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Defining Digital Problem Solving

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Defining Digital Problem Solving

**What Does It Mean to be Literate in the Digital Age?**
The definition of literacy itself is evolving due to the prevalence of digital texts, tools, and applications that are ubiquitous within our daily interactions. Literacy not only involves the ability to read the *word*, but also to read and interpret *the world*. Likewise, digital problem solving is broad in that it reflects an individual's ability to navigate and use multiple digital resources in order to accomplish one's goals in multiple domains including professional work, personal interests/hobbies, educational pursuits, social/professional networking, civic areas, and for future uses we have not yet conceptualized.

We believe it is important to define what is meant by digital problem solving, as distinct from related constructs. We developed our evolving definition of digital problem solving through experience interpreting data and observations collected from two sources:

1) Observing individuals and pairs complete the Problem Solving in Technology Rich Environments (PSTRE) assessment from the Program for the International Assessment of Adult Competencies (PIAAC) and analyzing screen capture videos that archived participants online navigation, in the moment think aloud processes, and reflections about their own digital problem solving strategies and approaches.
2) Observing a group of tasks performed on the Multnomah County Library website (also a technology rich environment) that were designed based on the cognitive dimensions of the PSTRE framework. We analyzed screen capture videos that archived participants online navigation, in the moment think aloud processes, and reflections about their own digital problem solving strategies and approaches.

The definition offered in this document is multifaceted with several intersecting layers that move beyond cognitive skills into affective and motivational domains, as well as moving across both well-structured and less-structured tasks in which digital problem solving could be observed.

Comparing Problem Solving in Technology-Rich Environments Tasks from PIAAC and Digital Problem Solving Observations
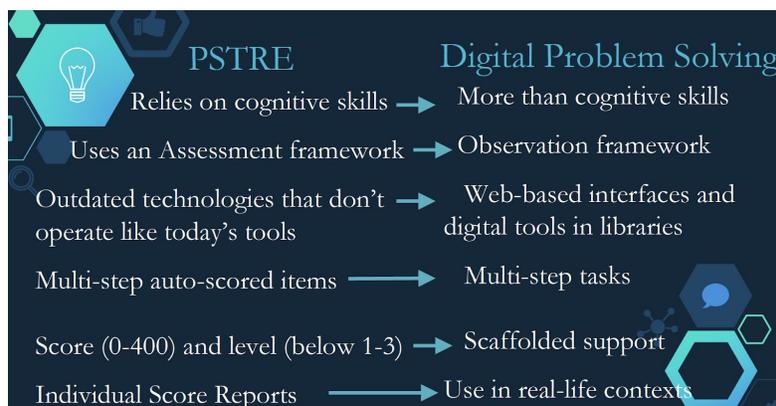
Operationalizing Digital Problem Solving Depends on Who's Defining It and for What Purpose
- PIAAC's Purpose was to <u>Assess</u> *Problem Solving in a Technology Rich Environment* (PSTRE). As a result, the PSTRE assessment was made up of 9 multi-stem constructed response items that evaluate digital communication, and the use of networks to acquire and evaluate information
- PIAAC's definition of Problem Solving in Technology-rich Environments is grounded in their assessment framework made up of cognitive skills: Using digital technologies, communication tools, and networks to **acquire and evaluate information, communicate** with others and **perform practical tasks** in **Personal, Workplace, Civic** situations
- PIAAC's Problem Solving in Technology Rich Environments assessment presented individuals with computer-based tasks designed to measure the ability to analyze various requirements of a task, define goals and plans, and monitor progress until the task purposes were achieved. Respondents were required to use simulated web, e-mail, and spreadsheet multiple, complex sources of information, in some cases across more than one environment, to complete the tasks. The focus of these tasks was not on computer skills per se, but rather on the **cognitive skills required to access and make use of computer-based information to solve problems.**

The Purpose of the Study Was to <u>Examine</u> and <u>Observe</u> Digital Problem Solving
- Our purpose was to support library users who use the library's digital resources, and online tools for personal, life-skills, education and enrichment purposes.
- **Our definition of Digital Problem Solving is applied to Adult Education and Lifelong Learning:** Digital Problem Solving involves 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.
- Our **observations of digital problem solving** required the application of a range of strategies in context of an individual's daily needs and interactions with online texts, tools, and interfaces, unlike the PSTRE assessment tasks that required individuals to to navigate and respond to task in an on-demand capacity. The PSTRE assessment tasks may or may not have relevance to the learners' lives and may or may not build on their background knowledge of the purpose or context for engaging in the task.

What Data Were Used to Develop the Definition of Digital Problem Solving?
This definition is grounded in observations collected while watching library users, and those from the library outreach community as they completed the PSTRE assessment and the series of library tasks. Screen capture software was used to record participants' screen movements and think aloud data. These screen capture and verbal data, verbal protocols were collected from 18 participants , made it possible and to examine the observable strategies and behaviors involved in digital problem solving.

Why Move Beyond the PSTRE Framework to Define Digital Problem Solving?
While the PSTRE framework provides a starting point for examining some of the cognitive areas involved in digital problem solving, more detail is needed within the definition to allow the field to examine the full range of competencies involved in digital problem solving, the strategies individuals use in different contexts, and to support the development and acquisition of digital navigation and online problem solving.

PIAAC's PSTRE Framework Reflects Four Cognitive Dimensions as Mostly Distinct Processes

Digital problem solving is a distinct area within the broader idea of digital literacies. There are many related bodies of work including:

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

While digital problem solving draws from multiple areas, and overlaps with some parts of related constructs surrounding digital literacies, there are unique aspects of digital problem solving that stand alone.

Defining Digital Problem Solving Lead Us to Ask <u>Three Key Questions</u>
- Because we see digital problem solving as being different from basic digital literacy, we asked,
    - What cognitive and other strategies are needed for digital problem solving?
- Because we see digital problem solving as context dependent, we asked,
    - How can digital problem solving strategies be supported, learned and practiced in libraries?
- Because we see digital problem solving as needing to be flexibly applied in an ever changing technological landscape, we asked,
    - How can we use what we learned about digital problem solving to support library professionals in their work with library users with different needs?