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Assessing Library Patrons' Problem Solving in  
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# Advancing Digital Equity in Public Libraries: Assessing Library Patrons' Problem Solving in Technology Rich Environments

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# Advancing Digital Equity in Public Libraries: □ Assessing Library Patrons' Problem Solving in Technology Rich Environments

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## Research purpose

To examine and understand the digital problem solving processes of vulnerable adults (defined as those individuals who are economically insecure, who may not have stable housing, and who may not have regular access to computers and the internet beyond that provided by the library or a mobile device).

## What is digital problem solving?

The **nimble use of skills, strategies**, and mindsets required to **navigate online in everyday contexts**, including the library, and use novel resources, tools, and interfaces in efficient and **flexible ways** to accomplish personal and professional goals.

## Research Questions

The research was intended to discover (a) what digital problem solving skills individuals had, (b) how they used those skills, (c) and how libraries can determine how best to support these individuals.

## Context of the Study

Conducted in collaboration with the Multnomah County Library in Portland, Oregon. Portland was selected as a site because of the community's commitment to digital inclusion and equity. These efforts include a policy framework that supports digital equity and meaningful Internet adoption. The library is uniquely positioned as a community anchor institution by virtue of the central role it plays in providing internet services to the community.

## Mixed Methods Design

Participants were recruited and data were collected in two phases. Phase one involved recruiting in library branches, online using the library's website, and through a link that went out in the library's newsletter. Phase two focused on the library's outreach community. This effort resulted in a participant pool made up of individuals who were subsidized housing residents, urban campers, job seekers, veterans, and others.

- 21-item Library Use Survey (N=450)
- PIAAC's Problem Solving in Technology Rich Environments (PSTRE) assessment administered through OECD's Education and Skills Online portal (N=211 selected based on ability to read English, experience using computers and the Internet, and interest).
- Observation protocol using screen capture software and unstructured interview/dynamic scaffolding (N=18 individuals from Phase 2 who responded to a request to participate in the longer observational protocol and members of MCL's Friends of the Library program).

## Data analysis

*Quantitative analysis* included (a) basic demographics; (b) comparisons between Phase 1 and Phase 2 participants, and (c) a latent class analysis. The latent class analysis allowed us to examine the relationship between library activities, library website use, and PSTRE scores.

*Qualitative analysis.* Qualitative analysis was conducted using an a priori coding scheme derived from the PSTRE framework and inductive codes developed by the research team.

## Findings

*The findings demonstrate the vital role of examining digital problem skills through a diversity of contexts.*

- Phase 1 participants navigated across a wide number of digital contexts and Phase 2 participants navigated across a limited number of digital contexts. Phase 1 participants scored higher on the PSTRE assessment than Phase 2 participants. Across both groups, library website use was a strong predictor of PSTRE scores.
- **Digital contexts** are operationally defined as being the variety of activities the participants indicated they used the library and library website for on the background survey. Different problem solving contexts require the use of different cognitive skills and strategies.
- The digital problem solving **process** involves individuals *learning how to problem solve* as they move through a task and encounter new interfaces, resources, and changing contexts. Observational data show how integrated and interdependent the problem solving processes are.
- Digital problem solving **approaches** involves *the ways individuals use strategies while problem solving*.
- Digital problem solving **strategies** involves the actions individuals take while problem solving. Digital problem solvers use different **strategies** to apply what they know to new situations.
- Digital problem solvers may use **all of the approaches and strategies** we documented **regardless of their experience** with digital problem solving
- **How individuals shift their approaches and use the strategies differs** depends on their experience with the task and the contextual aspects of the problem being solved.

## Implications

- **How problem solving occurs.** Our understanding and assessment of digital problem solving needs to go beyond skills evaluation to understand the role of context.
- **What impacts problem solving.** Our understanding of context needs to include (a) the problem to be solved, (b) the problem solvers' unique repertoire of experiences (c) affective factors.
- **Library/University collaborations offer rich opportunities for work in digital inclusion.** These data position libraries and researchers to take concerted action to improve basic skills required in a digital age and to tackle inequities, to adapt to diversity, and to support action with evidence.
- **Libraries as leaders in digital inclusion.** These findings show that libraries are ideally positioned to take a leadership role in work around digital inclusion.

## Toolkit

- Blueprint for Designing Digital Problem Solving Tasks
- Observing Digital Problem Solving Checklist

Go to the Digital Literacy Acquisition and Equity Research Hub (<https://dlaerhub.wordpress.com/>) for more information about the project and to access the materials. All materials are licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License 