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

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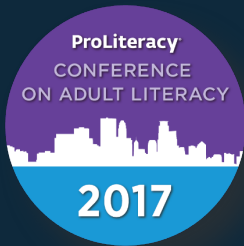
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# Examining Adult Learners' Digital Problem Solving in Libraries Using A Learning Typology

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*Advancing Digital Equity in Public Libraries: Assessing Library Patrons'  
Problem Solving in Technology Rich Environments (LG-06-14-0076)*



Info & Updates **Digital Literacy Acquisition and Equity Research Hub** [dlaerhub.wordpress.com](http://dlaerhub.wordpress.com)

# Where We're Heading

## Defining Digital Problem Solving

Connected to PIAAC/PSTRE

From Observation Protocol

## Describing the Strategies Involved in Digital Problem Solving

Affect, Prior Knowledge, Context, and Experience

## Implications for Acquiring & Assessing Digital Problem Solving

Libraries

Adult Education

Info & Updates [Digital Literacy Acquisition and Equity Research Hub](http://dlaerhub.wordpress.com) [dlaerhub.wordpress.com](http://dlaerhub.wordpress.com)



## 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)



## 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)




## 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)



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Setting the Context:  
Purpose, Need, and Collaboration

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# 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



Info & Updates [Digital Literacy Acquisition and Equity Research Hub](http://dlaerhub.wordpress.com) [dlaerhub.wordpress.com](http://dlaerhub.wordpress.com)

# Purpose of the Project



**PIAAC**

Programme for the International  
Assessment of Adult Competencies



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

Info & Updates **Digital Literacy Acquisition and Equity Research Hub** [dlaerhub.wordpress.com](http://dlaerhub.wordpress.com)

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# Defining Digital Problem Solving

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# 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





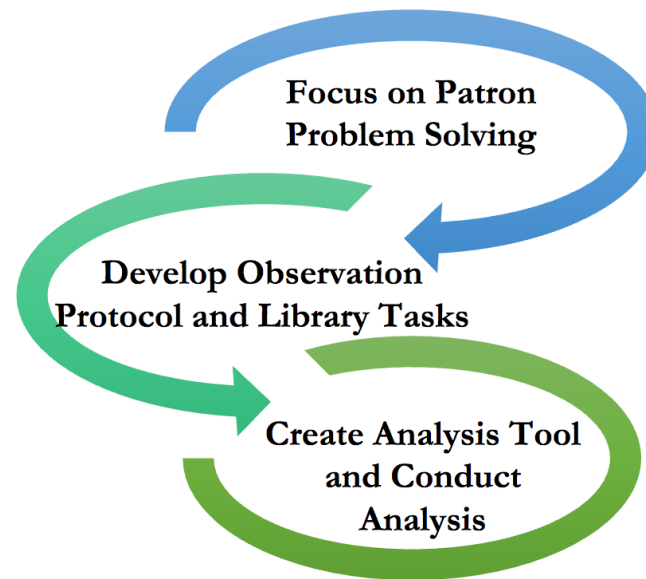
# Operationalizing Digital Problem Solving Depends on Who's Defining it & for What Purpose

- ◇ 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





## PSTRE

## Digital Problem Solving



Relies on cognitive skills

More than cognitive skills



Uses an Assessment framework

Observation framework



Outdated technologies that don't  
operate like today's tools

Web-based interfaces and  
digital tools in libraries

Multi-step auto-scored items

Multi-step tasks

Score (0-400) and level (below 1-3)

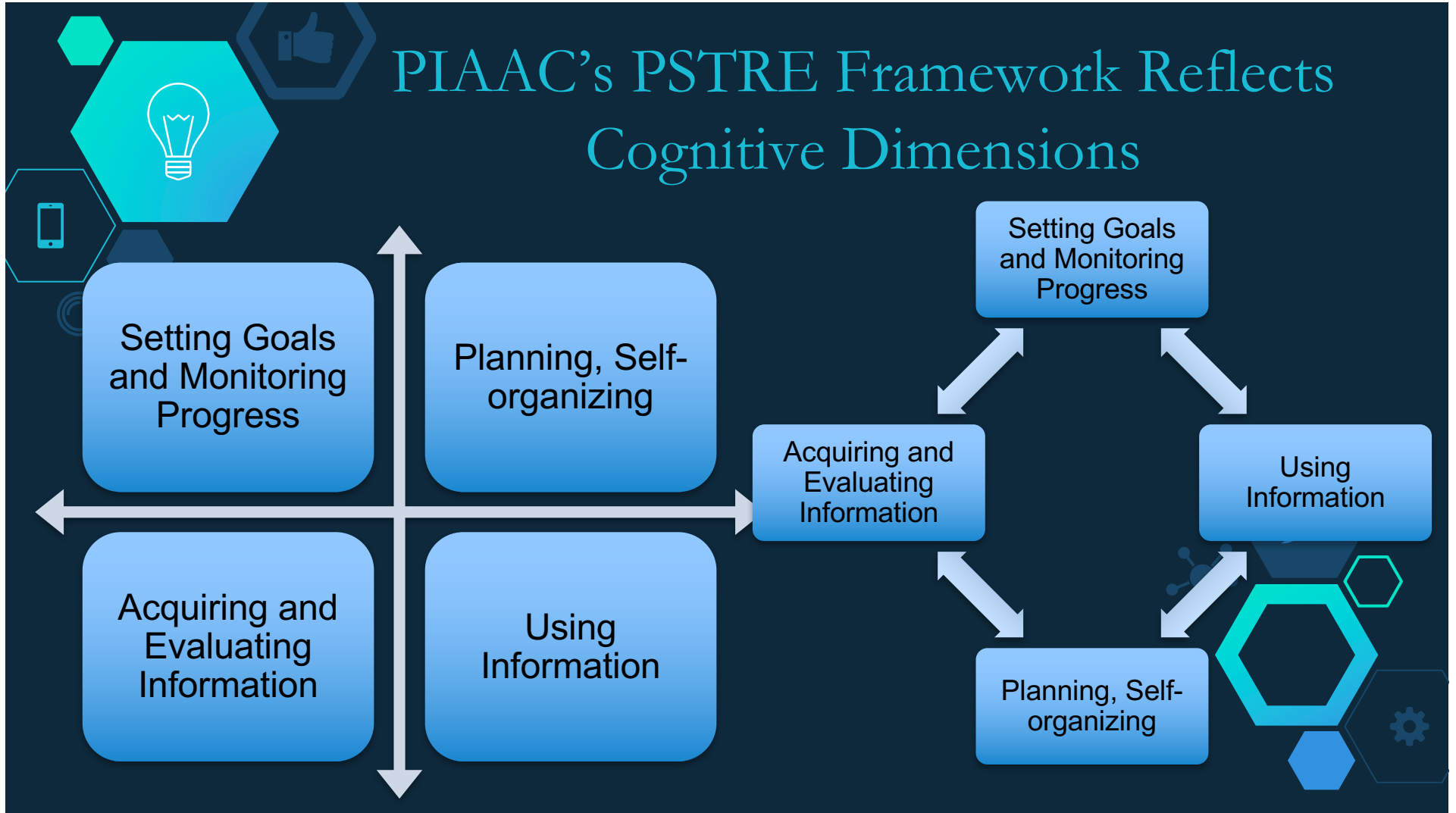
Scaffolded support

Individual Score Reports

Use in real-life contexts

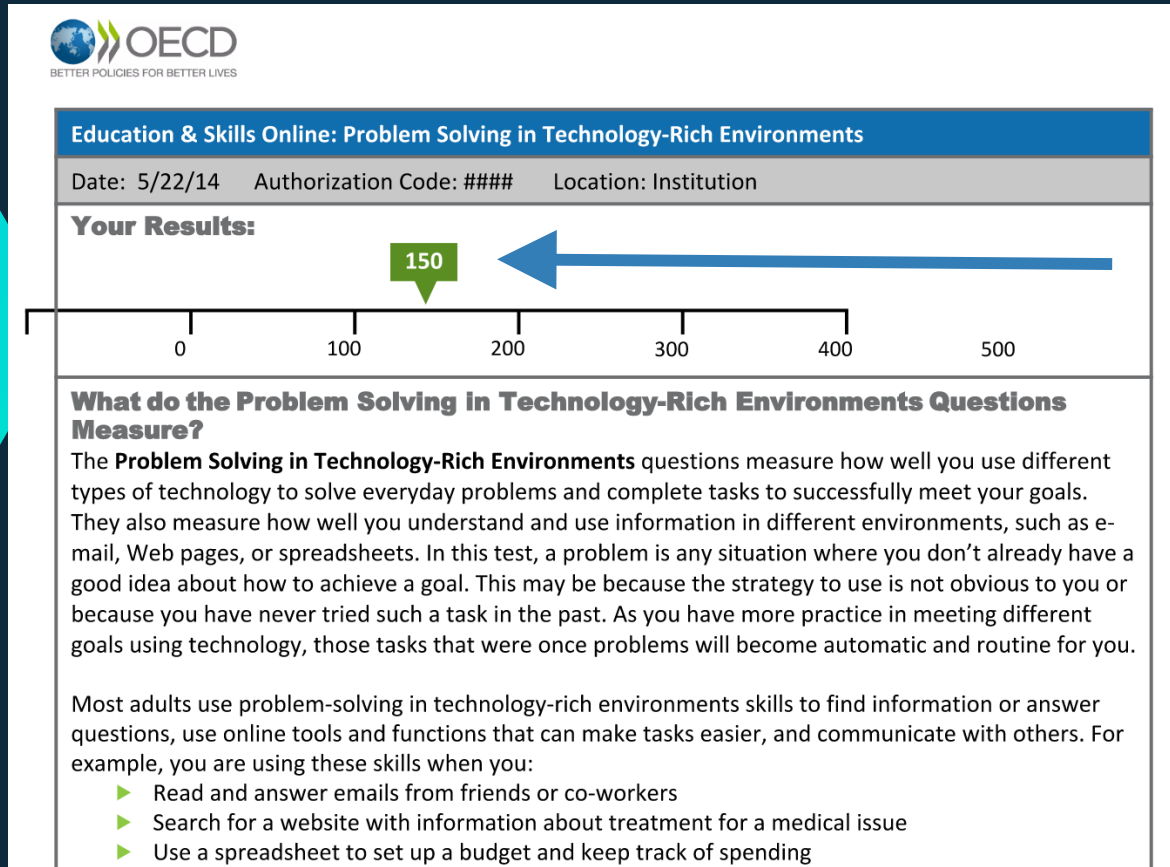



# PIAAC's PSTRE Framework Reflects Cognitive Dimensions



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






# Our (evolving) definition of Digital Problem Solving



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.





## What do we know?

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 need to 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

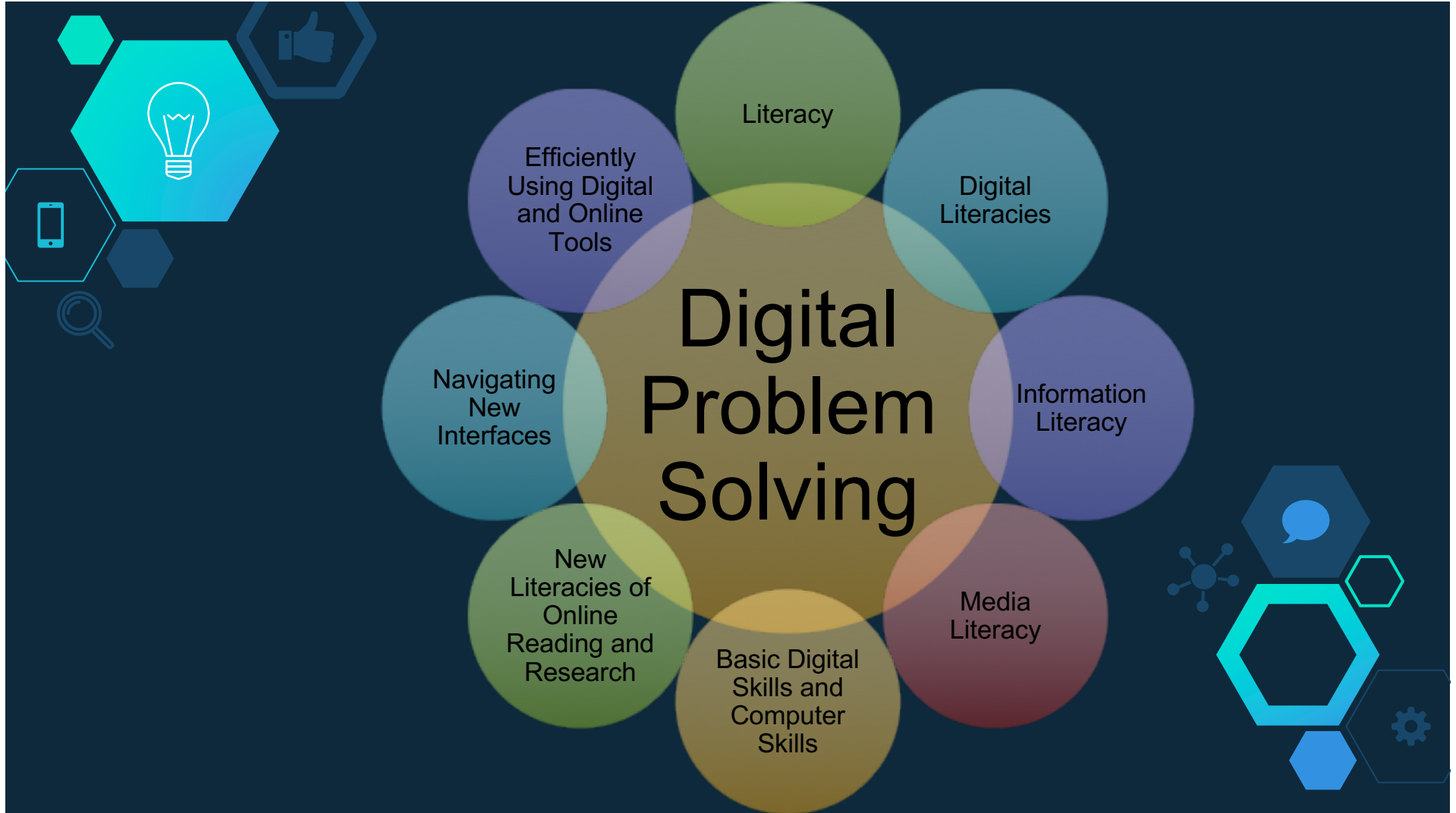
Media Literacy

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

### **Why?**

**Why do we need to define digital problem solving?**

**How does it intersect with other literacies and digital skills?**

### **What?**

**What are the unique aspects involved in digital problem solving?**

**How are these facets unique from other digital skills?**

### **Contexts?**

**What contexts are important to consider?**

### **Affect?**

**What role might affect play in the acquisition and application of digital problem solving?**





# 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



# Examples of Enacting Approaches

## Systematicity

*Nigel carefully read all the instructions, then explored the menus, evaluated choices and surveyed the page.*

## Flexibility

*When the tool did not work as expected, Gabriel tried sorting in a variety of ways and then picked an approach.*

## Persistence

*Duane kept trying to use the right mouse button.*

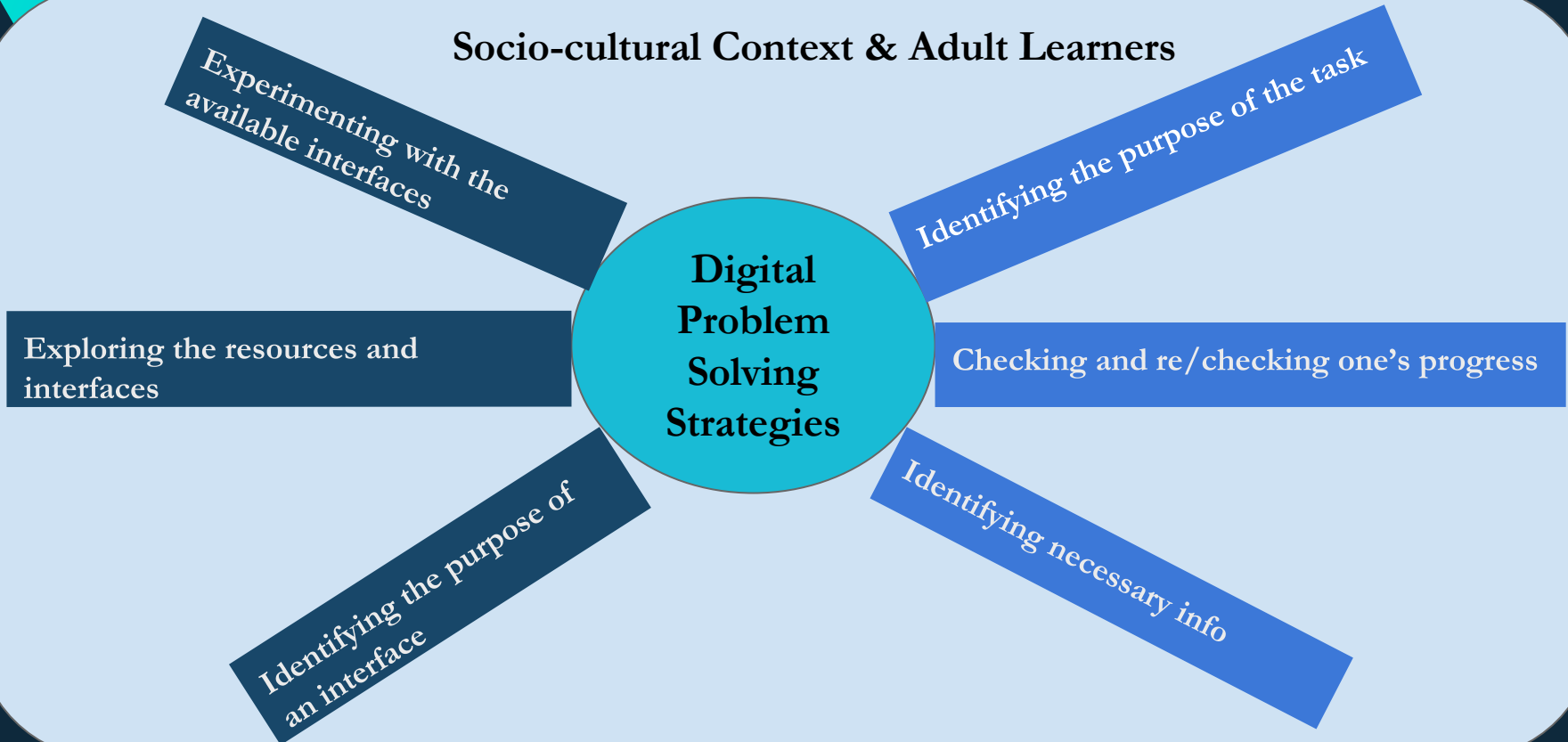
*Gabriel came up with a work around rather than being frustrated by the task.*


## Good enough

*Sasha and Elizabeth played with the tool for a while before deciding their results were sufficient.*

# Strategies have an architecture

Socio-cultural Context & Adult Learners





# 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





# Strategies are affected by...

## 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

Definition

Strategies

Implementation

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