



**Digital Inclusion and Digital
Literacy in the United States:
A Portrait from PIAAC**

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Background

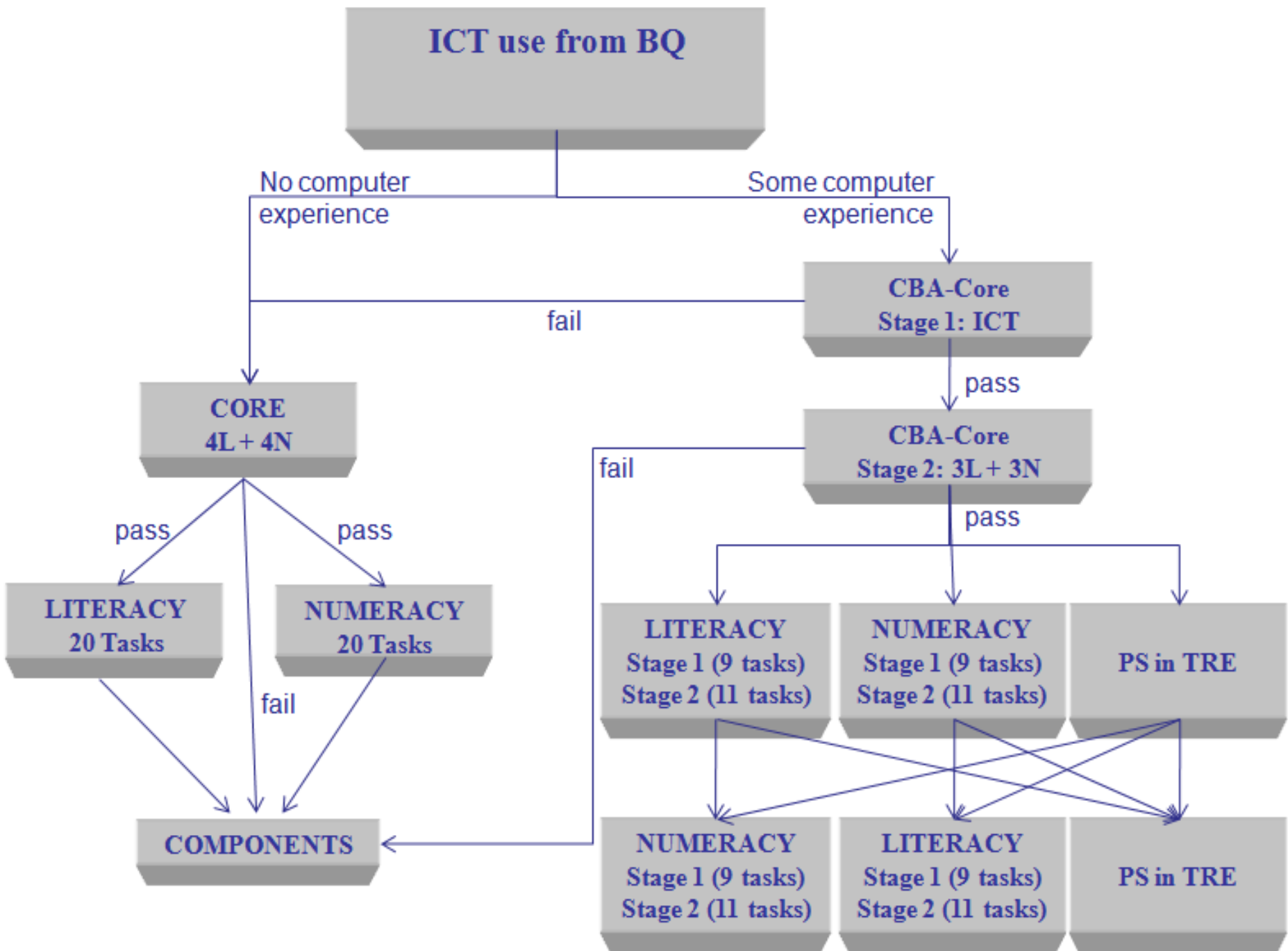
- The emergence and use of ICT is dramatically changing many aspects of life in numerous countries around the world
- The U.S. lags behind its competitors in ICT adoption
- In the U.S., equity issues are very evident in ICT adoption
- The SAS added measures of PSTRE proficiency & use of ICT skills to the literacy & numeracy measures used in previous adult surveys
- This paper analyzes the U.S. SAS data to look at *digital equity* issues in adoption and use of ICT and the impact of digital literacy on economic and social outcomes, termed here *digital embedding* in economic and social outcomes

Research Questions

- RQ 1: In which demographic groups is there *digital equity* in the adult population?
 - Gender?
 - Race/ethnicity?
 - National origin?
- RQ 2: What is the extent of *digital embedding* in economic and social outcomes for adults?
 - Earnings
 - Employment
 - Social trust
 - Volunteerism
 - Political efficacy
 - Health

Methodology

- Statistical modeling of U.S. SAS (PIAAC) data
- Models *not* intended to represent causal relationships
- Multivariate linear, ordinal and logistic regression models used with continuous, ordinal and binary dependent variables
- Stata PIAACTOOLS and REPEST packages used to account for complex survey design and multiple imputation (plausible values) in estimation



Digital Inclusion Pathway

- Digital Access
- Digital Taste
- Digital Readiness
- Digital Literacy
 - Use of ICT Outside of Work
 - Use of ICT at Work
 - Proficiency at problem solving in technology-rich environments (PSTRE)

DIGITAL LITERACY STAGE
Develops ICT uses and proficiency

READINESS BARRIER
Lacks basic computer skills

READINESS STAGE
Develops basic keyboarding, mouse and computer skills

TASTE BARRIER
Lacks confidence, need or desire to use computer.

TASTE STAGE
Develops interest, desire and confidence to use computers.

ACCESS BARRIER
Lacks access to computers

ACCESS STAGE

THE DIGITAL INCLUSION PATHWAY

Digital Equity

Along the Digital Inclusion Pathway

- Digital equity for a group defined as the lack of statistically significant difference between its and other groups' digital inclusion status after differences in educational attainment & other demographic variables are taken into account.
- Digital equity may vary over stages of the digital inclusion pathway.
- Multivariate logistic regression and ordinal logit regression models, respectively, evaluate digital equity at a specific stage or within the overall pathway.

<i><u>Equity Groups</u></i>	Digital Access	Digital Taste	Digital Readiness	Inclusion Pathway	Digital Liter.: PSTRE	Digital Liter.: ICT Use
Women	+	+	+	+	—	ns
Blacks	—	—	—	—	—	ns
Hispanics	—	—	—	—	—	ns
Other Minority	ns	ns	ns	ns	—	+
Foreign Born	—	—	—	—	—	—
<i><u>Covariates</u></i>						
Age	—	—	—	—	—	—
Education	+	+	+	+	+	+
Work Status	+	+	+	+	ns	ns

Digital Embedding

- Digital embedding in an outcome is a statistically significant association between the outcome and a digital literacy measure (ICT use or PSTRE proficiency) after associations between the outcome and demographic and educational attainment variables are taken into account.
- Whereas digital equity focuses on the digital inclusion of social groups, digital embedding focuses on the social and economic concomitants of digital literacy
- Multivariate linear, logistic and ordinal logit regression models, respectively, are used to estimate digital embedding of ICT use and PSTRE proficiency in continuous, binary and ordinal economic and social outcome variables.

	Log Earnings	Log Earnings	Employment Status
	Workers Age 25-54	Workers Age 25-54	Adults Age 25-54
PSTRE	+	+	ns
ICT Use at Work	+		
ICT Use Nonwork		ns	ns
Age	ns	ns	ns
Gender	—	—	—
Black	ns	ns	ns
Hispanic	ns	ns	ns
Other Minority	ns	ns	ns
Foreign Born	ns	ns	ns
Education	+	+	+

	Social Trust	Volunteerism	Political Efficacy	Health Status
PSTRE	+	ns	ns	ns
ICT Use Nonwork	+	+	+	+
Age	ns	ns	ns	ns
Gender	+	+	+	+
Black	—	+	+	—
Hispanic	ns	ns	+	—
Other Minority	—	—	—	—
Foreign Born	ns	ns	ns	+
Education	+	+	+	+
Working Status	ns	+	ns	+

Implications

- Equity issues look different along the pathway and for different groups (e.g., gender, race)
- Importance of ICT use for all measures
- Difference between employment & earnings
=> different strategies/initiatives for job search/job development and incumbent worker
- ICT use outside of work linkages to all the social outcomes

Future Research

- Cross-national comparisons of digital inclusion and digital embedding models
- Modeling of the embedding of literacy and numeracy in economic and social outcomes
- Using Education and Skills Online in multi-method and longitudinal research projects
- Expansion of Practice Engagement Theory