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The Office of Community College Research and Leadership (OCCRL) was established in 1989 at the University of Illinois at Urbana-Champaign. OCCRL is affiliated with the Department of Educational Policy, Organization, and Leadership in the College of Education. Our mission is to use research and evaluation methods to improve policies, programs, and practices to enhance community college education and transition to college for diverse learners at the state, national, and international levels. Projects of this office are supported by the Illinois Community College Board (ICCB) and the Illinois State Board of Education (ISBE), along with other state, federal, and private and not-for-profit organizations. The contents of publications do not necessarily represent the positions or policies of our sponsors or the University of

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Editors' Note: This edition of *UPDATE on Research and Leadership* focuses on data and its use to shape policy. Among the most potentially disruptive changes occurring in the education policy environment is the development of state longitudinal data systems (SLDS) that store and link student level data from across P-20 state education agencies, districts, institutions, and in many cases, further linking that data to workforce outcomes. Supported by significant federal investment and encouraged by several prominent foundations, the last few years have shown a marked increase in the creation and use of such big data systems in education. The implications of potential research generated by these SLDS will span the P-20W spectrum, and in many ways, the development of such data systems represents a new era in education research. This issue explores the importance of data in an era of accountability and considers models, methods and the impact of SLDS use.

Community Colleges and the Increasing Importance of Data: An Interview with David Baime

by Allison Witt, Office of Community College Research and Leadership



David Baime is the Senior Vice President for Government Relations and Research for the American Association of Community Colleges. He directs the national advocacy efforts for the nation's close to 1,200 community colleges and their students. Mr. Baime is a frequent contributor in *The Chronicle of Higher Education*, *Inside Higher Ed* and other publications and has made numerous appearances, including on CNN, MSNBC, C-SPAN, and National Public Radio. I had the opportunity to interview him on October 8, 2013, regarding the role of data as it impacts community colleges.

UPDATE: Several articles in this issue discuss the development and use of state longitudinal data systems (SLDS). How do you see these systems impacting Community Colleges?

Baime: Nothing is more important than getting appropriate data. So much of policy revolves around that. The federal government has invested large sums of money into this important project with the understanding that data is critical to the policy process.

UPDATE: Do you see ways in which SLDS could lead to improved policy for Community Colleges?

Baime: Having a clearer picture of students' progression through education is essential. Longitudinal data by definition looks across systems, across institutions, so it's a more precise picture. As we move increasingly into an era of performance based funding and other accountability structures, it becomes a necessity to have reliable data systems.

UPDATE: Describe the role of the VFA in providing data. How do you see this effort impacting colleges?

Baime: We are very excited about it. We have worked on the VFA for a number of years. It is data by community colleges for community colleges. Again, it is very important for accountability purposes to have accurate data. Colleges need to show value for the money, that students are getting their money's worth, and colleges need to be able to benchmark against other colleges. So there is both an internal and an external function. The VFA is based on measures of accountability that reflect what colleges actually do. While graduation is important with the current emphasis on completion, community colleges need data that better reflects what they do; remediation, transfer, along with completion. They need data that shows the preparation of the student coming in and the successes of the student along the way.

UPDATE: What about the function within the community that is also a part of what community colleges do? For example, the student who wants to improve a skill, or study a foreign language and just takes a class or two?

Baime: Those kinds of success are difficult to quantify, even with the VFA. The truth of the matter is that aspect of community colleges has lost an amount of favor in the public discourse. That function is less valued in certain accountability frameworks such as performance funding and others.

UPDATE: Can you compare and contrast the VFA with other initiatives such as the College Score Card?

Baime: The VFA is similar to other initiatives like the College Score Card, the federal example. What makes it unique is it is us measuring us. It reflects that understanding of how community colleges operate. We are collaborating with ACE on recommendations to inform the reauthorization of the HEA Act (<http://www.acenet.edu/news-room/Documents/HEA-Reauthorization-Recs-080213.pdf>). Those recommendations call attention to the need for data keyed to different sectors of postsecondary education, such as community colleges.

UPDATE: One of AACC's Data Points discusses the difference between being Transparent and being Translucent. It demonstrates an example where consumer information hides or obscures more than it reveals. Could you discuss examples where data has been misleading regarding Community Colleges?

Baime: The classic example of a misleading data point is, of course, the graduation rate. That number is just completely inaccurate. Because data are collected on the number of students entering the institution as full-time, first-time, degree seeking undergraduate students and the number completing their program within 150 percent of normal time to completion, it just simply doesn't accurately reflect community college students or community college graduation. In all sorts of ways we are doing better than what the federal IPEDS number shows. The National Student Clearinghouse captures completion rates separately for adult learners and traditional-age students and encompasses postsecondary credentials of all levels and types at any institution. Completion rates are also reported separately for full-time and part-time students giving a much clearer picture of actual completion.

Another example is the default rate. So few community college students borrow money and so little is known about it, that the number touted is at best a very rough indicator. Institutions don't collect that information, so that is very unclear.

Placement rates, too, are inherently difficult to gather.

And, defining student outcomes is data that has proved difficult to capture, particularly for community colleges. To be accurate, student outcome measures would need to capture what is unique to community colleges, the wide variety of programs we offer, the preparation level of our students, the fact that programs are two years.

UPDATE: As you consider the policy landscape and the data being used to inform policy, are there examples that you find positive or constructive?

Baime: Florida tends to have very good data on students. California's Student Success Scorecard does a pretty good job for community colleges. Texas, too, has some good data. What is needed is data that is specific to community colleges, that captures part-time enrollment, other basic data points that really reflect what colleges do, like the VFA does.

UPDATE: How can data better inform policy that impacts Community Colleges?

Baime: Better workforce data is essential. We need accurate earnings and placement data. This would require the Social Security Administration to work with the Department of Education to match data. As I mentioned, placement rates are difficult to generate.

We also need data that captures student learning outcomes. Work is being done on this. The regional accreditors are looking at this issue. But for this data to be meaningful, it will need to be community college specific. While I do think it would be beneficial to somehow capture the ancillary benefits of community college, the service to the community, and the courses taken that benefit the community, at this point, we would be good if we just got the VFA. That would be a big step and a big improvement.

As the federal government gets more involved in outputs and accountability, it seems more essential than ever for the federal government to ensure appropriate data are generated. Lots of the right questions are currently being asked, but it's tough to produce a scorecard when you don't even know where students are transferring. So much radiates out from an accurate picture of how colleges are performing. It's not scintillating. Graduation rates and default rates can grab the headlines, but accurate data remains crucial. When I think about it, in some ways, it's astonishing that there are not better data available. But, I'm not sanguine that such a system will be created. A federal student unit data system is precluded by the Higher Education Act, so it would require statutory change. In many ways the National Student Clearing House has superseded the federal systems. Some might even say that the National Student Clearinghouse as the logical entity to handle this. It's controversial but it is quite possible that it serves as the national system. ♦

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The Illinois Longitudinal Data System (ILDS) Research Agenda

by Debra D. Bragg, Office of Community College Research and Leadership,
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The Research Agenda for the Illinois LDS (ILDS) was formalized as part of Illinois' first round application for Race to the Top (RttT), beginning with an extensive review of empirical literature associated with five key areas important to RttT and Illinois policy makers¹. The initial draft of the ILDS Research Agenda was posted to website of the *Forum on the Future of Public Education* (Forum), University of Illinois at Urbana-Champaign, in spring 2010 for public review and vetting. Since that time, Dr. Debra Bragg, former director and principal investigator for the *Illinois Collaborative for Education Policy Research* (ICEPR) has presented the *ILDS Research Agenda* at numerous national, state and regional meetings, including every *Illinois Education Research Council's* (IERC) annual conference from 2010 to the present.

ICEPR has worked deliberately and strategically to align the *ILDS Research Agenda* with the state's emerging longitudinal data system (LDS) and the research needs of Illinois government agencies, education researchers, policy makers, and other stakeholders. Recognizing the need to seek insights from states further ahead of Illinois in the implementation of SLDS, the research team associated with ICEPR collected examples of other SLDS research agendas by searching websites and contacting officials throughout the United States. Results of these qualitative methods reveal a multitude of ways to conduct research using ILDS, if Illinois state officials desire to do so. Further, ICEPR researchers Witt, Linick, and Brewer (2013) conducted over 30 interviews with state-level administrators and agency personnel throughout the United States to ascertain how they are supporting researchers to access and use LDSs for the purposes of conducting research studies associated with SLDS.

¹ Efforts to create and sustain an SLDS research agenda have received extensive support (fiscal and human resource) from the University of Illinois. In November of 2009, a meeting of nearly 100 state leaders, university researchers, policy analysts, practitioners, and other interested citizens was convened in Springfield to prioritize research questions that could be aligned with the creation of the Illinois LDS. These areas include teachers and leaders, P-20 alignment, assessment and learning management, school turnaround, and continuous improvement in instruction. Since these initial efforts, the University of Illinois Administration and Forum on the Future of Public Education in the College of Education at UIUC has continued to provide leadership for the development of an ILDS Research Agenda, culminating in the Illinois Collaborative for Education Policy Research funded by RttT.

In 2012 and 2013 the leadership team of ICEPR invited Illinois state agency personnel and educational researchers to form a governance structure to support ICEPR (see attachment naming the ICEPR Leadership Team). Additionally, education advocacy organizations and other critical friends of ILDS were invited to join ICEPR's Stakeholder Group (see attachment naming the ICEPR Stakeholder Group). Members of the ICEPR leadership team and stakeholder group met in April 2013 and during that meeting, added new research questions, modified existing research questions to fit the evolving needs of Illinois, and ultimately, prioritized ILDS research questions. An additional product of these efforts was the addition of two new areas included in this draft of the *ILDS Research Agenda*: early childhood education and adult education, workforce development and employment.

Illinois Collaborative

Therefore, the research questions that emerged from the above mentioned multi-phase process are categorized into seven key policy areas:

- Section 1: Highly effective teachers and leaders
- Section 2: P-20 alignment and college and workforce readiness
- Section 3: Assessment and learning management
- Section 4: School turnaround
- Section 5: Continuous improvement in math, science and reading instruction
- Section 6: Early childhood education
- Section 7: Adult education, workforce development, and employment

The full report link is: <http://occr.illinois.edu/update-newsletter-fall-2013/>. ◆

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Potential Models for Using State Longitudinal Data System (SLDS) Data to Improve Student Learning



by Katherine Ryan and Jennifer Timmer, Department of Educational Psychology

The implementation of Statewide Longitudinal Data Systems (SLDS) in Illinois and across the United States will lead to a stream of new student, teacher, and school data available for educational improvement. The data can highlight specific areas of need within schools and perhaps lead to strategies for addressing problems to improve schools, teaching practices, student learning and achievement, and workforce readiness (Data Quality Campaign, 2006, 2009; Illinois State Board of Education, 2011; Mandinach & Gummer, 2013). While the SLDS is a promising endeavor, educational policymakers and practitioners “can become ‘data rich but information poor’ without adequate capacities to make sense of large quantities of data” (Bragg, Ryan, Lubienski, & Robinson, 2011, p. 7).

Based on a robust literature review we propose three models Illinois might consider in using the SLDS data for improving student learning after appropriate modifications: *Chicago Collaborative School Improvement Partnership* (Roderick, Easton, & Sebring, 2009), *Framework for Data Use* (Coburn & Turner, 2011), and *The Evidence-Informed Policy and Practice Pathway* (Bowen & Zwi, 2005). Each of these models offers potential benefits for implementation in Illinois, although each also comes with challenges. Acknowledging the need for adaptation, we recommend

that ISBE might consider the following steps in identifying and refining what model might be best for the state of IL.

1. **ISBE selects model.** ISBE selects the model it determines would best fit its needs and presents it to a diverse group of stakeholders (e.g. representatives of state universities, advocacy groups, state agencies) to gain more ideas about the model overall, how it would fit with the goal of improving student learning, and how it should be adapted.
2. **Adapt model.** ISBE, with stakeholder feedback, adapts the model and specifies an explicit statement (logic model) outlining how the adapted model will work to improve student learning.
3. **Field test model.** ISBE field tests the model in one or two settings prior to state-wide implementation to further develop and refine the model for utilizing SLDS data, and consider how to implement the model in the Illinois context.

The full report can be view online at <http://ocrl.illinois.edu/update-newsletter-fall-2013/>. ♦

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Table 1. Models of Data Use Processes

Author(s)	Publication Title	Model Title
Bowen & Zwi (2005)	“Pathways to ‘Evidence-Informed’ policy and practice: A framework for action”	<i>The Evidence-Informed Policy and Practice Pathway</i>
Coburn, Toure, & Yamashita (2009)	“Evidence, interpretation, and persuasion: Instructional decision making at the district central office”	
Coburn & Turner (2011)	“Research on data use: A framework and analysis”	<i>Framework for Data Use</i>
Mandinach, Honey, & Light (2006)	“A Theoretical framework for data-driven decision making”	<i>Framework for Data-Driven Decision Making</i>
Marsh, Pane, & Hamilton (2006)	“Making sense of data-driven decision making in education”	<i>Conceptual Framework of Data-Driven Decision Making in Education</i>
Massell, Goertz, & Barnes (2012)	“State education agencies’ acquisition and use of research knowledge for school improvement”	
Roderick, Easton, & Sebring (2009)	“The Consortium on Chicago School Research: A new model for the role of research in supporting urban school reform”	<i>Chicago Collaborative School Improvement Partnership</i>
Spillane (2012)	“Data in practice: Conceptualizing the data-based decision-making phenomena”	
Tseng (2012)	“The uses of research in policy and practice”	

Education Lessons Learned with Longitudinal Data Systems and Quasi-Experimental Design

by Matthew Linick, RMC Research Corporation, and Joe Robinson, Department of Educational Psychology



Introduction

States and districts with detailed longitudinal data systems (LDSs) provide researchers with an opportunity to study the effects of implemented educational policies and programs. Presently, Illinois is creating the Illinois Longitudinal Data System (ILDS), a system that will track students longitudinally, both within and across educational agencies, making it possible to follow a single student or a cohort of students, from early childhood through K-12, into post-secondary education, and eventually into the workforce. To understand the potential of the ILDS, we examined over 50 studies from top-tier research journals that used longitudinal data, and we identified six areas of study, prominent in the literature, important to both policy makers and educational researchers:

- education finance
- market-based education reforms (i.e. charter schools, private school vouchers, open enrollment, etc.)
- teacher effectiveness
- teacher mobility
- special populations (English language learners (ELLs), students with special needs, students from low-income families), and
- P20 pipeline and transitions

For each area of study, we examined how these studies used longitudinal data combined with various quasi-experimental

methods to provide insight into the effects of state policies and programs. Our interest focused on both the analytic methods that were used and the results that emerged from more rigorous methodological approaches.

We begin with a brief description of a “quasi-experimental design.” Quasi-experimental designs use non-experimental data and—through clever design—can obtain an estimated treatment effect. Some examples of quasi-experimental designs, which will be discussed more completely in the context of specific studies later in this report, are difference-in-differences, regression discontinuity, propensity score matching, instrumental variables, and fixed effects (for an in-depth yet accessible discussion of these techniques, see Murnane & Willett, 2011). As we will discuss in the six research areas below, the application of quasi-experimental designs to a state longitudinal dataset can reveal plausible effect estimates (even in the absence of a true experimental design), which can then be used to inform policy decisions.

Education Finance

As educational organizations face more and more financial challenges, studies examining the effective use of public dollars are of utmost importance to policy makers and organizational leaders. (For a summary of the key features of studies pertaining to educational finance that tap longitudinal data systems, see Table 1.)

Table 1. Finance Studies’ Characteristics (2010-2012)

	State	Methods	Findings
Strunk, (2011)	CA	Fixed Effects Regression	Restrictive teacher contracts led to higher spending on instruction-related services, less on school boards and materials; restrictive contracts are associated with lower performance, but not a change in performance.
Roy (2011)	MI	Fixed Effects Regression; Instrument Variable Estimation	School finance reform reduced interdistrict spending disparity; led to higher performance in low-spending districts/lower performance in high-spending districts
Henry, Fortner, & Thompson (2010)	NC	Regression Discontinuity	Increased funding in educationally disadvantaged school districts led to improved performance for whole district, and for disadvantaged students attending district.
Scott-Clayton (2011)	WV	Instrument Variables Difference-in-Difference	Federal work-study program negatively impacted female post-secondary outcomes, but positively impacted male post-secondary outcomes.
Bowers, Metzger, & Militello (2010)	MI	Discrete Time Hazard Modeling	Bond amount, number of students enrolled, number of attempts, and urbanicity were found to significantly predict passage/failure of a school bonds; rural and small-town districts have lower chances of passing bonds.

For example, a study that has importance at the postsecondary level was conducted by Scott-Clayton (2011). Through access to the West Virginia Higher Education Policy Commission's comprehensive database and a natural comparison group, Scott-Clayton used a difference-in-differences approach to examine the effects of Federal Work Study (FWS) on college academic performance. She compared the performance of FWS-eligible students at high-allocation FWS schools and low-allocation FWS schools (the first difference), and she also compared the performance of FWS-ineligible students at high- and low-allocation schools (the second difference). To then estimate the causal effect of FWS eligibility for students attending high-allocation FWS schools on student performance, Scott-Clayton simply subtracted the first difference from the second difference, thus yielding a "difference-in-difference" estimate. She found that participation in Federal Work Study had a negative impact on female students but a positive impact on male students. Whereas Scott-Clayton's research was focused on higher education, other researchers have attempted to address these issues in K-12 education.

Henry, Fortner, and Thompson (2010) examined K-12 educational finance reforms by examining the effect of a policy that provided targeted investments to academically disadvantaged districts. Having access to North Carolina's LDS, the authors included student data, including assessment data, from all 337 regular public high schools in North Carolina. This study used a regression discontinuity design to investigate the effects of a North Carolina policy that provided targeted funding for districts based on district level of academic advantage. Regression discontinuity designs take advantage of policies and programs that determine treatment status based on a cut score and assume that a subject very near the threshold for treatment activation on one side of the cut score is nearly identical to a subject very near the threshold for treatment activation on the other side of the cut score, and therefore differences between the two subjects can be attributed to activation of the treatment. Because funding was determined based on a district's level of advantage in relation to a cut point (for example a district with 70% of its students qualifying for free and reduced lunch would receive additional funding, while a district with 69.9% of students qualifying for free and reduced lunch would not), the authors were able to determine that additional funding resulted in improved performance for all students attending targeted districts. These findings are only applicable to the districts near the policy-determined threshold; however, despite the fact that a district's eligibility to receive funding depended on the population of disadvantaged students attending the district, all students who attended the district were found to benefit from the targeted funding.

Market-based Education Reforms

Market-based education reforms have appeared throughout the country primarily in the form of charter schools, vouchers, and open-enrollment schemes. Research into the effects of such reforms has returned mixed results, but continues to offer insight for policy makers pursuing such reform. (For a summary of the key features of studies pertaining to market-based education reforms that tap longitudinal data systems, see Table 2, page 7.) For example, an analysis of charter schools and their traditional counterparts in Texas used five years of student achievement and district spending data, collected from administrative files and public records assembled by the Texas Education Agency, and a stochastic cost frontier model to find that charter schools operate for less money than traditional public school districts, but are not necessarily more efficient—where efficiency is measured as a production of standardized test achievement by district expenditures (Gronberg, Jansen, & Taylor, 2012). With access to five years of longitudinal student achievement data from Utah's Data Warehouse, which contains a complete record of every student's history in Utah public schools, Ni and Rorrer (2012) were able to measure student growth while accounting for student characteristics by using hierarchical linear models with matched samples and general methods of moments with student fixed effects. Both methods compare charter school performance over time to traditional public schools. Ni and Rorrer found that charter schools tended to perform worse on standardized tests than their traditional counterparts. However, that difference was largely due to newer charter schools, as charter school performance increased over time. These findings are echoed by Carruthers' (2012) analysis using a 12-year longitudinal dataset, collected from the North Carolina Education Research Data Center at Duke University, and dynamic panel data methods—a method that examined changes in student performance from year to year—which found that student performance at charter schools on standardized tests improved over time. Developing an understanding of the growth in performance for students at charter schools is only possible because the research studies had access to LDSs.

Teacher and School Effectiveness

Many states have implemented laws that increase teacher and school accountability through the use of Value Added Measures (VAM), which calculate the average student achievement gains in each teacher's classroom over a year. (For a summary of the key features of studies pertaining to teacher and school effectiveness that tap longitudinal data systems, see Table 3, page 8.) However, some studies have pointed to the potential for error inherent

Table 2. Incentivist Reform Studies' Characteristics

	State	Methods	Findings
Carlson, Lavery, & Witte (2012)	MN	Hierarchical Linear Modeling	There is no relationship between type of charter school authorizing organization and student achievement.
Carruthers (2012)	NC	Dynamic Panel Data	Charter school maturity is a strong predictor of math and reading achievement; however, faculty development only explains small share maturity effects.
Winters (2012)	NY	Fixed Effects Regression with School-Spell Effects	Students in traditional public schools facing competitive pressures from charter schools either experience no achievement, or small achievement effects in math and reading.
Gronberg, Jansen, & Taylor (2012)	TX	Stochastic Cost Frontier Approach	Charter schools are not more efficient, but operate at a lower cost, than traditional public schools.
Ni & Rorrer (2012)	UT	Matched Hierarchical Linear Models; General Methods of Moments with Fixed Effects	Charter schools typically underperform, compared to traditional public schools, but this is largely due to the ineffectiveness and student mobility at newly founded charter schools.
Ghosh (2010)	MA	Spatial Econometric Framework	Traditional public schools are strategic with expenditure levels when exposed to the expenditure decisions of nearby districts.
Welsch & Zimmer (2012)	WI	Value Added Modeling	Districts losing students produce higher test scores the following year; the districts that lose the most students show the highest gains; districts experiencing growth do not show improvement.
Welsch, Statz, & Skidmore	WI	OLS Regression	Students that transfer (take advantage of WI open enrollment) are likely to live in districts with high property values and low taxes, but transfer to districts with higher expenditures; also, students transfer to districts with lower minority students and more extracurriculars.
Winters & Greene (2011)	FL	Fixed Effects Regression; Spell Effects Regression	Competition from voucher programs decreases the likelihood that students with mild disabilities will be identified; competition leads to higher academic achievement in public schools.
Carruthers (2012)	NC	Fixed Effects Regression	Less qualified teachers that are also less effective, tend to move from traditional public schools to charter schools.
Ni (2010)	MI	Hierarchical Linear Models	Student sorting due to charter schools exacerbates the isolation of socioeconomically disadvantaged students in less-effective urban schools.

in this approach. Harris (2011) argued that VAM could yield valid estimates of school performance, but individual teacher performance would be much harder to measure accurately. Braun of the Educational Testing Service (2005) noted, “the implementation of such [VAM] models and the proposed uses of the results raise a host of practical, technical, and even philosophical issues” (p. 3) As classroom assignment by both teachers and students is not random, technical issues of statistical accuracy must be addressed, some of which can be resolved by the development of SLDs; however, philosophical issues regarding the basing teacher employment on student performance on standardized exams are not addressed by the collection of longitudinal data. Concerns were also expressed by McCaffrey et al. (2003) of the RAND Corporation, who argued that VAM holds promise, but many measurement and statistical issues affect the

validity of these measures. For example, there are concerns with the use of VAM to measure teacher effectiveness because of the type of assessment (Koedel & Betts, 2010) and length of available data (Koedel & Betts, 2011), both of which may bias estimates. However, VAM, combined with longitudinal data that links teacher characteristics to student performance data, can address some of these concerns and answer complex questions related to teacher performance. For example, using linked student and teacher longitudinal data provided by the Florida Department of Education’s LDS, Winters, Dixon, and Greene (2012) found highly effective teachers are more likely to leave the field. Implications of this study suggest incentivizing and professionalizing teaching may be needed to attract and retain a critical mass of effective teachers in underperforming schools.

Table 3. Teacher Effectiveness Studies’ Characteristics

	State	Methods	Findings
Loeb, Kalogrides, & B’eteille (2012)	FL	Value-Added Modeling, Instrument variable estimation	There is no relationship between type of charter school authorizing organization and student achievement.
Chingos & West (2012)	FL	Value-Added Modeling	A 1 standard deviation increase in student value-added performance is associated with 6-8% higher earnings outside teaching for teachers that leave the classroom for other industries.
Koedel & Betts (2011)	CA	Value-Added Modeling	While some estimates of teacher effects are biased due to sorting effects, a sufficiently complex value-added model reduces sorting effects to statistical insignificance.
Koedel & Betts (2009)	CA	Value-Added Modeling	Severe ceiling effects, such as those found when examining minimum competency, may significantly alter value-added measures, but value-added estimates are largely unaffected by ceiling effects.
Player (2009)	NC	Value-Added Modeling, Fixed Effects	Teachers with higher exam scores and classroom success tend to be matched with more students with higher prior ability and female students, and fewer ELL, IEP, and FRL students.
Winters, Dixon, & Greene (2012)	FL	Value-Added Modeling with Fixed Effects and Heckman Selection	More effective teachers are more likely to exit the classroom.
Jacob & Walsh (2011)	IL	Fixed Effects	Principal ratings are correlated with teacher experience, credentials, and absenteeism. Principals reward teacher qualities associated with improved student performance.
Chingos & Peterson (2011)	FL	Value-Added Modeling, Fixed Effects	Teacher effectiveness is not correlated with college major, master’s degree, or university, but is positively correlated experience. Later in careers, experience becomes negatively correlated with effectiveness.
Jacob (2011)	IL	Discrete Time Hazard Model	Principals consider teacher absenteeism, teacher value-added measures, and teacher demographic characteristics when determining which teachers to dismiss.
Lefgren & Sims (2012)	NC	Value-Added Modeling	Using test score data efficiently improves the predictive ability of value-added models in both math and reading.

Teacher Mobility

Teacher turnover is incredibly high in many urban school districts. (For a summary of the key features of studies pertaining to educational finance that tap longitudinal data systems, see Table 4.) For example, in Chicago Public Schools (CPS) over 100 schools lose over a quarter of their teaching staff every year, and the typical CPS school loses half its teaching staff every five years (Allensworth, Ponsiciak, & Mazzeo, 2009). Analysis of longitudinal data in other states and locales have spoken to this issue and provided examples of ways to analyze data that are useful to understanding the problem. Having access to longitudinal data, researchers can use discrete time hazard models to study teacher mobility. These models, which measure the length of time, on average, before an event occurs, are appropriate for studying teacher turnover—here, the “event” under study is the act of a teacher leaving the school/district/profession. Using nine years of longitudinal data from the North Carolina State Department of Education that link data on teacher characteristics to student performance, Guarino, Brown, and Wyse (2011) examined whether and when teachers exited the profession. Guarino et al. found that schools serving more at-risk students have a harder time attracting and retaining effective teachers than schools with fewer at-risk students. After attracting new teachers, retaining teachers is further complicated by class assignment. Feng (2010) used Florida’s LDS that combined student characteristics and performance, teacher characteristics and training, and teacher surveys, and found that inexperienced teachers are more likely to be assigned to lower performing schools and classes within the lower performing schools with more English Language Learners, students from low-income backgrounds, and minority students than teachers with more experience. These assignments increased the likelihood of new teachers exiting the profession.

Special Populations

Student subgroups, such as English Language Learners (ELLs), students with special needs, and students from low-income families, have been historically disadvantaged; therefore, finding ways to better serve these students is a concern to educators, policy makers and researchers. (For a summary of the key features of studies pertaining to educational finance that tap longitudinal data systems, see Table 5, page 10.) Policies designed to reduce the gap between students from special populations such as reclassifying high performing ELL students as fluent English speakers have been shown to potentially exacerbate the achievement gap rather than ameliorate it (Robinson, 2011). With six years of longitudinal student data from a large California school district, Robinson (2011) examined a policy that specifies the English language proficiency requirements for when an ELL is “reclassified” as Fluent English Proficient (FEP). The policy specified that if an ELL scored above a particular threshold, the student should be reclassified. Along with the label change (from ELL to FEP), reclassification also entailed a change in the student’s instructional setting and ancillary services provided. For example, if scoring a 70% labeled a student as proficient and not in need of ELL services, a student who scored a 70.1% percent would have had a completely different instructional experience than a student who scored a 69.9%. Robinson used a variation of the regression discontinuity design to compare outcomes for students that barely “passed” the test (i.e. scoring over 70%) to students that barely “failed” the test (i.e. scoring under a 70%) in order to measure the effect of ELL reclassification on barely “passing” students. He found that students barely passing and reclassified as FEP scored lower on future English Language Arts assessments than students that barely failed and remained classified as ELLs. He also found that not using an approach as

Table 4. Teacher Mobility Studies’ Characteristics

	State	Methods	Findings
Feng (2010)	FL	Multinomial Logistic Regression, Discrete Time Hazard Model, Fixed Effects	Teachers with less experience are assigned to more challenging schools with more challenging students. Teacher classroom assignment effects teacher mobility.
Clotfelter, Ladd, & Vigdor (2011)	NC	Discrete Time Hazard Model	When examining the retention of teachers, those with stronger credentials are more responsive to the racial and SES makeup of their school than to financial compensation.
Jacob (2011)	IL	Discrete Time Hazard Model	Principals consider teacher absenteeism, teacher value-added measures, and teacher demographic characteristics when determining which teachers to dismiss.
Guarino, Brown, & Wyse (2011)	NC	Discrete Time Hazard Model	Schools with at-risk students are less likely to attract and retain the most desirable teachers, and are more likely to lose desirable teachers to other schools. School-based pay-for-performance policies exacerbate existing inequities related to the distribution of desirable teachers.

Table 5. Special Populations Study Characteristics

	State	Methods	Findings
Iatarola, Conger, & Long (2011)	FL	Probit Regression, OLS Regression	Schools are pushed to offer Advanced Placement and International Baccalaureate classes by student demand.
Robinson (2011)	CA	Regression Discontinuity Instrument Variable Estimation	ELL reclassification, for students at or near the cut-score, results in lower test scores and did not benefit curricular opportunities or attendance.
Steinberg (2011)	IL	Multilevel Modeling	Students with lower prior year achievement, but lower disciplinary infractions are more likely to participate in Supplemental Education Services.
Jepsen (2010)	CA	Fixed Effects, Propensity Score Matching	ELL students in bilingual education programs score lower than their peers not in bilingual programs, these differences are greater in grades 1-2 than in grades 3-5.
Graves (2011)	CA	Fixed Effects	ELL, low SES, African American, and Latino students experienced significant and negative impacts on a national achievement test due to year-round school calendar.

rigorous as a regression discontinuity design could lead policy makers to reach the wrong conclusions about ELL policy effects. Such studies fill an important function and demonstrate that longitudinal data can help policy makers understand and evaluate outcomes associated with educational policies.

P20 Pipeline and Transitions

As policy makers focus on ways to improve student transition and resulting performance, some studies have examined the effectiveness of policies and programs designed to improve

transitions along the P20 pipeline. (For a summary of the key features of studies pertaining to educational finance that tap longitudinal data systems, see Table 6.) In regards to transitioning to post-secondary education, Xu and Jaggars (2011) examined what happened to students that took online as opposed to classroom-based “gatekeeper courses,” courses designed to determine whether a student is prepared for more advanced content, typically thought of as prerequisites. With four years of longitudinal higher education data from the Virginia Community College System containing nearly 24,000 students from 23 community colleges, Xu and Jaggars used a propensity score

Table 6. P20 Pipeline and Transitions Study Characteristics

	State	Methods	Findings
Niu & Tienda (2010)	TX	OLS Regression, Probit Regression	Black and Hispanic students admitted to UT Austin under the 10% requirement, outperform white students at or below the third decile, despite differences in standardized test scores.
Schwartz et al (2011)	NY	Fixed Effects	Students that attend K-4 and 5-8, or K-8, schools outperform students that attend differently organized schools.
Xu & Jaggars (2011)	VA	Multilevel Propensity Score Matching	Online, rather than face-to-face, courses had significant negative effects on course retention and course performance in students first community college course.
Liang, Heckman, & Abedi (2012)	CA	ANOVA	Many students who take Algebra in 8 th grade do not continue, and 9 th grade students are more likely to succeed in Algebra if they pass the General Mathematics state exam rather than fail the Algebra 1 state exam.
Goodman (2009)	MA	Fixed Effects	Low-income students, even of the same ability and attending the same district, are less likely to enroll in college than their middle and upper income counterparts.

matching approach to identify students that took a gatekeeper course online and matched those students to statistically similar students that took a gatekeeper course in a classroom setting. Propensity score matching matches students based on a variety of factors so that matched students are similar in terms of observable characteristics. If students are matched on all factors believed to be related to both treatment status (here, online course taking) and outcomes (here, course retention and performance), then matching can allow researchers to make causal inferences. Xu and Jaggars found that taking online gatekeeper courses had a significantly negative impact on course retention and performance.

Conclusions

This brief has identified how collecting longitudinal data can best facilitate the examination of educational policies, what data facilitate these examinations, and whether these data must be linked across sectors. Many states have created, or are creating LDSs. The studies included here demonstrate that access to longitudinal data and the use of quasi-experimental designs can provide policy makers with important insight to outcomes associated with programs and policy. However, one should keep in mind that certain questions and data considerations lend themselves to study with certain quasi-experimental designs—that is, not all quasi-experimental designs are created equal, and not all of them can be applied in all instances. For example, as mentioned above, if policy treatment is based on the subject crossing a certain threshold, such as districts having a certain proportion of disadvantaged students or an ELL scoring a certain level on an English Language Arts assessment, the use of regression discontinuity designs can provide reliable causal estimates of the effects of these policies for subjects near the policy-specified threshold.

In order to take full advantage of a LDS, policy makers should focus on matching the appropriate quasi-experimental design with the current question of interest. Further, there are many concerns regarding the appropriate pursuit of quasi-experimental designs. These methods provide important feedback, though the reliability of these methods depends on certain assumptions being met. For example, the findings from regression discontinuity designs can only be reasonably extended to a subject at or near the cut score. Thus, this method only provides reliable information about a subset of a population impacted by a program or policy. As another example, VAM provide information of great interest to policy makers, but the reliability of these measures can be affected by the type of test or length of available data.

As states, like Illinois, continue to develop longitudinal systems that track students both within and across state agencies, researchers will be better equipped to capture the complex nature of educational policies and programs. For instance, studies of teacher effectiveness and teacher mobility are of great interest, but such studies require the most robust datasets drawing on student demographics and

performance data, teacher training and postsecondary data, as well as workforce and labor data. The more robust a dataset, the more reliable the findings of any quasi-experimental design and the creation of LDSs will provide policy makers with an opportunity to examine policies and programs. There is tremendous potential in the ILDS to examine educational outcomes in Illinois, but policy makers and researchers must be careful to use the appropriate design to answer the question of interest and mindful of assumptions and limitations to generalizability inherent in such examinations. ♦

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State Longitudinal Data System (SLDS) Research Agendas: National Context and Instructive Models

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The development of State Longitudinal Data Systems (SLDS) has required innovative technologies in data linkage and data storage, but technology is not the only sector of innovation. SLDS development has also provided the impetus for innovative cooperation across the P20 education spectrum, from early childhood to post-graduate studies. Linking education information to the workforce sector has also be a high priority, requiring unprecedented collaboration around a shared understanding of the potential for data to inform policy and practice in education. In addition to the necessity to converge around different timelines and systems of data collection, P20 workforce stakeholders have aligned diverse priorities and goals around an agenda for the use of SLDS. Since 2009, Illinois education and workforce agency leaders, university researchers, policy analysts, practitioners, and other stakeholders from across the state have collaborated on a research agenda to direct the use of the SLDS.¹ This research

¹ Bragg, D. D., Ryan, K., Lubienski, C., & Robinson, J. (2011, October). *Establishing a research agenda for Illinois' state longitudinal data system*. Proposal for the SLDS Research Agenda prepared by the Forum on the Future of Public Education, College of Education, University of Illinois.

brief describes how Illinois fits in the national context of SLDS development, how research agendas can facilitate efficient use of the SLDS by the research community, and how other states have engaged in innovative practices to impact policy and practice through the creation and development of an SLDS.

Illinois in the National Context

Illinois' efforts occurred as a part of a national movement to establish SLDS and make longitudinal data an accessible tool for stakeholders and policymakers. Approximately 40 states have developed a research agenda, or are planning to, in order to guide the use of their SLDS.² To understand Illinois' research priorities within this national context, and to identify useful models for using the research agenda, we collected all available research agendas and interviewed representatives from states engaged in creating them. We also identified some states that have opted not to develop a research agenda, or do not have an agenda at this

² Data Quality Campaign (n.d.). <http://www.dataqualitycampaign.org>

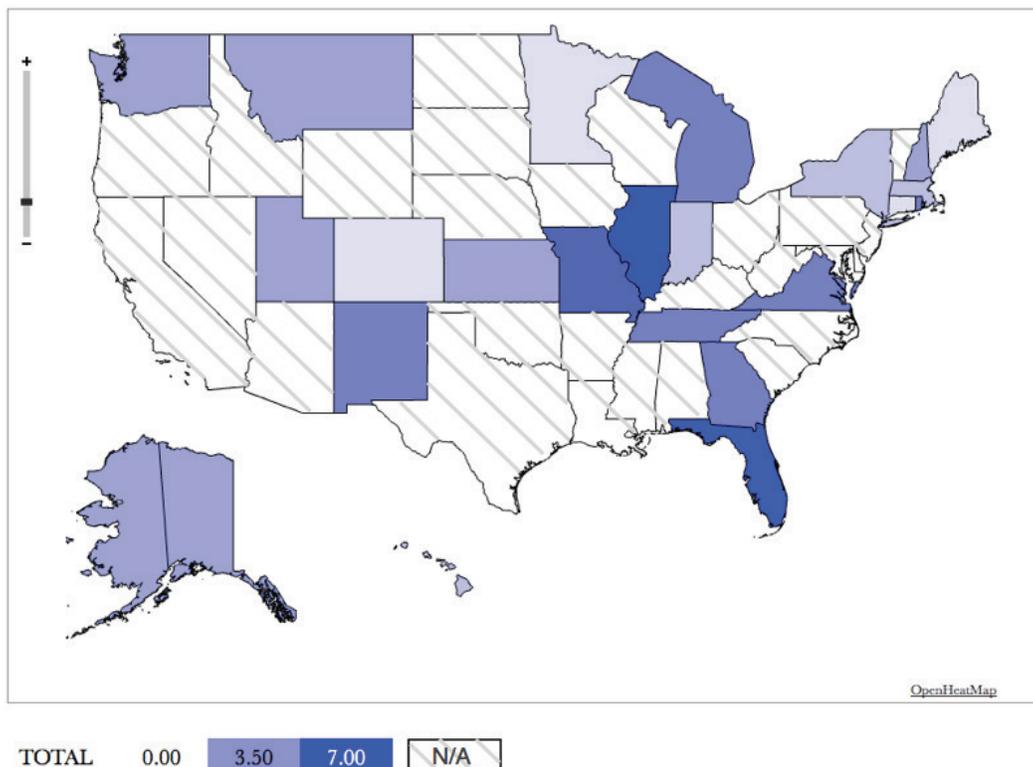


Figure 1. Intensity Map Comparing States to Illinois Research Agenda

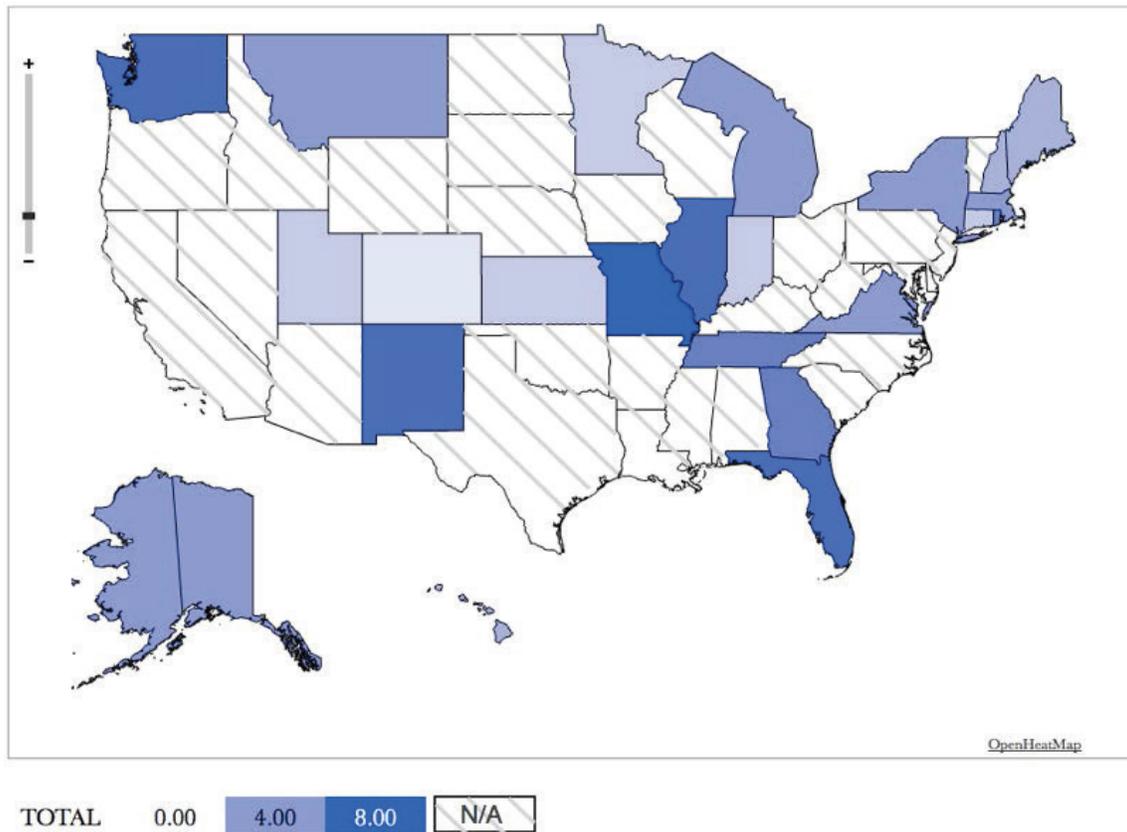


Figure 2. Intensity Map Indicating Illinois' Alignment with National Themes

time: California, Nevada, New Jersey, North Dakota, and West Virginia. To date, we have conducted 30 interviews and examined 22 research agendas.

The form and content of the research agendas varies by state. Some states have only brief, bulleted statements, while others have lengthy detailed questions on multiple topics. The following intensity map shows Illinois' research agenda themes in a national context. This map shows that the seven themes identified by Illinois are also relevant, in varying degrees, to the other states that do have an agenda.

To better understand how Illinois' research agenda³ compares to other states, we reviewed all available research agendas that were accessible via websites and hard-copy format, and we identified the themes represented. In all, eight themes were represented in the agendas to provide a snapshot of the national SLDS research (see Table 2 online, <http://occril.illinois.edu/update-newsletter-fall-2013/>). The following map provides a picture of the national areas of interest in SLDS and Illinois' place within that context.

³ Bragg, D., & Linick, M. (2013). The Illinois Longitudinal Data System (LDS) research agenda. Champaign, IL: Illinois Collaborative for Education Policy Research, University of Illinois.

The most commonly listed single research question evident in the state LDS agendas centered on teacher certification and preparation, and the impact of these processes on student outcomes (see Table 3 online, <http://occril.illinois.edu/update-newsletter-fall-2013/>). In all, 14 states listed a research question pertaining to this issue. Grouping the single questions into larger themes, we identified eight themes (see Table 2 online, <http://occril.illinois.edu/update-newsletter-fall-2013/>). Among the themes, "Student & Family Characteristics" was the most frequently listed among the states' research agendas. Questions within this theme centered, for example, on student and family socioeconomic status (SES), race/ethnicity, and parental involvement. Given the vast array of questions pertaining to this theme, it is of little surprise that 95% of the collected SLDS research agendas included this thematic category.

Though Illinois is well aligned with other SLDS research agendas, some themes emerged in other state's research agendas that are not specifically addressed in Illinois. For example, School Characteristics, such as school and district finances is not called out in Illinois' research agenda. Certainly each state has specific policy concerns and educational needs, yet the work of other states is worth considering as Illinois continues to revise its SLDS research agenda.

The Function of SLDS Research Agendas

Of the states that have developed research agendas, the function varies dramatically by state. In Washington, the research agenda serves as a guide to researchers and policy makers invested in answering the most pressing questions for Washington's P-20 educational system. Researchers seeking data from Washington experience a similar process in gaining access to the data regardless of the alignment of their project to the Washington research agenda, but researchers with a focus on utilization may be driven towards the state's particular concerns.

In other states, such as Florida, among other criteria, researchers gain access to data only if the topic of the study is specifically mentioned in the research agenda. It appears the state has adopted this process to ensure that the studies that researchers conduct uses the SLDS in ways that serve the highest priorities of the state. While this approach may seem restrictive, it is important to note that Florida has adopted an extensive research agenda that has heightened the interest in SLDS among members of the research community who are consequently bringing their expertise to the state's priority topics.

Finally, some states focus their SLDS research agenda on the needs of the state agencies. In Connecticut, access to the SLDS is only granted to contributing state agencies; as such, the research agenda serves as a guide to how the SLDS can be used to fulfill reporting requirements and address other agency-level demands. In some cases, particularly where SLDS development is in early stages, the research agenda serves to advertise the importance of developing a SLDS.

Models of SLDS Research Use

SLDS research agendas take on diverse forms. All profess the need to inform and support the use SLDS research on some level, but access to SLDS data varies widely. Some states have moved far beyond the stage of planning for the use of SLDS data to implementation of comprehensive data access and use systems. For example, Florida and Virginia are cited frequently as models for SLDS development, but our research shows several other states that have adopted innovative practices to support data use for the purposes of conducting research. Similarly, several states have developed and supported innovative methods to make SLDS data useful to a range of stakeholders, including policy makers.

The Rhode Island Data Hub, ridatahub.org, is an innovative example of how SLDS data can be used to address questions for policymakers, researchers, and the public. The Data Hub contains tutorials and reports in the form of "Data Stories."⁴ A Data Story

⁴ Rhode Island (RI) Data Hub. (n.d.). Retrieved from <http://www.ridatahub.org>

is presented through a series of charts, graphs, and explanatory text investigating a topic. Starting with an essential question, these data stories indicate what insights or conclusions the data reveal and then provide next steps for stakeholders, including researchers, policy makers, and practitioners. For example, in alignment with the theme of Student & Family Characteristics, a data story entitled: "The Educational Costs of Unhealthy Housing" seeks to provide information and data on the ill-effects of "lead, mold, allergens, carbon monoxide, pesticides, and radon harm" on student educational outcomes.⁵ Providing data and analysis, the data story also concludes with suggestions on how to use such insights at the state, municipal, and health care provider levels. While users are encouraged to create their own data stories, those that are featured on the site represent a collaboration of multiple state agencies and other stakeholders. Each agency takes a turn developing a key question. Guided by a facilitator and recorded by a journalist or other communications' expert, state agency representatives and other stakeholders meet to discuss and develop the data stories. The result is a wide variety of data stories that approach questions of concern to the state of Rhode Island from multiple perspectives.

Mississippi's Longitudinal Data System, more commonly known as Mississippi LifeTracks, is designed to help meet data needs for reporting requirements and to answer critical policy questions relevant to education, workforce, and economic development.⁶ Moving the state beyond the previous model of patchwork data sharing, Mississippi LifeTracks is an interoperable data system that securely facilitates research and analysis to provide linkages between early childhood, K12 education, postsecondary education, and the workforce. Mississippi LifeTracks is designed to enhance not only the capacity of the state and policy makers to make data-driven decisions, but also the capacity of local school districts, schools, and teachers as well. It seeks to further enhance the state's capacity to link, match, and share education and workforce data that can lead to an increased ability within the state to improve career-readiness outcomes and enhance economic success. The dashboard feature makes it simple and intuitive for users to ask questions and obtain real time answers based on data from across the P20 workforce system. Data from LifeTracks has been used to attract companies and even multi-national corporations, notably Toyota and its subsidiaries, to Mississippi because of the ability to measure and predict future workforce educational qualifications. LifeTracks is changing the landscape and raising the bar for SLDS.

⁵ Rhode Island (RI) Data Hub. (n.d.). The educational costs of unhealthy housing. Retrieved from <http://www.ridatahub.org/datastories/educational-costs-of-unhealthy-housing/1/>

⁶ See, for example: NCES. (2012). SLDS spotlight: Mississippi's approach to building a P-20W data model. Retrieved from <http://nces.ed.gov/programs/slids/pdf/msp20.pdf>

Washington exemplifies how collecting data and making data available to researchers can aid policy makers in pursuing pressing questions related to educational outcomes. Presently, Washington is in the process of matching “base data”, such as extensive early childhood data, K12 data that contains student and teacher records, postsecondary data from the public 2-year and 4-year higher education institutions, and wage and industry data across agencies. Matching student unit records across state agencies has been done for years, but now the state is working to create a formal data warehouse that contains all data in a single location. Currently, there is an effort to add additional early childhood data, labor data, career and technical education (CTE) data, financial aid data, health and social welfare data, and corrections data to build out their data warehouse, as much as possible. The data are housed at the State of Washington Education Research and Data Center (ERDC), <http://www.erd.c.wa.gov/> a governmental organization staffed by educational researchers⁷ The state has established an innovative request process that provides data to educational researchers seeking to answer questions. Part of this process requires researchers to give any products generated from their research to the data contributing organizations for review. This review process provides an opportunity for researchers and state agencies to engage with one another, while providing useful feedback. The combination of an extensive data system with a data dissemination process that requires engagement between the researchers and agencies creates appears to fertile environment for addressing educational policy concerns with research-based answers.

⁷ Education Research & Data Center. (n.d.). Retrieved from: <http://www.erd.c.wa.gov>

Conclusion

Illinois’ SLDS research agenda is well aligned with other state examples. There are, however, thematic areas where Illinois may benefit from a review of other state agendas. Further, as Illinois moves towards the creation of its own SLDS, models developed by other states may help to guide the state towards a SLDS research agenda that informs policy, but only if researchers are given access to the data and allowed to conduct and publish research. Washington and Florida employ approaches to the SLDS that provide a framework for SLDS research projects that encourage and support researcher access to data that address critical problems that the states are facing. Finally, Rhode Island, Mississippi, and Washington provide innovative examples of how SLDS research can be used to improve program and policy making by providing agency leaders and policy makers with data for informed decision-making.

The full report can be view online at <http://occr.illinois.edu/update-newsletter-fall-2013/>. ◆

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