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Assessing and Addressing Patrons' Digital Problem Solving Skills: What Does Digital Equity Look Like in the Library?

Cindy Gibbon  
Multnomah County Library, cindyg@multcolib.org

Judy Anderson  
Multnomah County Library

Jill Castek  
University of Arizona, jcastek@email.arizona.edu

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ASSESSING AND ADDRESSING LIBRARY PATRONS DIGITAL PROBLEM SOLVING SKILLS: WHAT DOES DIGITAL EQUITY LOOK LIKE IN THE LIBRARY?

CINDY GIBBON & JUDY ANDERSON MULTNOMAH COUNTY LIBRARY

JILL CASTEK, UNIVERSITY OF ARIZONA
OTHER MEMBERS OF OUR PROJECT TEAM INCLUDE

- Cindy Gibbon
- Judy Anderson
- Amy Honisett
- Vailey Oehlke
- Matthew Timberlake
- Patricia Moran
- Shani Fox
- Steve Casburn
- Gloria Jacobs
- Stephen Reder
- Kathy Harris
- Laura Hill
- Drew Pizzolato
- Jill Castek
- Camille Martinez-Yaden
- Tyler Frank
- Gloria Jacobs

Independent Evaluator

Lori Wamsley, Lane Community College
Advancing Digital Equity in Public Libraries: Assessing Library Patrons’ Problem Solving in Technology Rich Environments (NATIONAL LEADERSHIP GRANT-06-14-0076)
Problem solving in technology rich environments

Using digital technology, communication tools and networks to **acquire and evaluate information**, **communicate** with others and perform practical tasks in 3 domains

Personal, Workplace, Civic
Programme for International Assessment of Adult Competencies

PIAAC is an initiative of Organization for Economic Cooperation and Development OECD & U.S. Department of Education
Problem Solving in Digital Environments

3/10 adults in the U.S. are likely to have difficulty
DIGITAL NATIVE DOES NOT MEAN TECH SAVVY

83% of millennials say they sleep with their smartphones.

YET

58% of millennials have poor skills in solving problems with technology.

U.S. millennials ranked DEAD LAST out of 19 countries tested in these skills.

19th

TECH SAVVY IS AN ENGINE OF OPPORTUNITY

On average, people at the highest skill level earn MORE THAN TWICE AS MUCH as people at the lowest skill level.

Even a modest boost in tech skills can add more than 30% MORE IN EARNINGS.
WHAT WE DON’T KNOW WILL HURT US

91% of millennials believe low computer skills have not hurt their chances of getting a job, a promotion, or a raise.

88% of those with low tech skills share that belief.

That amounts to 13 MILLION low-skilled millennials who do not recognize a major barrier to their future success.

Source: Change the Equation, 2019
Workers who **use digital applications**, such as e-mail, **frequently** in their jobs **earn 9% more** per hour, on average, than workers who are equally proficient in literacy, numeracy and problem solving, have attained similar levels of education and work in similar jobs, but who rarely use them.
DIGITAL EQUITY ACTION PLAN FOR PORTLAND & MULTNOMAH COUNTY

• Ensure access to affordable high-speed Internet and devices
• Provide training and support to ensure that everyone has the skills to use digital technology
• Empower community partners to bridge the digital divide through funding, coordination, training and staff resources.
• Create opportunities for jobs in the digital economy for underserved populations.
• Build a policy framework that supports digital equity and meaningful Internet adoption.
AIMS OF THIS PROJECT ALIGN WITH DEAP GOALS

• to better understand library users digital problem solving
• administer a valid and reliable assessment of Problem Solving in Technology Rich Environments (PS-TRE),
• from the Program for the International Assessment of Adult Competencies (PIAAC)
PURPOSE OF THIS PROJECT

Extend national work on digital literacy acquisition to inform local efforts

Bring libraries into the PIAAC conversation

Maximize resources and meet community needs around lifelong learning and access

Education and Skills Online: Problem Solving in Technology-rich environments
WHY ARE PST-RE DATA RELEVANT FOR LIBRARIES?

Libraries of all types...

- Support interest-driven lifelong learning
- Provide hubs for Internet access and digital literacy training
- Deliver content & services using technology

Include libraries in workforce development through the use of the PIAAC
Who did we sample?
- Face-to-face in Library Branches
- Face-to-face Library Outreach Community
- Distributed Link using the Library’s newsletter

What were the data sources?
- Researcher designed survey focused on online access and library use
- PS-TRE assessment from Education and Skills Online

How did we learn about individual approaches to digital problem solving?
- Screen recording
- Verbal Protocol Analysis
**Desired Skills:** Participant perception of whether they have the skills they need to accomplish their goals.

**Self-efficacy:** Participant perception of whether they are able to accomplish their goals.

**Library Website Use:** Set of questions about ease of library website use.
WHAT DO THE DIGITAL PROBLEM SOLVING DATA COLLECTED FROM LIBRARY PATRONS SUGGEST?
PSTRE Levels

- **Level 1**: 41.4% (N=80)
  - Sort emails into pre-existing folder using given criterion

- **Level 2**: 39.5% (N=77)
  - Respond to a request by locating information in a spreadsheet and e-mailing the requestor

- **Level 3**: 3.6% (N=7)
  - Manage requests to reserve meeting room using a reservation system. Discover schedule conflict, e-mail to decline the request.

**Below Level 1**: 12.8% (N=25)
Employment status

- Full-time employed: 16.4%
- Part-time employed: 18.7%
- Unemployed (looking): 25.7%
- Unemployed (not looking): 36.8%
- Other: 2.3%

(N=171)
Age ranges include: 18–24, 25–34, 35–44, 45–54, 55–65, over 65

(N=187)
<table>
<thead>
<tr>
<th>Age</th>
<th>Has Web Internet at Home</th>
<th>Has Computer or Laptop at Home</th>
<th>Access Internet Mostly from Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>44.4%</td>
<td>55.6%</td>
<td>77.8%</td>
</tr>
<tr>
<td>25-34</td>
<td>60.6%</td>
<td>57.6%</td>
<td>63.6%</td>
</tr>
<tr>
<td>35-44</td>
<td>65.7%</td>
<td>42.9%</td>
<td>51.4%</td>
</tr>
<tr>
<td>45-54</td>
<td>64.3%</td>
<td>40.5%</td>
<td>45.2%</td>
</tr>
<tr>
<td>55-65</td>
<td>70.3%</td>
<td>51.4%</td>
<td>40.5%</td>
</tr>
<tr>
<td>Over 65</td>
<td>90.3%</td>
<td>77.4%</td>
<td>32.3%</td>
</tr>
</tbody>
</table>

Older people were more likely to access the Internet at home, from a computer or laptop

Younger people were less likely to access the Internet at home, and were more likely to use the Internet on their phone.
Do you have the skills to do what you need or want to do online?

N=173

87.3%
n=155

12.7% n=22
When I'm trying to do something online...

- I can usually figure it out: 87.7%
- I can figure it out but it's really hard: 5.8%
- I almost always get stuck: 5.35%
PSTRE level by age (N=181)

- Below level 1
- Level 1
- Level 2
- Level 3

Age Groups:
- 18-24 (N=9)
- 25-34 (N=33)
- 35-44 (N=35)
- 45-54 (N=39)
- 55-65 (N=37)
- Over 65 (N=28)
PSTRE level by employment status (n=165)

- Full-time employed (N=27)
- Part-time employed (N=32)
- Unemployed (looking) (N=44)
- Unemployed (not looking) (N=58)
- Other (N=4)

Levels:
- Below level 1
- Level 1
- Level 2
- Level 3
PSTRE level by education (N=181)

- No formal education (N=1)
- Primary education (N=9)
- Secondary education without a diploma (N=6)
- Secondary education (N=30)
- Some post-secondary education (N=39)
- 4 year college or university degree (N=54)
- Beyond a college or university degree (N=42)
PSTRE LEVELS: Do you access the web/internet mostly from your phone? (N=178)

Yes (N=88):
- Below level 1: 16%
- Level 1: 48%
- Level 2: 34%
- Level 3: 2%

No (N=90):
- Below level 1: 11%
- Level 1: 37%
- Level 2: 48%
- Level 3: 4%
PSTRE levels: People who access web/internet mostly from library (N=50)

Below level 1: 34% (N=17)
Level 1: 44% (N=22)
Level 2: 22% (N=11)
Level 3: 0% (N=0)
PSTRE Levels: Do you have the skills to do what you need or want to do online? (N=167)

Yes (N=146):
- Below level 1: 8%
- Level 1: 43%
- Level 2: 45%
- Level 3: 5%

No (N=21):
- Below level 1: 14%
- Level 1: 38%
- Level 2: 0%
- Level 3: 0%
PSTRE levels: When I’m trying to do something online... (n=164)

- I can usually figure it out (N=147): 9% (Below level 1), 42% (level 1), 44% (level 2), 5% (level 3)
- I can figure it out but it's really hard (N=9): 22% (level 1), 22% (level 2), 0% (level 3)
- I almost always get stuck (N=8): 50% (level 1), 38% (level 2), 13% (level 3), 0% (level 3)
OBSERVATIONS OF DIGITAL PROBLEM SOLVING: LIBRARY TASKS
DEVELOPMENT OF LIBRARY TASKS ALIGNED WITH PSTRE FRAMEWORK

Goal Setting and Progress Monitoring

Varying Levels of Complexity

Planning and Self-Organizing

Find the Overdrive book *My Beloved World* By Sonia Sotomayor. Check it out and read it on your desktop.

Find a resume help session that at a time and Location convenient to you.

Find a volunteer opportunity at the library for someone who likes to play chess and wants to work with the public. What is the minimum age for that volunteer to be eligible?

Find a librarian who can give you reading suggestions on true crime. Ask that librarian for a reading recommendation.

Go to the Medline Plus database and find the symptoms of Zika Virus.

Acquiring and Evaluating Information

Making Use of Information
**OBSERVATIONAL PROTOCOL**

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<th>Levels of Independence</th>
<th>Gives Up</th>
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<th>Partial Independence</th>
<th>Independent, Straightforward</th>
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<tr>
<td>Goal setting &amp; Progress monitoring</td>
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<tr>
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A COMPLEX MODEL OF DIGITAL PROBLEM SOLVING
Digital Problem Solving Competencies

- Ability to determine what task is asking
- Familiarity and background knowledge with context
- Relevancy to learners’ needs
- Fluency with resources
- Self-monitoring & thoroughness

Flexible set of digital skills and strategies
Digital readiness: The five groups along a spectrum from least ready to most ready

% of U.S. adults in each group

14% The Unprepared
They have relatively lower levels of tech adoption and do not use the internet for learning, need help setting up new tech devices, and are not familiar with “ed tech” terms. The Unprepared do not have confidence in their computer skills and are not sure they can find trustworthy information online.

5% Traditional Learners
They are active learners and have technology, but are not as likely to use the internet for pursuing learning and have concerns about whether to trust online information.

33% The Reluctant
They have higher levels of digital skills than The Unprepared, but they have low levels of awareness of new education technology concepts. This translates into relatively low use of the internet for learning.

MORE LIKELY TO HAVE THESE CHARACTERISTICS

Women
Ages 50 and older
Lower income households
Lower levels of formal education

Women
Minorities
Age: 50 and older
Lower income households

Men
Age: 50 and older
Lower income households
Lower levels of formal education
Pew Internet Project

31% Cautious Clickers
They have high levels of tech ownership as well as confidence in their online skills and abilities to find trustworthy information. But they are less familiar with online learning terms and less apt than the Digitally Ready to use online tools for learning.

17% Digitally Ready
They are ardent learners for personal enrichment. They have technology and are confident about their digital skills and abilities to find trustworthy online information. They also know the most about online learning resources.

Higher income households
Some college experience
Age: In their 30s and 40s

Higher income households
Higher education level
Age: In their 30s and 40s
OBSERVATIONAL PROTOCOL

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I’m going to go step-by-step to figure this out. I’ll need help if I run into something I haven’t seen before.

The Schematic Mindset

I’m going to look at all the different tools available and pick the one that seems to be the best. I might need to be reminded of how to do something if I get lost in my exploration.

The Exploratory Mindset

There might be a better way to do this, but I’m sticking with what I know works. I’ll keep trying, but will need help if what I know doesn’t help.

The Schematic Mindset

The Procedural Mindset

The Learn from Experience Mindset

What I did back there and the resources I used can help me with what I’m trying to do here. I can use the same resources and process.
DIGITAL PROBLEM SOLVING IS A COMPLEX ECOSYSTEM
Riparian Zone: Ecologies nested within ecologies
Aspects Related to the Individual

- Literacy Skills
- Self-efficacy
- Cognitive flexibility
- Self-checking
- Fluid Mindsets
Aspects related to skills/strategies

Use of Resources

Range of competencies

Strategies

Self-checking

Self-efficacy

Level of support

Fluid Mindsets

Cognitive flexibility

Barriers

Literacy Skills
Aspects related to the task

Context

Complexity

Use of Resources

Strategies

Self-efficacy

Fluid Mindsets

Literacy Skills

Barriers
CONCLUSIONS

• Digital Problem Solving is complex and multi-dimensional – to explore the full range, we need to look at both scores and observations
• Digital Problem Solving Competencies are fluid and cut across task, use of resources, and contexts
• Mindsets and stances also shift across tasks and contexts; within individuals
• Comparisons can be made across PSTRE and library tasks
• Levels of Support provide a means of scaffolding both competencies and mindsets
PIAAC’s Background Questionnaire Doesn’t Include Any Questions About Library Use

- Produce knowledge about adults’ library use and Internet Access
- Identify future research areas that dovetail with library needs
- Generate a list of new survey items concerning the use of library services that can be added to PIAAC for future administration
- Produce PIAAC data that can be mined to support community initiatives
FOR MORE INFORMATION VISIT

DIGITAL LITERACY ACQUISITION AND EQUITY RESEARCH HUB

DLAERHUB.WORDPRESS.COM

CONTACT INFORMATION

Cindy Gibbon – cindyg@multcolib.org

Judy Anderson - judya@multco.us

Jill Castek – jcastek@email.arizona.edu

Thank you for your attention