Adult Literacy Development and Program Impact in Longitudinal Perspective:

New Approaches to Research, Evaluation and Policy

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The learning spiral of literacy …

- Takes *time* to progress
- Engages learning in multiple life contexts
- Enhances numerous life outcomes
- Operates across generations
Understanding the Literacy Spiral

- Adopt a longitudinal perspective
- Follow individuals over time
- Observe participation in programs, further education, and life history events
- Examine *lifelong* and *life-wide* learning
- Analyze changes in key life outcomes
The Longitudinal Study of Adult Learning (LSAL)

Portland State University

funded by

U.S. Department of Education

National Institute for Literacy
LSAL Perspective

- Look at how programs fit into the lifelong and life-wide landscape of adults’ learning, rather than at how adults fit into LLN programs as students.

- We’ll see that things look considerably different from this vantage point.
LSAL Design

- Decade-long *panel study* of Portland (Oregon) early school leavers, age 18-44 at the beginning of the study
- Representative sample of ~1,000 drawn from local rather than national population of dropouts
- Includes both program participants and nonparticipants
- Examines program participation and other learning activities, social and economic changes, and changes in literacy skills, literacy practices & technology use over time
- Periodic in-home interviews and literacy assessments and SSN-linked administrative data (with individuals’ permission)
- Smaller-scale qualitative components
LSAL Realized Sample

- N = 940
  - 496 from RDD Frame
  - 444 from Student Frame
- High level of diversity in sample
- 90% sample retention over 8 years
- 39 additional pilots for instrument development, training & qualitative studies
Some LSAL Demographics

- Average age is 28 (at Wave 1)
- 50% female and male
- 35% minority
- 9% foreign-born
- 34% live in poverty
- 29% report a learning disability
- 34% took special education
- Broad range of assessed basic skills
Tales from the Random Sample: Fred

interviewed by Cynthia Lopez
LSAL Timeline

✓ wave 1  1998 – 1999
✓ wave 2  1999 – 2000
✓ wave 3  2000 – 2001
✓ wave 4  2002 – 2003
✓ wave 5  2004 – 2005
✓ wave 6  2006 – 2007
Categories of LSAL Data

- **Background information**
  - Demographics
  - Family characteristics
  - School history including reasons for leaving

- **Special modules**
  - Life turbulence details
  - Self-study details
  - Learning disabilities details
  - Health status & health care utilization details
  - Oral vocabulary assessment
  - Writing assessment
  - Reading subskills assessment
Categories of LSAL Data (con’t)

- Repeated Measures
  - Functional literacy assessment
  - Literacy practices
  - Self-assessed skills and skill changes
  - Participation in basic skills programs, receipt of GED
  - Linked admin data on program participation
  - Learning activities
  - Postsecondary education
  - Employment, job characteristics, wages & earnings
  - Linked data on quarterly hours and earnings
  - Work-related training
  - Household & family composition
  - Life goals and aspirations
Literacy Measures in LSAL

**Measures of Proficiency**
- Repeated measures of TALS Document Literacy
- SSN-matched GED test scores

**Measures of Practices**
- Repeated measures of literacy practices
- Repeated self-reported changes from wave-to-wave in reading, writing and math

**Measures of Component Skills**
- Oral vocabulary
- Word recognition
- Fluency
- Holistic writing
Literacy Practices Measures

- Engagement in literacy activities in home, workplace & community contexts
- Measure both breadth & frequency of use
- Provide vital link between standardized proficiency test scores and lifelong, life-wide literacy development and use
- Scales were developed to be longitudinally stable: Measure the same thing at different points in time
Cumulative Participation Across Waves

- Median Hours
- Percent Ever Participated

Wave: 1, 2, 3, 4, 5, 6

Cumulative Hours of Participation
Percent Ever Participated
Periods of Participation in Basic Skills Programs Since Leaving School

- None, 40%
- One, 21%
- Two, 17%
- Three or four, 13%
- 5 or more, 9%
Self-Study in the LSAL

- Defined as “studying on your own to improve your reading, writing or math skills or prepare for the GED”
- Probes distinguished such self-study from activity conducted in school or as part of a basic skills or GED class
- In-depth qualitative interviews confirmed the validity of these self-reports
Self-Study and Participation

- 20% have self-studied
- 62% have taken adult ed
- 65% have self-studied

(self between leaving school and Wave 4)
Self-Reported Change in Literacy Practices by Participation & Self-Study

![Bar chart showing change in literacy practices since previous wave]
Percent GED Attainment by Participation & Self-Study

- 0%
- 5%
- 10%
- 15%
- 20%
- 25%

None | Program Only | Self Study Only | Both
--- | --- | --- | ---

Stephen Reder

2014 ACAL Keynote
Literacy Growth Curves: Findings

- Repeated measures of literacy proficiency and literacy practices show systematic change over time across the adult lifespan.
- Age, birthplace, parental education, intergenerational reading practices, K-12 schooling experiences, and health systematically influence adult literacy development.
- Key life history events – such as changes in family composition and employment changes -- influence adult literacy development.
- The dynamics of change are quite different for literacy proficiency and literacy practices: e.g., program participation directly affects literacy practices measures but not literacy proficiency.

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2014 ACAL Keynote
Program Impact on Literacy

- Literacy proficiency growth over relatively short periods of time is *not* affected by program participation.
- Pre-post test accountability data, that apparently show systematic gains in participants’ proficiency, do not contrast participants’ gains with those of comparable non-participants; LSAL indicates their gains are equivalent.
- Literacy practices growth over short periods of time *is*, on the other hand, directly affected by program participation.
- These findings are reinforced by cross-sectional research (e.g., Smith & Sheehan-Holt) and by classroom studies (e.g., Purcell-Gates, Jacobson & Degener).
Literacy Proficiency Development

Participation = 100+ hours

(Participation = 100+ hours)
Practice Engagement Theory

- Highlights the importance of everyday literacy practices for connecting culture and context to proficiency development.
- Shows how instructional programs, which research indicates have short-term effects on literacy practices, can have longer-term effects on proficiency growth.
- Provides a framework for understanding how everyday literacy practices, instructional programs and proficiencies mutually influence each other.
Practice Engagement Theory

Proficiency (t) → Proficiency (t+1) → Proficiency (t+2) → Proficiency (t+3)

Practice Engagement (t) → Practice Engagement (t+1) → Practice Engagement (t+2) → Practice Engagement (t+3)
Practice Engagement Theory:
Formal System of Equations

\[ l_{t+1} = \alpha_0 l_t + \beta_0 p_t + \chi_0 + \varepsilon_{0,t+1} \]
\[ p_{t+1} = \alpha_1 l_t + \beta_1 p_t + \chi_1 + \varepsilon_{1,t+1} \]

where \( l_t \) = literacy proficiency at time \( t \)
\( p_t \) = engagement in literacy practices at time \( t \)
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<th>Proficiency</th>
<th>Practices</th>
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<td>Proficiency at Previous Time</td>
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<td>0.002***</td>
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<td>Practices at Previous Time</td>
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<td>0.411***</td>
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<tr>
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*** p < 0.001   ** p < 0.01    * p < 0.05
“Use It or Lose It”

“Practice Makes Perfect”

“No Pain, No Gain”
Estimating Participation Impact

- Adults decide whether to participate in basic skills programs, so participants and nonparticipants are not usually comparable (selection bias)

- Several analytical methods can be used to address selection bias in comparing program participants & nonparticipants:
  - Treatment effects (propensity score matching)
  - Difference-in-differences (propensity score matching)
  - Fixed effects panel regressions
Propensity Score Matching

- Compares participants and nonparticipants matched on their likelihood of participating based on *observed pre-participation* characteristics:
  - Age  Gender  Race/Ethnicity  Education
  - Immigration status  Income
  - Learning disabilities  Parents’ education
Income Growth in Propensity Score-Matched Participants (100+ hours) & Nonparticipants
Treatment Effects Model

- Estimates average treatment effect on treated by comparing 2007 incomes of matched participants and nonparticipants.

- With participation defined as *any* amount of attendance, there is no significant difference between groups.

- With participation defined as *25 or more hours* of attendance, there is no significant difference between the groups’ 2007 incomes.

- With participation defined as *75 or more hours* of attendance, there is a nearly significant (p=0.053) difference between the groups’ 2007 incomes.

- With participation defined as *100 or more hours* of attendance, there is a statistically significant difference: participants average $9,621 *more* in annual income over what they would have received if they had not participated (in 2013 USD).
Difference-in-Differences (DID) Model

- Compares income changes over a decade (1997-2007) between matched participants and nonparticipants.

- There is no statistically significant DID between groups if participation is defined as *any* amount of attendance.

- If participation is defined as *100 or more hours* of attendance, there is a statistically significant DID.

- Despite different statistical assumptions, estimates 2007 incomes to average $10,179 more because of participation, comparable to the treatment effects estimate of $9,621 (in 2013 USD).
Difference-in-Differences


Annual Income (1997 $)

Nonparticipants

Participants
Fixed Effects Panel Regression Model

- Within-subject models of year-to-year variations in income in relation to year-to-year program participation and other life events.

- Eliminates selection bias due to observed and unobserved time-invariant individual characteristics.

- Reveals how temporal details of participation -- intensity, duration and elapsed time -- are reflected in observed changes in economic status.
Fixed Effects Panel Regression (con’t)

- Results consistent with other models
- Only when participation involves about 100 or more hours of attendance does it have a significant & substantial impact on future earnings
- Concentrated hours have a larger impact on earnings than hours distributed over years
- The impact of participation on earnings takes several years to develop after program exit
Pulse, Step, Growth: The Shape of Program Impact
• High burst, short-lived impact

• Example in LSAL data: effects of receiving GED credential shows a short-lived “brushing up” of proficiency
• Abrupt, qualitative & lasting impact
• Some changes in literacy practices seem to have this temporal shape
• Slow, steady & progressively accumulating impact
• This is the shape of program impact on proficiency
• This is the shape of program impact on earnings
• Life history events -- such as the birth of children, taking on or losing a partner, or a significant change in employment -- have similarly shaped impacts on the course of literacy development
Summary: Impact of Participation on Earnings

- Multiple methods of controlling for selection bias all indicate that participation in LLN programs has a significant positive impact on adults’ future earnings.

- The significance of the impact requires a minimum amount of program attendance, about 100 hours in the LSAL data.

- The earnings premium grows over time and becomes substantial 5-6 years after program exit: the annual premium was nearly half (0.45) a standard deviation of 2007 incomes.

- The impact of participation is not at all evident in short-term follow-ups to program participation.

- Post-program learning, proficiency growth, and postsecondary education and training may all play a role mediating the continuing impact of participation on labor market outcomes.
Key Points

- For both literacy proficiency and earnings outcomes, our longitudinal research clearly shows programs are having long-term beneficial effects that are NOT evident in short-term accountability measures being used.

- Programs are thus evaluated with measures that don’t reflect their actual impact, often measures they must use for program improvement.
Contrasting Metaphors of Adult LLN Programs

- The program-centric “Parking Lot”
- The learner-centric “Busy Intersection”
“Parking Lot”

- Recruit students
- Fill seats & retain students
- Programs provide *services* to students
- The longer students stay, the more they learn
- Pathways are within program
- Short-term *proficiency* gains are emphasized

“Busy Intersection”

- Adults come to programs along different life pathways
- Programs are *resources* used by active learners
- How long students stay may not matter as much as the directions and tools they exit with
- Increased engagement in *literacy practices* is emphasized
Implications for Program Design

- Recall that LSAL is not a study of what happens inside programs as much as how program participation happens as part of learners’ lives.

- Program design should:
  - help connect periods of “self study” with periods of classroom participation too often fragmented by life circumstances.
  - support lifelong and life-wide learning trajectories beyond the classroom, not just learning in classrooms.
  - prioritize engaging students in sustainable literacy & numeracy practices.
  - utilize learning support systems that provide personalized, portable lifelong and life-wide learning plans that learners can access in classrooms and other contexts, around which support services are wrapped and provision is coordinated.
Policy Implications

- Develop and use measures of engagement in literacy practices in diverse life contexts as part of program evaluation & accountability.

- Gather data and build accountability and return-on-investment frameworks around longer-term outcomes.

- Don’t focus exclusively on short-term proficiency test score gains: this is not a useful logic model of program impact.

- Fund provision that supports engagement in literacy and numeracy practices in varied settings - e.g., workplace, health care, community settings.
A Space for Innovation

- The many suggested innovations in program design and policy will be best developed in an environment that encourages experimentation & evaluation of new approaches.

- Practitioners must serve as expert partners and stakeholders in all phases of system development & implementation.
Literacy is for Life!

- Special thanks to Clare Strawn, Cynthia Lopez, many LSAL staff & graduate students, and especially the 1,000 adults who shared their lives

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