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Analyzing and Interpreting data from PIAAC's Problem Solving in Technology Rich Environments (PSTRE) Assessment and Library Use Survey: Quantitative Results

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The research team administered the *Problem Solving in Technology Rich Environments* (PSTRE) assessment connected to the Program for the International Assessment of Adult Competencies (PIAAC) and accessed through Education and Skills Online (OECD, 2016). The PSTRE is a valid and reliable scenario-based assessment made up of 9 multi-stem constructed response items that evaluate digital communication, use of networks to acquire and evaluate information and perform practical tasks in personal, work-related, and community contexts. Completing these tasks required basic digital navigation abilities and also required advanced knowledge to conduct and interpret searches, interact within databases, and make decision about competing information in order to solve problems.

Library Use Survey

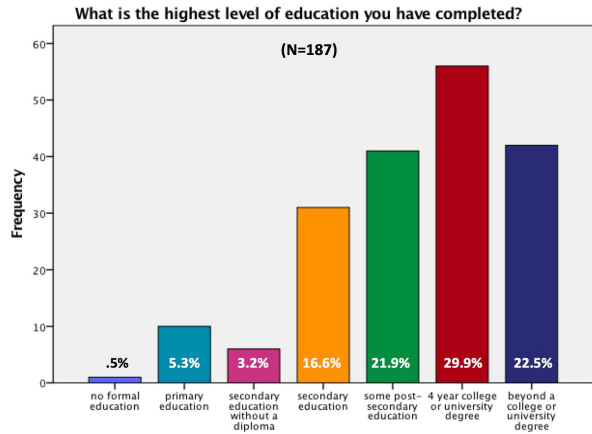
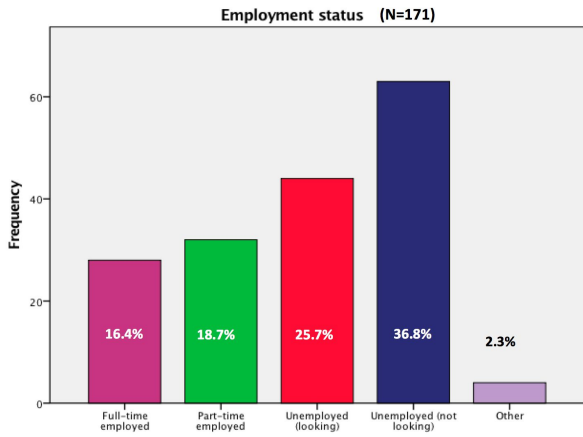
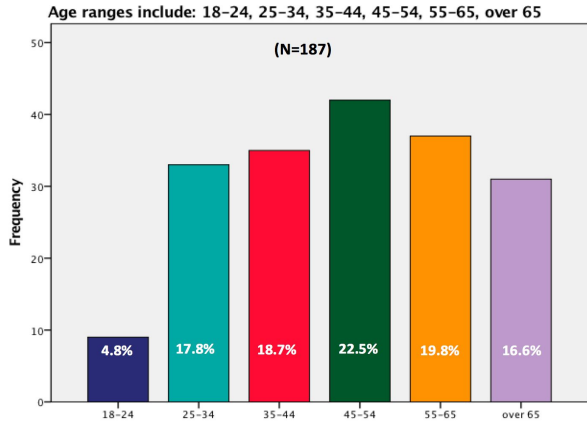
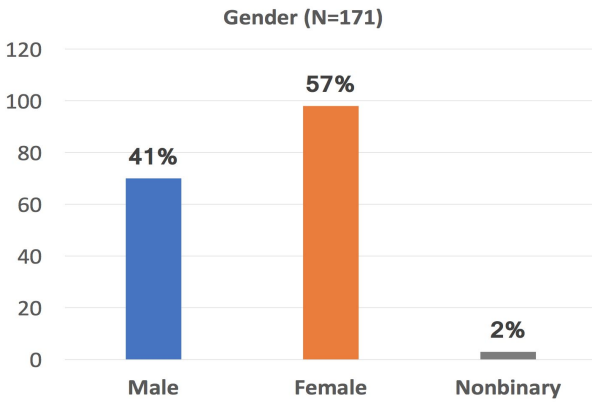
Sampling participants who would complete the PSTRE involved designing a 21-item library use survey that collected basic demographics, information on library use, and asking participants' to determine the difficulty level of various common online library tasks. The demographic portion of the survey was aligned with the background survey used by PIAAC so that results could be compared to national PSTRE scores. The library use survey also included a question designed to determine whether the participants could highlight and drag, and copy and paste using a mouse. These abilities were required to complete the PSTRE.

Library use survey data were collected from approximately 450 library users, and of those, 211 completed the PSTRE assessment through the [Education and Skills Online](#) portal. Data were collected in two phases. In phase 1, participants were recruited in library branches, online through the library's website, and through a link that went out in the library's newsletter. Initial demographic analyses indicated that this group skewed toward women, individuals with higher levels of education, and who had access to the internet at home. In phase 2, participants were recruited through the library's outreach community that included veterans, subsidized housing residents, urban campers, job seekers, and others. Participants were offered a \$20 cash incentive for their participation.

The research team conducted three phases of analysis: 1) basic demographics, 2) comparisons between Group 1, (those recruited during phase 1), and Group 2 (those recruited during phase 2), and 3) a latent class analysis that examined the underlying relationship between two groups of participants on their Internet use patterns, library use patterns, and digital problem solving abilities.

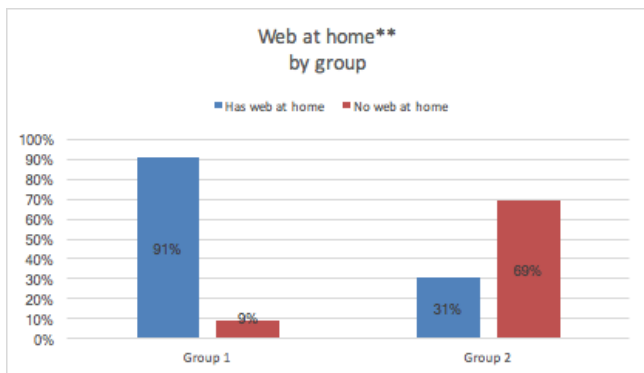
Basic Demographics

Basic demographic questions asked participants to choose from a range of options for to describe their age, employment status, gender, educational attainment, first language, and primary language used for reading and writing. The majority of respondents indicated English as their first language and as their primary language used for reading and writing. The following tables show the distribution for age, gender identification, employment status, and educational attainment.



Group Comparisons and Latent Class Analysis

A comparison of access between the two groups showed that those from the outreach community had less home access to the internet from home.



Further analysis indicated that Group 1 navigated across a wide number of digital contexts and Group 2 navigated across a limited number of digital contexts (Table 1).

Table 1. Comparing Means of Number of contexts based on library activities and website use by latent class

	Latent Class 1	Latent Class 2	t	df
Number of total contexts	1.71 (1.77)	4.94 (2.21)	-17.32**	422.67 ⁺
Number of library activities	1.26 (1.44)	1.16 (1.56)	.64	467
Number of library website uses	.45 (.72)	3.77 (1.49)	-27.54**	453.12 ⁺
PSTRE scores	259.31 (34.94)	299.92 (30.11)	-7.61**	98.57 ⁺

⁺Corrected for heterogeneous variance

The latent class analysis allowed us to examine the relationship between library activities, library website use, and PSTRE scores.

Findings suggest that those who fell in Latent Class 2 used the library website more often and for more purposes. Thus, library website use is strong predictor of higher PSTRE scores and competency in digital problem solving. A cross tabulation demonstrates that Latent Class 2’s PSTRE scores are associated with strong effect size (Table 2).

Table 2. Cross-tabulation of latent classes and PSTRE levels:

PSTRE Levels	Latent Class 1	Latent Class 2	χ^2	ϕ
Below Level 1	20 (35%)	4 (3%)	50.96**	.53
Level 1	31 (53%)	46 (38%)		
Level 2	7 (12%)	66 (54%)		
Level 3	0 (0%)	6 (5%)		
Total	59	123		

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