics and conducted analysis of variances (ANOVA) to see
how different grouping information, such as age and income level
influenced participants’ attitudes toward reading online. The
dependent variable was library patrons’ perception of online
reading difficulty, and the independent variables were age groups,
and income levels. ANOVA tests examined four null hypotheses:

H1: There is no statistically significant difference in library
patrons’ perception of ease of online reading among various age
groups.

H2: There is no statistically significant difference in library
patrons’ perception of ease of online reading among various
income levels.

H3: There is no statistically significant difference in library
patrons’ perception of ease of online reading by difference in
gender.

H4: There is no statistically significant difference in library
patrons’ perception of ease of online reading among various
ethnicities.

4. RESULTS
Two hundred thirty-eight library patrons completed
the questionnaire during their library visits. Among them,
87 (38%) were male and 141 (62%) were female. Twenty-
eight percent were 18 to 25 years, 24% were 26 to 35; 16%
were 36 to 45, and 19% were 46 to 55. Only 13% were 56
or older. Among the participants, 167 (73.2%) claimed to
be urban, and 26.8% claimed to be suburban or rural, albeit
probably all should be considered “urban” as the term is
broadly defined. Fifty-six percent (or 124) of the
participants were African American, 22% (51) Caucasian,
14% (31) Hispanic, and only 6% (17) interracial or other.
The surveyed area possessed a relatively high
unemployment rate. Hence, this study surveyed income
level, indicated by average annual incomes of the
participants of those neighborhoods. Twenty-eight percent
of the people did not report. Twenty-one percent were
living $10,001 or below, 28% between $10,001 and
$30,000, and 29% between $30,001 and $50,000. The
$50,001 or above accounted for only another 22%. Most
participants commented that they did not have a computer
at home, and used library computers to access the Internet.

Table 1 illustrates descriptive statistics of answers to the
first 13 questions asked in the Appendix. Answers were
clustered based on mean scores (1 = strongly disagree, and
5 = strongly agree). Positive answers include Questions 6
(how video impacts reading), 10 (parents’ influence), 11
(volunteering in libraries), and 12 (summer reading
programs). Negative answers include Questions 2 (Internet
browsing), 4 (email), and 7 (too many books). Neutral answers include Questions 1 (TV), 3 (Internet to find books), 5 (chat), 8 (movies), 9 (sports), and 13 (reading online).

Table 1. The Influence of Digital Media on Reading Literacy

<table>
<thead>
<tr>
<th>Questions</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Answers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A6. Video impacts reading</td>
<td>3.91</td>
<td>1.19</td>
<td>-.96</td>
<td>.05</td>
</tr>
<tr>
<td>A10. Parents’ influence</td>
<td>4.01</td>
<td>1.25</td>
<td>-1.2</td>
<td>.37</td>
</tr>
<tr>
<td>A11. Volunteering in libraries</td>
<td>3.86</td>
<td>1.07</td>
<td>-1.95</td>
<td>-.08</td>
</tr>
<tr>
<td>A12. Summer reading programs</td>
<td>4.2</td>
<td>1.01</td>
<td>-1.45</td>
<td>2.0</td>
</tr>
<tr>
<td>Negative Answers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2. Internet browsing impacts reading</td>
<td>2.51</td>
<td>1.33</td>
<td>.01</td>
<td>-1.38</td>
</tr>
<tr>
<td>A4. Using e-mail impacts reading</td>
<td>2.52</td>
<td>1.36</td>
<td>.48</td>
<td>-1.02</td>
</tr>
<tr>
<td>A7. Too many books to choose from</td>
<td>2.28</td>
<td>1.30</td>
<td>.73</td>
<td>-.59</td>
</tr>
<tr>
<td>Neutral Answers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1. Watching TV impacts reading</td>
<td>3.01</td>
<td>1.44</td>
<td>.01</td>
<td>-1.38</td>
</tr>
<tr>
<td>A3. Using the Internet to find books</td>
<td>2.58</td>
<td>1.30</td>
<td>.41</td>
<td>-.90</td>
</tr>
<tr>
<td>A5. Using Chat impacts reading</td>
<td>2.77</td>
<td>1.45</td>
<td>.17</td>
<td>-1.32</td>
</tr>
<tr>
<td>A8. Watching movies impacts reading</td>
<td>2.95</td>
<td>1.33</td>
<td>.11</td>
<td>-1.05</td>
</tr>
<tr>
<td>A9. Sports impact reading</td>
<td>2.97</td>
<td>1.17</td>
<td>-.02</td>
<td>-.71</td>
</tr>
<tr>
<td>A13. Reading online same as print books</td>
<td>2.95</td>
<td>1.33</td>
<td>.11</td>
<td>-1.05</td>
</tr>
</tbody>
</table>

Note: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

In order to answer Question 1, one-way Analysis of Variance (ANOVA) was conducted to estimate the effects of Gender and Income Level on Ease of Online Reading. Table 2 displays the ANOVA results.

Table 2. Ease of Online Reading by Age Groups

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>MS</th>
<th>Sig.</th>
<th>eta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>28.69</td>
<td>5</td>
<td>5.74</td>
<td>.01*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>364.68</td>
<td>220</td>
<td>1.66</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>393.34</td>
<td>225</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Statistically significant at .01 level. Levene’s Test of Homogeneity was statistically nonsignificant at .93, which secures the use of ANOVA.

From Table 2, the ANOVA yielded a statistical significance: a p-value of .01. ANOVA is a statistical technique to estimate the difference between means of groups. A statistically significant p-value indicates statistically significant differences among the groups. Because statistically significant difference is influenced by sample sizes, effect sizes should be reported. In this study, the effect size is .07 in terms of Eta square. Thus one can reject the null hypothesis and substantiate the research question that a statistically significant difference in library patrons’ perceptions of ease of online reading exists across different age groups.

In order to find out what contributed to the difference, the author conducted the least significant different (LSD) post hoc tests. The LSD t-test coefficients identified that the younger group (18 to 24) was statistically significantly different from all other age groups: 25 to 34 ($\alpha = .01$), 35 to 44 ($\alpha = .01$), 45 to 54 ($\alpha = .02$), 55 to 64 ($\alpha = .01$), and 65 or older (alpha = .02). The means for age groups were illustrated in Figure 1.

From Table 2 above, participants from 18 to 24 tend to agree that reading online is as easy as reading print books, while the other three groups’ opinions were either neutral or negative. As reported above, the difference is statistically significant.

In order to answer research Question 2, the author conducted another ANOVA to see how people with different income levels reacted differently to Ease of Online Reading. The survey did not directly ask the individual’s actual annual income due to local regulations, but indirectly sought the average income of the average household of the neighborhood where he or she resided. The limitation is minimized because historically people with same social economical status are clustered together in this city and each branch library serves residents in their own communities. Table 3 displays the ANOVA results.

Table 3. Ease of Online Reading by Income Level

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>MS</th>
<th>Sig.</th>
<th>eta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>24.65</td>
<td>3</td>
<td>8.22</td>
<td>.00*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>269.62</td>
<td>163</td>
<td>1.65</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>294.28</td>
<td>166</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Statistically significant at .01 level. Levene’s Test of Homogeneity was statistically nonsignificant at .87, which secures the use of ANOVA.

From Table 3, the ANOVA yielded statistical significance with p-value <.01. Thus one can reject the null hypothesis and support the research hypothesis that there is a statistical
significant difference on library patrons’ perception of ease of online reading among those with different income levels.

In order to find out what contributed to the difference, the author conducted LSD post hoc tests. The statistics identified that the more affluent group ($50,001 or above in family income) was statistically different from other groups: $10,000 or less ($α = .02), $10,001 to 30,000 ($α = .00), $30,001 to 50,000 ($α = .00), and $10,001 to 30,000 ($α = .00). The means for all age groups are illustrated in Figure 2.

![Figure 2. Ease of Online Reading by Income Level](image)

ANOVA tests on hypothesis 3 and 4 yielded statistical non-significant results. Thus, the author rejected the null hypothesis. Contrary to common sense that women outread men, the data from current sample did not find any statistical differences among males and females, nor differences among different ethnic groups, on their perceptions on reading online. It seems urban men and women have similar potential online resources.

**5. Conclusions and Implications**

This study confirms that libraries hold tremendous importance in promoting digital literacy to diverse population. Patrons from low-income communities are often only able to access the Internet through public library outlets. They may not have the financial resources to set up a computer at home and install Internet service. Also, their using the Internet has proven not so excessive to print and electronic reading materials. Younger generations and low-income users read over the Internet as comfortably as they read print formats. A follow-study might identify what led to each individuals like or dislike online reading, and whether lower income was caused by younger age. Future efforts seem vital to advocate digital literacy to diverse communities, since these endeavors advance reading and literacy, and the attainment of literacy skills can lead underserved populations toward training, education, and employment.

Currently library and information science (LIS) students may choose to pursue online degrees quickly while distancing themselves from users with diverse background. To promote digital literacy to diverse communities, iSchool educators should prepare LIS students to be able to communicate with diverse audience, teach information literacy to users with different background, be sensitive to needs of their communities, even further, and engage in global social information exchange. Library and information agencies still face the challenging job of supplying equal access and service to diverse patrons - women, youth, the aging, people with disabilities, racial and ethnic minority readers, and user groups from different income levels to overcome the digital divide. More support to iSchools education is needed to create workforce to unemployed, underserved urban citizens to acquire knowledge and skill online, transform the daily living of underserved populations, and ensure digital equality.

**6. REFERENCES**


