Examining Adult Learners’ Digital Problem Solving in Libraries Using A Learning Typology

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### Where We’re Heading

<table>
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<tr>
<th>Defining Digital Problem Solving</th>
<th>From Observation Protocol</th>
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<tr>
<td>Connected to PIAAC/PSTRE</td>
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### Describing the Strategies Involved in Digital Problem Solving

- Affect, Prior Knowledge, Context, and Experience

### Implications for Acquiring & Assessing Digital Problem Solving

- Libraries
- Adult Education

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Segment #1

Activating Your Knowledge about Digital Problem Solving (Individual)

Exploring the Definition of Digital Problem Solving (from our Research)

Contributing to a Shared Understanding of Digital Problem Solving (Interactive)

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Segment #2

Reflect on Digital Problem Solving Strategies (Individually)

Interact with Descriptions of Digital Problem Solving (from our Research)

Discussion in Small Groups (questions provided)

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Segment #3

Discussion in a small group of implications/applications for Digital Problem Solving (questions provided)

Implications for Acquiring and Assessing Digital Problem Solving (from our Research)

Discussion about implications across contexts & wrap up (whole group)
Setting the Context:
Purpose, Need, and Collaboration
**IMLS National Leadership Grant**

- **Digital literacies** are vitally important in today’s digital world
- The **library is a community anchor** and provides digital access and training
- **Use data** to examine digital problem solving and improve library practices, programs, and services for *all* adults
- **Link libraries** to PIAAC networks

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Purpose of the 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

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Defining Digital Problem Solving
Activity and Discussion
Defining Digital Problem Solving

Take a 1-2 minutes to THINK ABOUT and REFLECT on the following questions...

What are the unique aspects involved in digital problem solving?

How are these facets of digital problem solving the same/different and/or unique as compared to other digital skills?
Operationalizing Digital Problem Solving Depends on Who’s Defining it & for What Purpose

- PIAAC’s Purpose was to Assess Problem Solving in a Technology Rich Environment (PSTRE)

- 9 multi-stem constructed response items that evaluate digital communication, and the use of networks to acquire and evaluate information and perform practical tasks in personal, work-related, and community contexts
PIAAC’s PSTRE framework definition

Using digital technologies, communication tools, and networks to **acquire and evaluate information**, communicate with others and **perform practical tasks** in **Personal, Workplace, Civic situations**
Operationalizing Digital Problem Solving Depends on Who’s Defining it & for What Purpose

- Our Purpose was to Examine and Observe Digital Problem Solving

- Our interest builds from supporting library users who use the library’s digital resources, and online tools for personal, life-skills, education and enrichment purposes.
Developing an expanded definition of Digital Problem Solving

Focus on Patron Problem Solving

Develop Observation Protocol and Library Tasks

Create Analysis Tool and Conduct Analysis
PSTRE
Relies on cognitive skills
Uses an Assessment framework
Outdated technologies that don’t operate like today’s tools
Multi-step auto-scored items
Score (0-400) and level (below 1-3)
Individual Score Reports

Digital Problem Solving
More than cognitive skills
Observation framework
Web-based interfaces and digital tools in libraries
Multi-step tasks
Scaffolded support
Use in real-life contexts
PIAAC’s PSTRE Framework Reflects Cognitive Dimensions

- Setting Goals and Monitoring Progress
- Planning, Self-organizing
- Acquiring and Evaluating Information
- Using Information
PSTRE Standard reporting yields a score that’s difficult to interpret. Unpacking what it means to digitally problem solve is much more complex than a single score can offer.
Applied to Adult Education and Lifelong Learning

Our (evolving) definition of Digital Problem Solving

Digital Problem Solving involves the **nimble use of skills, strategies, and mindsets** required to **navigate online** and use novel resources, tools, and interfaces in efficient and **flexible ways** to accomplish personal and professional goals.
Digital Problem Solving strategies are different than basic digital literacies.

Digital Problem Solving strategies are context dependent.

Digital Problem Solving strategies need to be flexibly applied in an ever changing technological landscape.

What do we know?

What cognitive and other strategies are needed for digital problem solving?

How can Digital Problem Solving strategies be supported, learned, and practiced in libraries?

How can learning be designed to maximize the application of these Digital Problem Solving strategies in meaningful ways?
Digital Problem Solving

- Literacy
- Digital Literacies
- Information Literacy
- Media Literacy
- Efficiently Using Digital and Online Tools
- Navigating New Interfaces
- New Literacies of Online Reading and Research
- Basic Digital Skills and Computer Skills

New Literacies of Online Reading and Research

Navigating New Interfaces

Efficiently Using Digital and Online Tools
## Activity and Discussion
### Defining Digital Problem Solving

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<thead>
<tr>
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<tbody>
<tr>
<td>Why do we need to define digital problem solving?</td>
<td>What are the unique aspects involved in digital problem solving?</td>
<td>What contexts are important to consider?</td>
<td>What role might affect play in the acquisition and application of digital problem solving?</td>
</tr>
<tr>
<td>How does it intersect with other literacies and digital skills?</td>
<td>How are these facets unique from other digital skills?</td>
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</table>
How can our evolving definition of Digital Problem Solving be Improved?

Applied to Adult Education and Lifelong Learning

Digital Problem Solving involves the **nimble use of skills, strategies,** and mindsets required to **navigate online** and use novel resources, tools, and interfaces in efficient and **flexible ways** to accomplish personal and professional goals.
Exploring the Strategies Involved in Digital Problem Solving
Strategies have an architecture

Socio-cultural Context & Adult Learners

REASONS FOR ENGAGING IN THE PROBLEM

Access to Computers and the Internet

Experience with digital resources

Stakes involved in learning these skills; time available

Educational history and work experience

RELEVANCE AND MOTIVATION
Strategies have an architecture

Socio-cultural Context & Adult Learners

Opposing Tensions with Approaches to Digital Problem Solving

**Systematicity**
- Works to understand task firsts
- One step at a time
- Take the time to explore the interface and resources
- Checks progress against criteria

**Flexibility**
- Switches strategies when what is being used doesn’t work
- Thinks creatively; develops work-arounds
- Experiments, might shift back and forth between approaches

**Persistence**
- Does the same thing over and over, even when frustrated
- Comes up with alternative approaches to avoid frustration
- Not flustered by error messages or unexpected results

**Good enough**
- Determines that an outcome of the problem solving process is sufficient
- Relates to an individual’s time to learn, motivation, affect, prior knowledge and the context of the task

Developing the ability to transfer learning from one situation and context to another

Knowing when to ask for help; listening; and making use of assistance provided
<table>
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<tr>
<th>Examples of Enacting Approaches</th>
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<tr>
<td><strong>Systematicity</strong></td>
</tr>
<tr>
<td>Nigel carefully read all the instructions, then explored the menus, evaluated choices and surveyed the page.</td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
</tr>
<tr>
<td>When the tool did not work as expected, Gabriel tried sorting in a variety of ways and then picked an approach.</td>
</tr>
<tr>
<td><strong>Persistence</strong></td>
</tr>
<tr>
<td>Duane kept trying to use the right mouse button. Gabriel came up with a work around rather than being frustrated by the task.</td>
</tr>
<tr>
<td><strong>Good enough</strong></td>
</tr>
<tr>
<td>Sasha and Elizabeth played with the tool for a while before deciding their results were sufficient.</td>
</tr>
</tbody>
</table>
Strategies have an architecture

Socio-cultural Context & Adult Learners

- Experimenting with the available interfaces
- Exploring the resources and interfaces
- Identifying the purpose of an interface
- Identifying the purpose of the task
- Checking and re/checking one’s progress
- Identifying necessary info

Digital Problem Solving Strategies
Digital Problem Solving
Observations & Insights
And Typology

Less experienced
Digital Problem solvers → More experienced
Digital Problem solvers

More than cognitive processes:
Affect, Prior Knowledge, and Context
Strategies are related to...

Affect

● the mindset to adapt to novel environments,
● being willing to ask for help to build reassurance, confidence, flexibility, persistence, systematicity
Prior knowledge

- Prior knowledge can be useful - if the problem solver **is able to apply it flexibly** to the new task at hand.
- Over-reliance on prior knowledge may hinder progress on the task if the problem solver is not able or **willing to let go of a strategy** or approach that is not working in the new situation.
Strategies are applied in...

**Context**

- Competencies are **context dependent**.
- Abilities and flexibility and **can vary greatly** between tasks and application contexts.
- The extent to which the task/context/purpose is well-defined or less-defined; **ambiguity within the task** affects the measurement of that ability.
Activity and Discussion
Describe the Strategies

Reflect on your digital problem solving.
In which contexts do you digital problem solve?
What strategies do you use and why?

Reflect on the digital problem solving of your students.
In which contexts do they digital problem solve?
What strategies have you seen them using?

What similarities and differences do you see between your digital problem solving and those of your students?

How does align with the idea of a continuum of less and more experienced digital problem solvers?
Implications for Acquiring & Assessing Digital Problem Solving
Assessment approaches and tools need to be expanded

PSTRE offers a summary of results that indicate broad trends across a population.

Desire for a tool that helps determine how skilled an individual is with digital problem solving.

Observational tasks & scenarios used with an assessment checklist to help guide instructional supports and approaches that build on the architecture we identified.
Application

- What are the implications of identifying digital problem solving strategies for the people with whom you work?

- What tools/assessment strategies/approaches are important for you to be able to track progress and guide instruction?
Wrap Up: Digital Problem Solving

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