Research to Inform College and Career Pathways

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I am truly honored to be invited to present to you today. I am fortunate to have been inducted into the research world by David Stern, a CCASN founder, by ConnectEd's Gary Hoachlander, by the Leadership in Educational Equity Program at UC Berkeley, which focuses on equity-based design studies, and by Svetlana Darche, of WestEd, with whom I have worked closely over the past two years analyzing research on the pathways funded through the CCPT grants.

I came to research as a practitioner, after 22 years of teaching and leading in a California Partnership Academy in a large comprehensive high school. I have focused my work on equity issues in pathway development, teacher leadership and education leadership. I value the education research knowledge base, because I really like being strategic. I want to pour my energy into making a difference. So while I am passionate about pathways, it is essential for me to temper that passion with thorough consideration of the evidence. Research on pathways has to help us check our compass, make sure we aren't going down paths that exacerbate disparities, and provide us with data to chart strategy for the difficult challenge of completely transforming schools.

The success of a reform as complex as this one relies on practitioners who understand and use research findings from a wide range of knowledge bases, many of which have yet to be thoroughly applied to the Linked Learning context. There are many things we do not yet know about how Linked Learning works, how context affects implementation, and how to bring this approach into the mainstream of secondary education. The Linked Learning approach can learn from research on school leadership, school organization, teacher recruitment, induction, and professional development, instructional practices and assessment, social-emotional learning, intersystem alignment and linkages (both postsecondary and workforce-related), counseling, student supports, career education, industry and community involvement in schools and work-based learning – to name just a few.

One key finding from previous research is that organizing high school students into small learning communities -- on the order of about 100 students per grade level or less -- can produce positive outcomes for students. This finding comes from research on career academies, small schools of choice, and Linked Learning pathways. For example, James Kemple's (2008) eight-year study of Career Academies with MDRC; David Stern's (2010) summary of the research, "Career Academies: A Proven Strategy to Prepare High School Students for College and Careers," Howard Bloom and his colleague's (2010) MDRC evaluation of small schools of choice in New York City and the SRI evaluation of Linked Learning in California (Guha et al., 2014; Warner et al., 2015), now in its seventh year. But the research on small schools has also determined that while small size can be helpful, it is not sufficient to bring about improved student success by itself. That may be true about each of the key components of the Linked

Learning approach. Necessary, but insufficient by themselves. **So this is a complex combination of interventions.**

Recent evidence on the greater effectiveness of pathways that offer the whole package of Linked Learning components comes from the SRI 5th and 6th year reports on their evaluation of Linked Learning. SRI found that only certified pathways produced significant effects on student outcomes. Pathways that did not meet certification standards did not significantly impact student success.

Unfortunately, the research does not tell us which features of Linked Learning produce the biggest impacts for students, or whether all of the features are necessary. Can we implement some but not others and still be effective? For instance, if we can't cohort students, is connecting thematically as effective as fully integrated project based curriculum and assessments? What if a pathway has four subjects linked at a grade level, but is not cohorted?

Cohorting is one of the most challenging components of the Linked Learning approach. While we cannot isolate the impact of cohorting on student performance, perhaps we could investigate its impact on teacher professionalism. We might compare pathway teams in similar schools with equivalent grade level width and planning time but different relationships to cohorting. We could correlate measures such as teachers' sense of efficacy and professionalism, the capacity of the teacher team to engage students in performance tasks and authentic performance assessments, and both teachers and pathway students' sense of community. While such studies can not draw causal implications because of the interplay of other factors, such as quality of leadership and access to professional development or industry partnerships, they would contribute to a deeper understanding of the role of cohorts in the Linked Learning approach. That would help administrators in Linked Learning districts understand the value of changing master scheduling processes to enable cohorting.

To determine whether some elements of Linked Learning matter more than others would require a truly massive longitudinal study, with many different schools implementing various combinations of the features that are included in Linked Learning pathways. Such a study would be very expensive and is unlikely to happen in the foreseeable future. We are therefore left with the finding that a certain combination of elements produces positive outcomes for students. The challenge is how to make that tested combination of elements available to greater numbers of students. But scaling up an effective intervention changes the context. Where once you had some innovative leaders developing model pathways, suddenly you need many leaders, and many people working in new and sometimes uncomfortable roles, changing systems when they don't necessarily know how or why. When whole systems are redesigned, the success of the reform is based upon people understanding the reform, to implement the changes it entails.

Several elements in the package that has been found effective are also contrary to the status quo, or "contra-normative." The Linked Learning pathway's interdisciplinary team is contra-normative. High school organization is solidly disciplinary in nature. Not only are we trying to get teachers to work across the subject disciplines that have ordered their own education, we also want them apply their subject expertise in collaboration with other disciplines to real world problems. But high schools work in departments. Moreover, we've set up a team that elevates the CTE teacher, whose work in many high schools has been considered marginal to the main

academic enterprise. And we want the team to integrate CTE content into academic coursework. We want them to do that on top of the work they are doing to revamp the teaching of academics through new state standards.

Linked Learning is promoting systemic transformational changes, particularly dramatic for the comprehensive high school. **Creating conditions that facilitate these changes is the work of leadership at all levels.** The recent effort to scale up pathways has brought school leadership, school culture, school organization, teacher professional development, and coherence in school reform to the fore as crucial areas for research in order to effectively build and sustain pathways in comprehensive high schools.

What do education leaders need to know and be able to do in order to scale up pathways? We are asking education leaders to manage a fundamentally transformative change process. What kind of leadership structures will engage teachers in taking ownership of these changes on a school-wide level? What is the impact of pathway size on scalability? How do leaders make decisions that balance student interest and workforce demands? Can we incorporate career education and improve transitions to postsecondary without a significant increase in counseling resources? These are some of the problems of practice leaders in the field face, which is what makes them good topics for design-based research or participatory action research.

Informing Policy. With the shift to Local Control, research on policy implementation can tell us how the new system of incentives and supports from the state are affecting the expansion of Linked Learning. How are pathways prioritized effectively in the LCAP process? Research collaborations with LEAs could be very helpful in developing pilot programs to address key barriers to pathway development at the local level. The lessons drawn from that work can inform policy development while addressing immediate local needs. The CSU CALL programs partnering with districts and consortia are leading this effort, and we are anxious to learn from your research.

Because Linked Learning is intended to change how teaching and learning happen, research on teacher recruitment, induction, and professional development also can be useful. People in the field are designing and creating systems for teachers to work together on implementing new instructional strategies, and programs for them to obtain new subject matter content connecting academics to current industry practice. This is another good opportunity for design-based research to determine which approaches to changing instructional practice really appear to take hold.

How to best prepare and induct teachers into pathways is a key question that CSU Linked Learning CALL faculty are engaging. The CSU CALL has created teacher, administrator, and EdD programs in seven CSUs, and has made a significant impact on teacher preparation for cross-disciplinary teaming, understanding CTE, project-based learning, work-based learning, and other practices employed in pathways. In 2010 the Blue Ribbon Panel on Clinical Preparation and Partnerships for Improved Student Learning (American Association of Colleges for Teacher Education (AACTE)) identified CSU Long Beach teacher graduates as more prepared to address the needs of local students, and as having significantly reduced the teacher turnover rate in Long Beach Unified.

Since then CSU CALL has expanded. In addition to the seven CSUs preparing Linked Learning teachers, administrators and education leaders, district and county offices are collaborating with CSU programs, and many are also preparing CTE teachers for Linked Learning pathways. As partnerships grow between local LEAs implementing Linked Learning and postsecondary institutions training the teachers and leaders for Linked Learning pathways, the role of CTE preparation and credentialing is changing. The CTE sequence is at the heart of the Linked Learning pathway program of study, and academic CTE courses are becoming a key component of the academic core.

What do we need to know to strengthen pre-service and in-service pathway teacher preparation? Already some of the Linked Learning CALL programs are incorporating industry externships into pre-service teachers' experience and supporting those new teachers to apply that real world experience to curriculum design. As these innovations are implemented, it would be helpful to know how they impact student success in the classroom, and teacher longevity. Could teacher education programs develop design studies to pilot program models that build upon incoming teacher candidates' previous industry experience, or that offer the coursework that candidates need to get a CTE credential and industry experience alongside their Single Subject credential?

Such design studies would not only move teacher preparation closer to meeting the demands of teaching in career pathways, but may also be able to help address the current teacher shortage which severely hinders pathway expansion. For example, many postsecondary institutions that prepare professionals in STEM fields like computer science and engineering already connect to elementary and secondary education, such as CalTeach. Could a program be designed to provide access to CTE credentialing information and coursework using an education minor so that graduates are eligible for CTE credentials once they have worked in the field? Working with LEAs to develop innovative programs, studying their implementation and measuring their impact can help refine and replicate innovative approaches, and inform policy.

As Linked Learning scales up, the demand for, and status of CTE teachers is changing, because CTE teachers are essential for implementing pathways. Yet we know very little about the shortage of CTE teachers. How many CTE positions are currently open? In which industry sectors? For what reasons? How does dual credentialing affect teacher shortages or pathway scheduling, or teacher skill in creating performance tasks and performance assessments? **Answers to these questions can inform policy aimed at integrating academics with CTE while also addressing the teacher shortage.**

Additional opportunities for useful research arise from the effort to align secondary and post-secondary systems, which requires new kinds of knowledge, tools and routines from both pathway teachers and Linked Learning districts. As many more pathways embed early college coursework, are pathway demographics changing? Are disparities in early college coursework shifting? What kinds of embedded supports for pathway Dual Enrollment courses decrease disparities in student success in early college coursework? Prime participatory action research for pathway teams, or design based research with secondary and postsecondary district involvement.

The differences between sectors in pathway alignment would also be helpful to understand for practitioners working with industry and postsecondary partners to develop pathways. For

example, in an action research project currently underway in the Sacramento region, while working on facilitating student transitions from high school to community college health pathways, we learned that in the health sector, where most postsecondary programs are impacted, it may be more strategic to build dual enrollment coursework into the spring semester of the senior year in order to access continuing student status than to try to obtain preferential admissions. Continuing student status effectively prioritizes health pathway students as they schedule their first semester courses. Comparative case studies analyzing the process of aligning pathways with early college coursework could also highlight best practices and identify dangerous pitfalls.

Teachers need time to lead, learn and collaboratively implement these changes. A tremendous amount of research supports that, including Linda Darling Hammond's "Addressing California's Emerging Teacher Shortage," (2016) and Steinhauser and Darling-Hammond's Report from the CDE Task Force on Educator Excellence (2012) on the needs of the teaching profession. Literature on whole school reform and professional development has amply demonstrated the importance of teacher collaboration time, teacher leadership, and site based, coherent professional development planning.

Yet at most sites, we have not yet figured out how to get teachers the time to collaborate – beyond taking away a prep period– or to lead the teacher team. This key challenge was reported overwhelmingly by pathway leads in a recent study that I collaborated on with WestEd, looking at the pathways supported by first year CCPT grants. How much of what kind of time is needed to create conditions conducive to pathway development? What changes are needed in teachers' union contracts, to codify working conditions and expectations of teachers, in ways that support pathway teacher teaming and teacher leadership?

As pathways scale up, moving from small autonomous schools and the corners of comprehensive high schools to the mainstream, systems have to be revamped in each local context to create conditions conducive to pathway development, and to ensure that pathways serve to improve equity in student outcomes. With LCAP, local districts and county offices now have much more say over their approach to schooling. It is up to districts and county offices of education to put into place professional development programs that can accomplish these changes in the teacher workforce. Research partnerships between those LEAs and postsecondary graduate schools of education are going to be crucial to transforming the teacher workforce for effective implementation of scaled-up pathways.

A role for field research. To identify effects of pathways on students requires the kind of study done by MDRC and SRI, which are designed to minimize the well-known problem of selection bias. Selection bias can arise, for example, if a certain pathway enrolls more highly motivated students. Randomized controlled trials are generally considered to be the best design for minimizing selection bias, especially if one is trying to measure change brought about by an intervention. However, the questions I've suggested about leadership, teacher preparation, district incentives and other implementation issues often do not lend themselves to random assignment studies, because it is not feasible to include the number of classrooms, schools, or districts that would make statistical analysis valid. To answer these kinds of questions, the most feasible approach would be a combination of design study and comparative case study.

Lafors and McGlawn's (2013) comparative case study of Linked Learning schools and districts was able to identify common practices that supported student success, note evidence of increased graduation rates and access to early college coursework, and identify areas where variations in performance indicate important equity issues for Linked Learning schools and districts, such as in improving equitable access to a college-preparatory, a-g program of study.

Design studies are best developed in collaboration with LEAs, connecting research questions with internal capacity building and strategic priorities. For example, a Linked Learning district prioritizing the development of the pathway teacher workforce might be very interested in a design study that brings industry partners into the classroom to work with academic teachers on industry based applications of academic content. A design study would allow careful consideration of the components needed to successfully pair academic teachers with industry partners, and would allow the lessons learned from a pilot program to be refined in later iterations. An embedded case study might compare teachers from a single subject area working with different industry sectors to understand the sectorial differences in performance tasks and assessments. Another design study related to both studies could design and test a tool for assessing teacher skill at creating performance tasks and assessments. Such collaborative research serves the field, while involving and empowering professionals in the field to implement Linked Learning in ways that work.

I am working with a planning team from a number of different research organizations, including SRI International, WestEd, Jobs For the Future, Learning Policy Institute, CCASN and the Linked Learning Alliance on a **College and Career Pathways Research Symposia Series** that will take place over the next two years, coordinated by Marisa Castellano, who wrote the recently released report in your packet, Proposed Elements of a Research Agenda for Linked Learning (2016). The symposia will each focus on one of four key topics: The Secondary Student Experience, Systems Alignment, Teaching and Learning, and Capacity Building. We will be inviting participants from around the country to expand our understanding of the knowledge base, identify gaps, prioritize questions for further research, and discuss the kinds of research that will most effectively address these questions. We are very interested in including your research findings, and will be working through the CSU CALL network to do so.

Thank you.

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