

Professional Learning for Linked Learning Series Valuing Career and Technical Education

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About Linked Learning

Linked Learning is an instructional approach that provides students with academically challenging pathways leading to careers in high-need, high-growth occupational sectors and prepares them to succeed in postsecondary educational institutions. By design, Linked Learning pathways aspire to develop students' academic and industry-related knowledge and skills by engaging them in projects and coursework that blend career and technical education (CTE) content with a traditional core curriculum (e.g., mathematics, English, and science). To do so, Linked Learning pathways are career-themed. They offer a sequence of rigorous coursework, integrated projects, and work-based learning experiences designed to develop students' abilities to pursue careers in a field of their choosing and in postsecondary education.

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The aim of Linked Learning pathways—to prepare all students for college and career—calls for a new paradigm for schooling. As Saunders and Chrisman report (2011), this new paradigm rests on three research-based propositions:

- 1) Learning both academic and technical knowledge is enhanced when the two are combined and contextualized in real-world situations;
- 2) Connecting instruction to real-world contexts promotes student interest and engagement; and
- 3) Students provided with both academic and career education are generally better able to choose from the full range of postsecondary options (p. iv).

Shifting our schooling paradigm so that all students are prepared for college and career will require more than redesigning school structures to incorporate Linked Learning pathways and legislating policies that provide needed resources. It will require societal shifts in attitudes and beliefs.

As Mike Rose describes in his book, *The Mind at Work: Valuing the Intelligence of the American Worker* (2014), there is a “tendency in our culture to diminish the intelligence of those who do manual work,” ascribing lesser value to this work and by extension its practitioners. A hierarchy of professional work is embedded in the language that people use to talk about different sorts of jobs and professions. In writing about the work of waitressing, hairstyling, carpentry, and plumbing, Rose suggests an alternate conception of the sort of knowledge required by this work: a “conception of knowledge that doesn’t separate hand from brain; that articulates the many kinds of knowing involved in work; that articulates the interplay of the cognitive, the social, the aesthetic; [and] that is more abundant and varied than a model built on hierarchies and binaries” (p. 215). In doing so, he suggests that as long as society views intelligence narrowly and values only some talents and capabilities, we neglect to appreciate the range of ways that people come to understand others and the world around them. Rose also points out that our conception of intelligence has social consequences, noting, “If we think that whole categories of people—identified by class, by occupation—are not that bright, then we reinforce social separations and cripple our ability to talk across our current cultural divides” (p. 216). These ideas are pertinent to Linked Learning, which aspires to change this narrow conception of intelligence and what it means to truly educate all students for success in life.

Ways of Knowing

A story told by a retired automotive teacher helps communicate the importance of the Linked Learning approach. This teacher's former student, Jimmy, was an "auto shop junkie" who loved cars and was an amazing technician. In his Engine Rebuilding class, Jimmy was a troubleshooter, a thinker, and a problem solver. So, when he came into the auto shop one day with his report card, his teacher was surprised to see that Jimmy was getting an F in Algebra One. When he asked Jimmy what was going on in math class, Jimmy said, "I just don't get it."

"What do you *mean* you don't get it?," his teacher asked, "You're doing advanced algebra and trigonometry in my class." Jimmy looked puzzled. His teacher asked Jimmy for his automotive notebook and then found calculations that Jimmy had done to calculate camshaft lift, duration, volumetric efficiency, horsepower, and torque curve to maximize engine output and told him, "That's advanced-level algebra." Jimmy responded emphatically, "That's not what my teacher's teaching me."

It made no sense to his automotive teacher that Jimmy was flunking Algebra One, so he asked to borrow Jimmy's notebook and then showed it to Jimmy's algebra teacher. When shown Jimmy's mathematical calculations from auto shop, his algebra teacher didn't believe the notebook belonged to Jimmy, arguing that there was *no way* Jimmy was doing *that* math and calling Jimmy a knucklehead who could not do math.

The automotive teacher couldn't believe what he was hearing because he'd seen Jimmy do these calculations. He suggested that the algebra teacher bring his car's manual to math class and ask Jimmy to make some calculations using the specifications for his car. In other words, he suggested that the algebra teacher ask Jimmy to demonstrate his knowledge of algebra concepts in auto mechanical terms. Although skeptical, the math teacher followed the automotive teacher's suggestion; to his surprise, Jimmy was able to do each calculation just as his automo-

tive teacher predicted. The following day, Jimmy entered auto shop with a huge smile on his face. He proudly told his teacher that he no longer had an F in algebra. As his teacher concluded, "That's the power of hooking kids up with things that are relevant to them." It is also the power of using multiple assessments to ascertain student knowledge and understanding, and it demonstrates the value of teachers talking and working with each other to explore the strengths, interests, and needs of students (see [Multiple Measures Approaches to High School Graduation](#)).

This story supports the approach upon which Linked Learning rests by showing that a student can learn things in different ways; by combining academic and technical instruction, Jimmy's learning was enhanced. We recognize that Jimmy had to pass Algebra One in order to choose from the full range of postsecondary options when he graduated. And, we perceive the injustice of his failing math. In addition to making the tenets of the Linked Learning approach concrete, there are two important lessons to draw from this story: one, the assumptions that we make about people's capabilities are limiting, and two, the manner in which we assess learning matters.

Both these lessons have important implications for how Linked Learning must be designed and used in our high schools if the Linked Learning approach is to prepare all students for college *and* career. What follows are a few recommendations for school leaders and teachers to help enact the sort of Linked Learning programs that do not replicate a system of sorting and tracking students, limiting their life opportunities and diminishing students' sense of self-worth.

Recommendation 1: Bridge the Divide Between Career and Technical Education and Core Academics

Connecting career and technical education (CTE) to core academic subjects in ways that are meaningful to all students will require CTE and core academic teachers to work together closely. To do so, they will need to see the reasons for in-

tegrating their subject matter, and they will need to value the expertise that their colleagues bring to teaching. For many, this will require a shift in beliefs and attitudes. There are some actions that school and district leaders can take to bridge this divide and thereby strengthen the Linked Learning experience for students.

Expect meaningful integration of core academic and career technical subjects.

Integrating core academic and technical learning in meaningful ways requires that all teachers work together, which as Jimmy's story suggests, does not always happen. Integrating core academic subjects and CTE in meaningful ways requires real thought, hard work, and genuine collaboration among teachers. Since this is critical, meaningful integration should be an expectation for Linked Learning teachers, who will then require administrative support in designing this integration. Teachers must know their own subject matter well enough to think about it in flexible ways and be alert to opportunities for integration. Providing examples of meaningful integration in teaching can be helpful in this regard, but school leaders will also have to help pathway teachers develop learning experiences for their students that integrate career technical and core academic content in each pathway.

Create enabling conditions.

At the school level, principals should provide core academic and CTE teachers with adequate time to work together so they can jointly develop curriculum and assess students' learning. This will require both longer blocks of time when teachers are released from their daily teaching responsibilities to design and plan together and shorter, more frequent meetings that allow teachers to stay abreast of their shared students' progress.

In addition to providing CTE and core academic pathway teachers with structured time to work together, principals also need to develop these teachers' abilities to learn from one another. Working effectively as a team requires "clear goals, well-thought-out tasks that are conducive to teamwork, team members with

the right skills and experiences for the task, adequate resources, and access to coaching and support" (Hackman, R., in Edmondson, p. 13). School leaders need to consider carefully how they design and support Linked Learning pathway teams so that team members can learn from one another and from the work they do together.

At the district level, policies need to be in place to ensure that CTE teachers are on the same salary schedule as core subject teachers. In some districts, CTE teachers are not on the same salary schedule as single-subject credentialed teachers and are not afforded the same bargaining rights. This situation typically occurs when CTE teachers have followed a different academic and career path into teaching; CTE teachers often have more industry-related experience and fewer academic credentials. The industry experience and relationships to industry professionals that CTE teachers can bring into schools, however, provide an important asset to Linked Learning programs. In the words of one teacher, "They bring [the career] theme to life." An English teacher explained, "Often as a teacher you go off to college and you get your teaching credential, and you don't have any field experience in industry. But the CTE teachers do have that experience and bring that to the table. The core teachers don't." The industry experience that CTE teachers have is extremely valuable. Districts need to make sure that they recognize its value and treat the CTE credential equally. Otherwise, district policies replicate the very two-track system that Linked Learning seeks to dismantle.

Districts can also bridge the divide between CTE and core academics through graduation requirements. Making a sequence of CTE coursework a graduation requirement for Linked Learning students, job security is created for CTE teachers. When CTE courses are offered as electives, course enrollment fluctuates more dramatically than when a course is required. If a course is under-enrolled, then a district cannot afford to pay a teacher to teach that class. This may mean that in schools where Linked Learning pathways are just developing, districts need to allocate additional

resources, recognizing that there are start-up costs associated with creating effective pathways.

Recommendation 2: Measure Student Learning in Multiple Ways

As Jimmy’s story shows, when we use narrow measures or only one type of measure to determine what students know and can do, we risk failing to accurately assess understanding. Much has been written on the need to measure student learning in multiple ways (e.g., [Accountability for College and Career Readiness: Developing a New Paradigm](#); [Recognizing College and Career Readiness in the California School Accountability System](#)). What can districts do to make sure students are provided with a variety of ways to demonstrate and further develop their understanding?

Examine student work collaboratively.

Districts and schools can create the needed structures for teachers to assess student work together (see [Developing Performance Assessment System from the Ground Up: Instructional Capacity: How to Build it Right](#)). While it is not practical for all student work to be assessed jointly by teams of teachers, it is possible and valuable to do so occasionally. For example, grade-level teams could jointly assess a student work product each quarter. This need not be a summative assessment, such as a final project, but might be a class assignment that could benefit from review by both CTE and core academic teachers. In addition, examining student work together can help teachers appreciate their colleagues’ knowledge and skills. When teachers with different backgrounds examine a work product together, instructional conversations—about the purpose of the assignment, which knowledge and skills are important for students to develop, and the best way to teach these—can ensue. At the same time, reviewing student work together allows teachers to learn about each other’s content and instructional approaches.

Jointly assessing student work, in a well designed process, is an example of a well-thought-out task in which teacher teams could engage

and benefit from the varying expertise in their group. Through engaging in these tasks, teachers can develop an appreciation for one another’s knowledge and instructional approach and value their colleagues’ differences. By recognizing the value of different perspectives, Linked Learning teachers can provide a richer program of instruction to their students. As one CTE teacher who leads a Linked Learning pathway in a comprehensive high school said, “The best situation from where I’m sitting is [having] content area experts who are willing and able to learn how to think beyond their content area. There is so much potential that is untapped because people get stuck in their specialty. . . .If [people] can step out of [their] comfort zones and see those connections, you can have a very powerful program.” School leaders can and must create opportunities that facilitate teachers’ thinking beyond their subject matter. Jointly examining student work is one way to do this.

Develop authentic products and provide an authentic audience for students’ work.

In addition to written tests, students can demonstrate their knowledge by creating a product. For example in one pathway, ninth-grade students built an aquaponics system, which combined aquaculture (fish farming) with hydroponics (growing plants in water, below).



The key to the system is cultivating cultures of bacteria and recirculating water in a way that converts the ammonia from the fish waste into nitrates to fertilize plants. When describing the learning opportunity, the teacher described learning and assessing the learning as an iterative process:

We lost a lot of fish—all in the name of science! When the fish died, I asked the kids, “What is the problem? What’s your plan? Explain your reasoning.” And they would try to fix that problem. It’s a messy business, . . . [but] in the end, they got it. The plants lived. The fish lived.

School and district leaders can help teachers design such authentic demonstrations of knowledge by providing teachers with time to plan them.

Other pathways provide opportunities in which students create products for actual clients outside of the school. For example, a media and design pathway teacher said client-based work “became the ultimate proof that our students were learning.” Students in this pathway created a product for a client that the client could actually use. This expectation “raises the bar” for students because the quality of their work becomes more relevant. Furthermore, having a real audience engaged students and increased their persistence, as it “gets beyond just do something, turn it in, and accept a C. If a client wants a change, students know they have to do it.” Therefore, district and school leaders can also support teachers by identifying authentic clients with whom pathways can work, since locating client partners is not a simple endeavor

and requires district support. The district office can even become a client site for such authentic learning (see *The District Office as a Site for Work-Based Learning*).

Developing the Learning Experiences All Students Need

Linked Learning is a promising set of ideas and actions that could better prepare students for a wide range of future opportunities after high school, but supporting this goal is complicated. It will require communities to consider what it means to be well educated in a world where the work environment is constantly changing; to design instructional approaches and learning experiences for teachers as well as students; and to value different ways of knowing and contributing to our society. All students deserve an education that prepares them for college and career.

Endnotes

- Edmondson, A. (2012). *Teaming: How organizations learn, innovate, and compete in the knowledge economy*. San Francisco, CA: John Wiley & Sons.
- Rose, M. (2014). *The mind at work: Valuing the intelligence of the American worker*. New York, NY: Penguin Books.
- Saunders, M. & Chrisman, C. (2011). *Linked Learning to the 21st century: Preparing all students for college, career, and civic participation*. Boulder, CO: National Education Policy Center. Retrieved January 22, 2015 from <http://nepc.colorado.edu/publication/linking-learning>

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