Developing a Performance Assessment System From the Ground Up: Lessons Learned From Three Linked Learning Pathways

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Preface:
A Reader's Guide to This Document

This document is designed to offer practitioners—teachers, principals, and central office administrators—models, tools, and examples from the Linked Learning field for developing a performance assessment system. This document describes the challenges and successes practitioners encountered when developing and implementing authentic performance-based assessment practices and systems in Linked Learning pathways as well as the conditions that enabled this work. It is the product of a 1-year study of three grade-level teams, located in three different Linked Learning pathways across California. These teams participated in a 2-year performance assessment demonstration project led by ConnectEd and Envision.

The demonstration project's purpose was to support continued site-based development of a performance assessment system within a Linked Learning pathway. The aim of this demonstration project was to engage a select group of certified Linked Learning pathways in cutting-edge work to more effectively and systematically measure and support student development of the knowledge and skills they need to graduate prepared for college, careers, and life (Project Overview, 2012). This demonstration project supported pathway teams from eight schools that were beginning to implement pathway-wide systems of authentic performance-based assessments that include the use of common, outcomes-aligned rubrics and performance tasks and a culminating student demonstration of learning and skill (Project Overview).

To better understand what is required of teachers who work in Linked Learning pathways to develop this thoughtful and ambitious approach to instruction, we collected multiple kinds of data, including teacher work artifacts and interviews, pathway assignments and rubrics, student work, and artifacts from, and observations of, workshops for teachers and for district administrators. We conducted two interviews with at least two teachers per pathway. For each pathway, we also interviewed a district administrator who worked with Linked Learning and a demonstration project coach who worked with the pathway.

Organization of This Document

We have organized our study into a collection of short sections in which the collection in its entirety offers a rich picture of what is required to build a performance assessment system in a Linked Learning pathway. The first section, *What Is Performance Assessment* and *What Is a Performance Assessment System*, defines these two concepts. The second section, *Pathway Vignettes*, shows the work of three pathway teacher teams engaged in the process of building a system of performance assessment: The *Health and Science*

Pathway is a stand-alone pathway where teachers worked to build vertical alignment in Grades 6-12 and highlights how teacher leadership was a driving force in this work; the *Law Pathway* is one of several pathways in a comprehensive high school with wall-to-wall pathways where teachers focused on creating a senior defense and found that looking closely together at the culminating project helped build a more coherent system; the *Performing Arts Pathway* is a school within a school where teachers focused on aligning pathway outcomes with grade-level curricula and highlights the conditions that enable building a system of performance assessment. The third section, *Core Principles*, identifies six core principles to keep in mind when developing a system of performance assessment. They are:

1. Educate teachers to use performance assessment to improve learning
2. Ensure coherence throughout the system of performance assessment
3. Provide instructional leadership at each level of the system
4. Create enabling workplace conditions
5. Make work time meaningful
6. Pay attention to disciplinary content

The fourth section, *How to Get Started*, provides four strategic questions to ask when embarking upon this process. Embedded within this digital document are various links to specific examples of performance assessment components and artifacts of practice (e.g., pathway outcomes, performance tasks, and rubrics) described in our analysis. In total, the document provides a set of strategies, tools, and questions for taking action to develop or strengthen a performance assessment system in the context of Linked Learning pathways.

The Linked Learning Movement: Preparing High School Students for Career and College

The California Linked Learning District Initiative is in its fifth year. Funded by The James Irvine Foundation and supported by a collection of partner organizations with ConnectEd at the helm, the initiative has provided significant support to nine school districts to design, develop, and implement ambitious, career-themed pathways as a way to better prepare high school students for college, careers, and life after graduation. What began as a nine-district initiative—situated in small and large districts representing the state's diversity—is now rapidly expanding. The state Linked Learning Pilot Program was authorized in 2011 with the passage of Assembly Bill 790, which encourages districts to form regional partnerships and work closely with community organizations and local businesses to implement career-themed Linked Learning programs. "A total of 63 local educational agencies were selected to participate in the first year of the pilot program, which is managed by the California Department of Education," and when the pilot program is fully implemented, Linked Learning will be available to more than one third of the state's high school students.[1]

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[1]Linked Learning Alliance (retrieved December 6, 2013) http://linkedlearning.org/about/where-linked-learning-is-happening/pilot-program/

With support from state and federal policymakers as well as support from an array of technical assistance organizations, like ConnectEd, the Linked Learning movement is likely to continue to gain momentum in communities and schools across the state as it aims to change the learning experiences and life opportunities for youth. In districts with Linked Learning pathways, career themes vary across districts as they reflect local industry. Examples of career themes include: engineering, environmental sciences, medicine, law, performing arts, agriculture, and teaching. While many high schools have only one or two career-themed pathways available to students, some districts, like Pasadena and West Contra Costa, have high schools that are "wall-to-wall pathways," meaning that each student who matriculates to that school must enroll in a Linked Learning pathway. As the Linked Learning movement takes hold in California districts, some districts, such as Los Angeles Unified School District, are experimenting with extending the Linked Learning approach into middle school to ensure entering students are well-prepared.

Intentionally open to all students, Linked Learning pathways aim to provide each student with a meaningful education. This requires having pathways that are replete with effective instruction and having district systems of assessment designed to improve student learning. Achieving these ambitious goals is difficult. Whatever approach a district takes to introduce and grow Linked Learning, the process of change demanded by this reform movement is significant at all levels of the system: Districts must manage the integration of Linked Learning and the Common Core State Standards; figure out how to design, implement, and assess the work-based learning emphasis of their pathways; and support the creation of a system of performance assessments that are credible, defensible, and aligned to the expectations of the CCSS and stated pathway outcomes.

Achieving Pathway Outcomes Through a System of Performance Assessment

A critical aspect of changing students' learning experiences, and thereby altering students' life opportunities, is providing all students with meaningful learning experiences. One sort of meaningful school learning experience connects workplace-relevant knowledge and skills to the classroom setting. The curriculum must challenge students and make new concepts and skills accessible. Importantly, meaningful learning also engages the learner in assessment experiences that provide opportunities for students to show what they know and can do, and it uses assessment experiences to provide feedback to students on their performance so that students can and do improve. Feedback is necessary for continuous learning. Therefore, an important lever for improving teaching and learning in all schools, including Linked Learning pathways, is the development of a performance assessment system.[2]

What Is Performance Assessment?

Performance assessment is an approach to determine student learning that does not rely upon multiple-choice tests as the sole measure of student learning. Performance-based assessment operates on the premise that a test-taker experiences a more complex task when asked to perform, create, or construct an answer rather than to choose the correct answer among a small set of possible answers. In other words, performance assessments are premised on the idea that there is, as Pecheone et al. note (2010, p. 1):[3]

> An important difference between actually *solving* a quadratic equation and using the lower-level, pre-algebra skill of substituting answer options in the equation to *identify* the correct answer [or] . . . between *drawing and justifying* one's own conclusions after reading a passage [rather than] *picking* the best conclusion from a set of four multiple choice options.

Adhering to this premise as well is the idea that important learning occurs in actually doing work.

One familiar performance assessment is the driving test that the Department of Motor Vehicles (DMV) administers. The DMV's performance assessment involves driving a car in traffic, making right and left turns, and parallel parking. In addition to assessing

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[2] For more on balanced systems of assessment, see *The Role of Performance Assessment in Achieving 21st Century Standards of Learning* [http://edpolicy.stanford.edu/projects/277] and *Creating Systems of Assessment for Deeper Learning* [http://edpolicy.stanford.edu/publications/pubs/1075].

[3] Pecheone, R., Kahl, S., Hamma, J., & Jaquith, A. (2010). *Through a looking glass: Lessons learned and future directions for performance assessment.* Stanford, CA: Stanford Center for Opportunity Policy in Education. https://edpolicy.stanford.edu/sites/default/files/publications/through-looking-glass-lessons-learned-and-future-directios-performance-assessment_0.pdf

a driver's skill, the assessor of the driving test is able to observe the judgment a driver displays in unexpected situations, for instance how a driver responds to a blocked lane of traffic or to the unexpected moves other drivers make on the road. In this way, the performance assessment differs from the written driving test, in which the candidate responds to static questions that simply require factual knowledge, such as how many feet does it take to stop a car traveling at 65 mph. Performance assessments used in schools operate in a similar manner: They involve students in an authentic task, such as writing an essay or conducting an experiment for a specific purpose and a real audience. Effective performance assessments often ask students to use knowledge in new ways and/or to create an original product. Performance assessments are typically designed to capture meaningful aspects of student understanding (Lane, 2010)[4], including a student's ability to perform skills and apply knowledge and concepts to a novel situation.

What Is a Performance Assessment System?

Linked Learning pathways are developing a system of performance assessment that spans a student's 4-year high school career. Systems are comprised of interdependent parts. How these parts work together—their interconnections—is what distinguishes a system from a collection of component parts. The aim within Linked Learning pathways is to offer students an integrated approach to instruction, assessment, and curriculum that privileges engaging students in projects and tasks where they can learn by doing and demonstrate their understanding through performance assessments that require complex thinking, problem-solving, judgment, and creativity. Tasks and projects in Linked Learning pathways are often multi-disciplinary and problem-based, and connections to the real world aim to be authentic and transparent. During this first demonstration project year, ConnectEd and Envision created several graphic images to depict the process of developing a system of performance assessment and implementation. Intended to aid teachers and administrators in the work of constructing a Linked Learning system of performance assessment, these images were used during the three demonstration project professional development meetings.

One frequently used image (see page 5) identifies four components of a performance assessment system and shows their relationship in a specific sequence:

> **1.** Pathway outcomes are the competencies that students work toward throughout their tenure in pathways. These are the graduation outcomes that all students are expected to achieve by graduation. Pathway outcomes are meant to align with school and district expectations, such as ESLRs (expected school-wide learning results).

[4] Lane, S. (2010). *Performance assessment: The state of the art.* (SCOPE Student Performance Assessment Series). Stanford, CA: Stanford Center for Opportunity Policy in Education. http://edpolicy.stanford.edu/publications/pubs/116

2. Grade-level benchmarks are distilled from the pathway outcomes. Benchmarks are the set of skills and competencies that students work toward within each grade level so that students achieve pathway outcomes upon graduation. Students are expected to meet benchmark outcomes at critical junctures, for example, at the end of 9th, 10th, and 11th grades. Pathways also refer to these benchmarks as grade-level outcomes (e.g., https://edpolicy.stanford.edu/sites/default/files/doc-sonly/performing-arts-pathway-outcomes.pdf).

3. High-level rubrics are assessment tools. A rubric typically takes the form of a matrix. It states learning outcomes and includes indicators or gradations of achievement for each named outcome along a continuum (https://edpolicy.stanford.edu/sites/default/files/docsonly/example-rubric.pdf). Common rubrics (used for various discipline-specific assignments and/or for interdisciplinary projects) are often used for assessing student performance of grade-level benchmarks on project work.

4. Projects with authentic products and performances are the mechanism through which students learn and display their learning. Some grade-level teams in pathways design integrated, multi-disciplinary

Figure 1: Assessing Pathway Outcomes

1 Pathway Outcomes

Pathway identifies/refines graduate outcomes aligned with school and district . . .

	9	10	11	12
Outcome 1	+	++	+++	++++
Outcome 2	++	++	+++	++++
Outcome 3	+	+	++	+++

2 **. . . which are then articulated into grade-level benchmarks**

3 **. . . that are assessed using high-level rubrics**

4 **. . . and the benchmarks are designed into projects with authentic products and performances . . .**
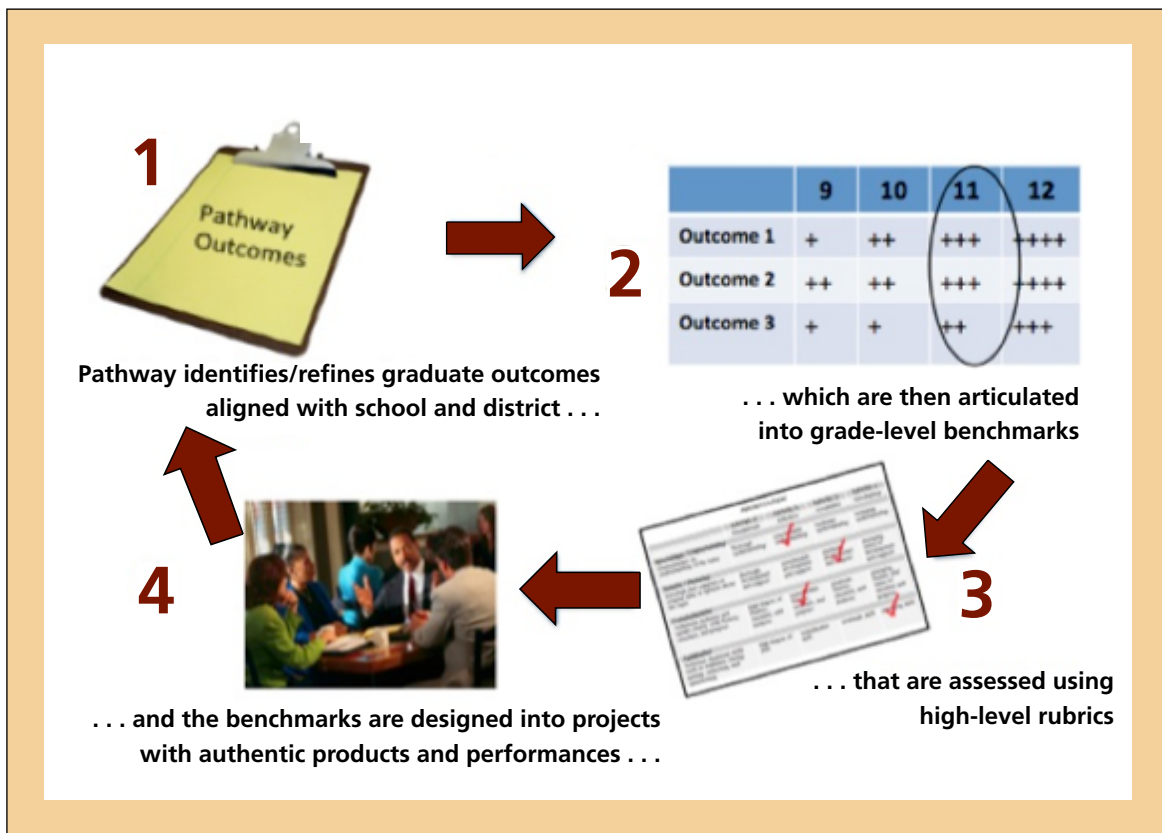
instructional units and use common rubrics to assess resulting work. The project work and performances, which are often the culminating event of such units, are assessed using the common rubrics to evaluate a student's level of proficiency on grade-level benchmarks.

Integrating these components in a clear and manageable system that aligns curriculum, instruction, and assessment is intended to support and guide students to become college- and career-ready and to provide evidence of student proficiency in pathway outcomes. Developing Linked Learning pathways that are truly grounded in work-based learning, meet college readiness requirements for admission to the University of California system, prepare students with 21st century career skills—like knowing how to work effectively in teams—and engage students in meaningful projects and worthwhile performance assessments during the course of a student's high school career, is an ambitious and complex undertaking.

Pathway Vignettes

Our analysis of each pathway team produced vignettes that depict particular aspects of the team's work that emerged as central to its success or that emerged as challenges in the work. Taken together, these vignettes suggest a set of lessons—or core principles—for developing a performance assessment system.

Health and Science Pathway Vignette: Teachers Work Together to Create a Coherent System of Assessment

The Health and Science Pathway (HSP) is a small public college-preparatory high school located in a large urban school district.[5] Since its inception more than a decade ago, HSP has maintained a particular focus on health and the biosciences and currently serves as a stand-alone pathway (i.e., all students enrolled in the school belong to the pathway). HSP is a veteran Linked Learning pathway that was lauded by one administrator as a "poster child academy" whose "community of practice and . . . particular mission is where we all would like to be 10 years from now." However, HSP did not jump to its star status overnight, and indeed it "has taken them 10 to 15 years to get there." The lessons that can be drawn from HSP point to the benefits of a teacher-led process that focuses on building coherence within a system of performance assessment.

One of the successes of HSP has been the establishment of a strong culminating assessment in the form of a senior defense. Every spring, seniors at HSP round out their high school experience by presenting and defending a yearlong "senior investigative project," which is viewed by pathway teachers as the embodiment of the competencies students should achieve during their high school careers. This senior project involves three distinct components that lend themselves naturally to the pathway's focal discipline of science. First, the project requires that students use inquiry skills to develop a research question that relates to work completed during an internship. Secondly, students write an investigative paper throughout the year that answers their research question. Finally, at the end of their senior year, students present their work to a four- or five-person panel consisting of their advisor, another teacher, partners in the health care industry, and community members. The senior defense requires students to present and defend their work for roughly 35 minutes and ultimately pass this graduation requirement.

The science team at HSP has worked ambitiously to make getting started on this culminating project prior to senior year a reality. The HSP teachers have centered their work on engaging students in aspects of this culminating assessment in lower grades and across subject areas in a meaningful way. Most recently, the team has concentrated the work of building this system of performance assessment within the science department.

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[5] School and pathway name is a pseudonym.

The work has largely involved the creation of grade-level rubrics that are aligned to the senior defense rubric. Aligning curricula and assessments across the grades did not happen in isolation but rather in the context of a particular assignment—the lab report—that was used in each grade level and by all science disciplines. Pathway teachers used student work from these lab reports to determine which content and skills were most appropriately developed at each grade level.

The senior defense rubric

The HSP senior defense rubric (https://edpolicy.stanford.edu/sites/default/files/docsonly/hsp-senior-defense-rubric.pdf) is aligned to the school-wide outcomes, also called the habits of mind at HSP. These habits of mind are outcomes framed by four concepts: inquiry, perspectives, logical reasoning, and evidence. While the senior investigative project is geared around the idea of scientific inquiry, students are evaluated on demonstrating certain learning outcomes identified for each of the four habits of mind. For instance, for the concept of perspectives, students are assessed on their ability to "apply context, background, and information to frame [their] problem or question" as well as their ability to "identify multiple perspectives on the topics in science especially with issues of science and controversy." To assess students' ability to show evidence, students are asked to "provide compelling and accurate evidence from multiple sources in the form of facts, quotes, or data." Students mine data from "both literature and field research." To assess students' ability to reason logically, students are asked to "articulate clear steps of investigation" and "support [their] conclusions with evidence [that leads

them to] accept or reject [their] hypothesis and explain why [and] how." Additionally, students are assessed along several criteria related to the effectiveness of their communication and their level of professionalism.

Assessments that build toward the senior defense

At HSP, rubrics are constructed for use in benchmark assessments, known as certifications in the HSP vernacular. These certifications or benchmarks are the primary method of assessment used prior to the senior defense. Certifications involve the completion of assignments that both develop and demonstrate proficiency with skills considered necessary for the mastery of the subject, or as one instructor puts it, "It's mainly the seven to 10 things I would be embarrassed if a student walked out of my class not knowing." The certification assignments take on many different forms, from roundtable presentations to position papers to lab reports. Certification assignments also vary in terms of content—some are more subject-specific, and others are more focused on occupation and life skills. For instance, in an 11th-grade physiology unit on the digestive system, the certification was a lab report on a fetal pig dissection. In contrast, the certification associated with a medical ethics unit consisted of a roundtable debate in which students were asked to use bioethical principles to justify a set of actions in the assigned case (https://edpolicy.stanford.edu/sites/default/files/docsonly/hsp-certifications_0.pdf). The HSP team aligned the certification rubrics to the habits of mind outcomes, which also shape the senior defense. As one instructor indicates, "They're grounded, of course, in content standards, but they also have to have that habit of mind component, so we ensure they're developing that."

The process of aligning the rubrics with the habits of mind outcomes and building consensus around a comprehensive system of assessment is challenging. The alignment of assessments across grade levels and across subject areas is not a simple endeavor. The obvious goal reflected in the outcomes and their indicators on the common rubrics is the intent to prepare students for college and career readiness. However, indicators of readiness had to be co-constructed. Using the science rubrics to collectively assess student work enabled the HSP teachers to build consensus within the science department.

An approach for building department consensus

HSP chose to begin incrementally, building out their performance assessment system in the science department, since it was the content focus of the pathway. However, even within the science department, challenges arose as teachers tried to develop coherence among their discipline-specific rubrics. Science includes several fields of study, such as biology, physics, and chemistry, each with particular content and skill emphases. For example, a physics and chemistry teacher reflected on how his expectations differed from the expectations held by life science teachers in respect of students' mathematical knowledge.

> The way that we approach logs and scientific thinking is different in terms of the numbers that we require kids to be proficient with. Even though there are numbers in life science, in physics and chemistry they

have to have mastery over the numbers in order to be able to interpret them and use them effectively, whereas in life science that's not emphasized as much. So, there's always a lot of disagreement between quantitative versus qualitative data.

Through the intra-departmental process of using rubrics to align expectations for student work and course content, the rubrics became a tool that facilitated building consensus. As the same instructor said, "It's really just getting some clarity around what our expectations are as a department, for each other, and also for the kids. The rubric is doing a really good job to facilitate that."

An approach for building consensus across grades and subject areas

In addition to differences between scientific fields of study, HSP faced a different sort of challenge with regard to consensus building. Vertical alignment across all grades involves coming to consensus about what should be taught and mastered at each grade level. An instructional coach said,

> [Teachers] decided they want the rubrics to align through all the grade levels. And they come together at a meeting, and they are trying to figure out what they think their kids can do. And the sixth-grade teacher says he has all these expectations for his students. And his expectations are high. So now the rest of the staff [are] talking about [how] maybe they have to change their expectations for students.

Teachers do not necessarily have a common view of which outcomes students need to master at each grade level. At HSP, teachers began to develop a shared conception of what grade-level student outcomes ought to be and look like in practice as they worked together to construct a system of performance assessments that were coherent and aligned across grades. As one science teacher said:

> What we're looking at now is actually creating a rubric that's vertically aligned . . . for 6th through 12th grade to help develop the habits of mind, specifically in the science department. . . . We're trying to make sure we articulate clearly what habits of mind we're trying to get at by the time students reach 8th grade, by the time students reach 10th grade, and by the time students are seniors, so that they're ready for college and for their senior defense specifically.

Teachers in the HSP science department were sensitive to both making sure the certification assignments were leading up to the senior defense and developing skills students would need to succeed in college-level science classes:

> There's been a push in our department to at least do a few lab write-ups per class and build those up as kids progress from [Grade] 6 through

12. . . . So, physics is an 11th-grade class, they do six write-ups in 11th grade, so one per marking period. It's to build them up to that so they don't walk into my class and go, "I've never seen this before." Especially, because they'll have to do quite a bit of lab write-ups in college if they take a lab science class.

Exposure to performance assessments in earlier grades was an important design principle in building the HSP system of performance assessment. For example, students in lower grades were invited to view senior defenses. According to one teacher, junior-year students were invited "because seniors serve as a model to the juniors," and students in the middle school were invited "because that's really important [for them] to see where they're going to be in seven years."

HSP was working on building mini-culminating assessments in Grades 8 and 10 similar to the senior defense to familiarize younger students with the senior defense format and provide students with opportunities to demonstrate their understanding of grade-level skills and content through a learning performance. In doing so, teachers made sure that the same assessment approach was used across grades. As a science teacher explained, "We're pulling stuff directly off of the senior project rubric, the 10th-grade defense rubric, and also taking what we currently have and modifying it . . . so it's aligned all the way up."

Although challenges came up in aligning the process, instructors agreed that the process has brought about a better sense of collective understanding of the skills and competen-

cies that all teachers in the pathway must make sure students attain. Teachers' support was demonstrated by their enthusiasm for using aligned rubrics as a tool for integrating new teachers. For instance, anticipating the arrival of new sixth-grade teachers to the school's faculty, instructors became excited to use the rubric to show the new teachers "what our kids can do."

Building consensus about grade-level outcomes also happened beyond the science department. The process that these teachers engaged in through the demonstration project mirrored earlier discussions that pathway teachers had engaged in to make sure that students were fully supported to complete the senior investigative project. For example, one teacher described how a concern with students' quality of writing led to changes in curricula:

> We realized that the writing of the research paper wasn't up to par, and one cause of that was because there wasn't an English teacher teaching it. So now there's a college writing class happening in the afternoon that takes up the writing component while the science teacher takes up the research component.

This instructional change stemmed from having teachers from various disciplines looking at examples of student work. In this particular situation, the "humanities department [was] not happy with . . . the quality of writing" seniors were demonstrating. So, together HSP teachers figured out a way to improve student performance. In addition to finding an English teacher to teach the writing component of the research paper, HSP also created interdisciplinary teams to oversee the senior projects.

The importance of teacher leadership

This process of building a coherent and aligned assessment system was led by teachers and occurred within the context of classroom practice, and this made it a valuable process. One teacher marked this as key advice to other pathway teams:

> If I [were] to offer advice to another team . . . I would say that this is a process . . . and that the process of actually going through and working together like we're doing right now in creating a rubric that we're all in agreement on is something that's very, very, very important to implementing it and having it be sustainable at a school site.

While instructors acknowledged challenges, such as the amount of time the process entailed, they also stressed the importance of teacher involvement. "There's the time, and yeah, there's a lot of things that we need to tweak to make people feel like it's okay to take a risk, to say something new, but it's got to be the teachers themselves leading it." In this way, teachers must own this process. An administrator confirmed this sentiment, "Expertise matters, but so does the motivation level and passion of the instructors involved."

One lesson of HSP lies in the value of designing a collaborative, teacher-led process. The intimate involvement of teachers in developing a performance assessment system created an enabling structure for establishing a sequence of performance assessments that built toward a senior defense, developed a shared understanding of grade-specific student performance outcomes, and built a common repertoire of school-wide assessment practices. Ultimately, teaching and learning take place in the classroom. As one HSP administrator commented, "At the end of the day, success must happen in the classroom level. . . . And that's where HSP really shines."

Law Pathway Vignette: Learning and Improving Through a Close and Extended Examination

It's early May, and seniors enrolled in the Law Pathway at Jackson High School[6] are focused on "passing the bar," the culminating assessment for their pathway. To showcase their work from the Law Academy, students will give a 12- to 15-minute presentation to a panel of three adults followed by a 5-minute question and answer session. These three-person panels, made up of not only industry professionals—such as attorneys, court personnel, or police officers—but also educators, such as district coaches, teachers, and former teachers, will decide if students pass the bar and receive the concomitant accolades, which include a letter of commendation and the privilege of wearing the Law Pathway sash at graduation.

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[6] This name and all others in this case are pseudonyms.

What does this presentation look like and require? The senior defense student packet (https://edpolicy.stanford.edu/sites/default/files/docsonly/lp-defense-packet.pdf) makes the expectations and the structure for passing the pathway bar explicit for the students. Significantly, students are expected to explain and analyze a single artifact from their pathway work for 9 of the 15 minutes. For the remaining 6 minutes, students identify and reflect upon their learning in the pathway and share their career aspirations. Using a rubric (https://edpolicy.stanford.edu/sites/default/files/docsonly/defense-rubric.pdf), panels assess students' proficiency with four of the eight pathway outcomes in these presentations. The pathway teachers, who have designed this assessment, view three of these outcomes as "embedded" in the task, meaning that simply by doing the task students will demonstrate their level of mastery. These task-embedded outcomes are: 1) the use of legal terminology and protocols, 2) communicating effectively, and 3) using critical thinking to solve problems. The fourth outcome, demonstrating knowledge of a career path, must be intentionally woven into students' short presentation.

Creating the senior defense

Where did this culminating assessment come from? This is the first year in its 8-year history that Law Pathway has implemented a senior defense, and teachers have been working toward it for months as part of the demonstration project. While the lead teacher, Sarah, started the demonstration project work intending to focus on "what skills [students] would have to acquire and demonstrate at each grade level, [or] at least by the end [of the pathway]," she was not clear about the format or content of those student demonstrations. After being introduced to the idea of a senior defense through project workshops, the teaching team determined that they would create two items that would serve as their pathway's senior defense: a certification process and a culminating performance assessment. To be certified, students would be required to complete a set of curriculum-embedded projects aligned with the pathway's outcomes, and this would show that they had, in the words of one teacher, "covered their [pathway] outcomes." Students would also have to pass the pathway bar, or successfully complete the culminating performance assessment that the pathway teachers designed and created.[7]

Thinking systematically: How do the parts fit together?

There were plenty of challenges and lessons embedded in the path toward creating this defense. Participating teacher and former lead, Jim, bluntly stated, "Everything is a challenge." He noted that a focus on certification and the senior defense event did not mean they could work on those pieces in isolation, remarking, "That's been what we've really been focusing on, and of course it requires a whole bunch of other things that are part of the Linked Learning program that fit into what we're doing." For example, it included considering the alignment across grade levels to support students to meet pathway outcomes.

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[7] Given that this was the first time this senior defense was required, it was low-stakes and no student would fail the pathway because of failing to pass the bar.

[Working on the defense was] a chance to look at our outcomes and really see what we're doing and how we need to address them more explicitly with the students and with ourselves, and how we need to articulate things through the course of a student's career in high school.

The teacher team was thinking they would work on a defense and certification but realized they needed to explicitly align the defense with particular outcomes and had to spend some effort and time refining and revising outcomes. Focusing on one constituent part of the demonstration assessment system helped teachers see other parts of the system that needed sharpening and attention. It also helped them spot holes in the pathway's curriculum.

We started out thinking we would put [existing] projects under each of our outcomes, and they don't really fit that neatly. They address several. But it did point out to us, for example, "Who's doing ethics? Are we really covering that?" We cover it in little things that come up, maybe, but not with enough intentionality. That was one of the things that came up.

Teachers also noticed holes in the tools and assignments embedded in particular courses. Sarah talked about ways that classroom projects need to be strengthened to ensure that all students "have access to high-quality work that they can retrieve and reflect upon" for the senior defense.

How do we really know that [students] know the protocols if they're only doing a piece of their court project, or a piece of their crime scene investigation? I think that has led us into saying, "Yes, there's that performance piece, but there's also something in addition, a kind of assignment that they're going to need to really demonstrate that they understand all the protocols, not just their little slice that was their part in it." . . . I did expand my projects to make sure that they could demonstrate full understanding of the protocols of the projects that they did.

And I think [Jim] is moving toward trying to figure out how to have better, high-quality, more comprehensive pieces of work that he puts in, instead of smaller things. So I think the work is leading us to put in pieces of work that are both more comprehensive and deeper.

Through this alignment process, educators noticed other things about their instruction.

I had to look for more terminology because I realized, "Oh, it was in our outcome, but was I really looking for that enough?" I think I do a better job of that now.

A focus on designing a senior defense embedded in a cohesive assessment system became a catalyst for these teachers to see holes in curriculum, and to guide them in more focused evaluation of student work. It also helped them become more precise and purposeful in their use of rubrics.

Jim discussed why an exemplar critical thinking rubric that had been shared with the group was not a good fit for their pathway, explaining that while it had "some critical thinking stuff," it focused on problem-solving rather than "what *we* mean by critical thinking: a focus on what's good evidence and what isn't, and what's good logic and what isn't." He concluded, "So we've got to design what we're actually looking for."

Sarah talked about how using the model rubric provided through the project helped her rethink her existing scoring methodology and rubrics.

> For the research paper [prior to this work], there was a little checklist of pages, proper citation, 12.5 Times Roman, those little things. . . . You could still use those, but I felt like the other rubric really put the focus where it should be, on the quality of the writing: Did you fully support your thesis? Like that. I wanted the students not to be hung up by the minutiae and to really go in and look at their skills—or lack thereof—where they needed to do their work.

Through focusing on designing a senior defense, teachers more deeply understood performance assessment as a part of a coherent and aligned system of assessment. They uncovered specific steps they could take to strengthen their own pathway (e.g., teach ethics) and how they prepared students to succeed, both within their classrooms and across all the pathway classrooms (e.g., use rubrics for quality writing, build in requirements that students show understanding of all protocols).

Meeting challenges

Teachers faced multiple challenges in designing and implementing a senior defense. Numerous details and logistics had to be figured out, including those related to scheduling the defenses, recruiting evaluation panels, preparing the seniors for the defenses, and making sure each defense ran uninterrupted. The teaching team decided to start that logistical work early in the year, and this paid off. Having a modified block schedule helped with being able to schedule substantive time for defenses and limiting the number of necessary evaluation panels. (Over three days, four defenses took place in each of seven rooms during one 100-minute block.) Jim talked about grabbing everyone they could to serve on the evaluative panels, and Sarah sent emails to recruit panelists. Sarah took care of details, such as making sure that students got appointment slips and passes, getting the school's broadcasting of morning announcements suspended, and setting up "do not disturb" signs on the doors. All of these logistical details were collected by Sarah, who made a "senior defense file" to share with colleagues.

Designing the defense assignments was also a challenge; however the Law Pathway team did not have to start from scratch or go it alone. Project leaders and facilitators shared models of a defense task and rubrics that proved important starting points for the Law Pathway team and helped them figure out the structure and demands of their own culminating assignment.

The team members decided they would not be too ambitious with their first attempt at implementing a defense, and this was reflected in several of their design decisions. They chose to have students present a single artifact, rather than multiple pieces of work as done in the model defense. They chose to limit the number of pathway outcomes to four of their eight, rather than ask students to show evidence of their proficiency in all eight. The teachers explained that outside advice prompted these decisions. Sarah talked about how she was persuaded by advisors and the team to go with one artifact. Jim noted, "Talking about how to present a single artifact—showing how to use one of these to accomplish, or discuss all these other outcomes, is something we had to learn about."

Their final decision was to use a single artifact and ask students to speak for 9 minutes about it. After the defenses were completed, Sarah talked about the wisdom of that decision and how they would "stay with this model for a while. . . . There's something really valuable about speaking for an extended period of time on one thing." In this case, outside advice was heeded, and it led to a better outcome as perceived by the educators. The availability of models and technical advice helped this team design something to fit the particular context.

Making effective use of time

Time was critical for teachers to develop this assignment and manage these challenges, and teachers were explicit about what kind of time they really needed. They called large chunks of time at the project workshops "essential" and "really important." Teachers explained, "[Project facilitators] didn't tell us what we had to do. They let us pick a particular project to focus on within a group of strategies and outcomes that they thought were valuable." This teacher choice and opportunity to "work on the stuff we have to work on" stood in contrast to more familiar professional development structures where teachers have to "listen to a whole bunch of training and [don't] get a chance to do anything." Teachers noted that having expert support and guidance at these demonstration project workshops helped them make their work and time more effective. "You have people choose whatever they think is important, and then you give them the expertise and the support to work on that."

Workshops were not the only place where teachers got time to work on what they needed; there were also some district and school structures for doing this. Most of the teachers in the pathway shared a common prep period, which one teacher called a "really critical" support. Sarah, the lead teacher, got an extra prep period. Teachers also attended a 5-day district summer workshop where pathway teams got time to work

together. A district coach described how they had designed the program for that week, "not as, 'You're coming to get information,' but 'We're coming here to work, and to roll up our sleeves and make sense of all these things that we know.'" When the Law Pathway team left the district-organized workshop, members had in hand a document that made explicit their agreements and responsibilities, and each of them posted it in his or her classroom. The summer and project workshops provided teachers with quality time, which was characterized by teacher decision-making, substantial uninterrupted blocks of time, and access to models and technical expertise.

Sarah talked about the power of beginning with a picture (see Figure 1 on page 5) of the whole process of designing an assessment system. Not only did this give the team an advanced organizer,[8] it also allowed the team to think about what was already in place and to build from there.

> Have a blueprint for how you're going to do it, and do it with a certain order so that everybody feels that they know where you're starting, what the steps are, and what the end is going to be. And . . . really figure out what high-quality projects are already going on, what you already have, and build from there.

Logistically, teachers reported that the web portal created by ConnectEd Studios (with input from demonstration project teachers) provided a necessary infrastructure for bringing the certification process and senior defense to life. Students needed a manageable way to collect all their work and revise and refine it; teachers needed a way to keep a checklist for students' certifications. The ConnectEd team's responsiveness in creating an online platform that could help Law Pathway teachers do their work led to teachers finding more ways to use the site, including establishing a shared calendar for the pathway and providing a safe and sanctioned way for career mentors and mentees to communicate by email. ConnectEd Studios now serves as online repository, tracking system, and communications hub for this Law Pathway.

Some of the supporting conditions for this work were obvious and on the tips of teachers' tongues, such as access to models, tools, technical assistance, and quality work time. But there may also be some conditions that were significant but less visible. The instructional coach talked about how her role was to maintain focus and coherence for the teachers' work, which included integrating internal and external initiatives. For the summer workshop, she worked to "integrate all of the different [district] initiatives so it felt cohesive for teachers, and not [like] initiative fatigue." She talked about how she tried to connect the dots for the teachers and go deep with focus areas, rather than "spreading . . . wide." Additionally, this coach talked about her approach to meetings and how she was "really trying to drill it down to that instructional level with kids in

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[8] Bransford, J., Brown, A., & Cocking, R. (Eds.) (1999). *How people learn: Brain, mind, experience, and school* (pp. 3-31). Washington, D.C.: National Academy Press.

the classroom." She talked of a struggle as making sure not to stay "up here in templates and tasks and tools," but to connect that to "what does that look like when we're actually with the kids." These conditions helped support teachers to reach their goal to create and implement a senior defense for their pathway.

While the Law Pathway team focused on creating a senior defense during this demonstration year, this focus led teachers to generate new understandings and practical ideas about more than just that defense. Teachers began to see developing performance assessment as an integrated process rather than an isolated event. One teacher talked about how they had been doing integrated projects for a very long time, but remarked, "Have we been doing it in a systematic way that includes your outcomes and rubrics and all that? No, that's what [the demonstration project] has really added to the mix, that we're going to really appreciate." Creating a senior defense propelled the team to revisit their pathway outcomes and identify the need to examine how opportunities for students to build mastery of those outcomes over their high school experience was or was not built into the pathway's curriculum. They saw holes in that curriculum, for example, when it came to their ethics outcome or the way that classroom projects were structured. Focusing on the senior defense became a catalyst for the team to think about the coherence and alignment of their pathway's curriculum and assessment.

Performing Arts Pathway Vignette: Enabling Conditions for Building a System of Performance Assessment

The Performing Arts Pathway[9] comprises a small school, the Performing Arts High School (PAHS). PAHS is nested within a larger comprehensive high school that sits inside a large urban school district. It was founded 6 years ago as a pilot school within the district. The governance and operation of this pilot school, which serves roughly 400 kids from a nearby community with a large immigrant population, functions somewhat autonomously within the district, free from some of the district structures that regulate the operation of most schools in the district. For example, PAHS has autonomy over its scheduling. This autonomy gives the PAHS principal leeway to provide teachers with 12 hours per month of professional development time, which, in her words, enabled teachers to "come together and work on curriculum, talk about instructional strategies, do assessment, learn from each other, create with each other." The school also has autonomy over curriculum and assessment. According to the founding principal, this meant:

> We didn't have to do the district assessment tools; we only had to do what was required by the state. . . . We could institute our own assessment; we could do project-based learning; we could do all sorts of things that allowed us to be more creative and innovative.

As a result of autonomy from some of the district regulatory structures and a forward-thinking principal whose "dream was to open a school with theater at the core of the curriculum and have professionals come to work with students," the PAHS was established with a strong commitment to project-based learning, interdisciplinary curriculum, performance assessment, and learning-by-doing. When PAHS decided to become a Linked Learning pathway school, it already had many pieces of a performance assessment system in place, such as interdisciplinary student projects and a "vision of what our graduates should be able to do."

The conditions within PAHS made this school a fertile environment in which to grow a system of performance assessment. The conditions include:

- Regular time for teacher-led collaboration,
- A belief in and commitment to cycles of teacher professional learning,
- Authentic leadership roles for teachers at each grade level,
- An instructional leadership team comprised largely of teacher leaders responsible for creating agendas, moving work forward, understanding needs, and providing feedback to the group, and
- A knowledgeable principal.

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[9] School and pathway names are pseudonyms.

These particular school conditions shaped the way the ninth-grade team of teachers (teachers of English, cultural geography, Spanish, design, acting, and math) approached their individual and collective performance assessment work during the 2012-13 school year. For instance, the team had "time every other week to work together for 3 hours," which was a concentrated block of time, and two of the three teachers had a weekly common planning period. PAHS was also committed to a performance assessment approach with vertical alignment in which students would write expository, argumentative, and narrative essays, growing in rigor but using the same rubric from Grade 9 through Grade 12 in order to have comparable elements to document students' progress from year to year.

Knowledge and know-how for designing a performance assessment system

The vision of teaching and assessing students at PAHS is commendable (https://edpolicy.stanford.edu/sites/default/files/docsonly/performing-arts-pathway-outcomes.pdf). Realizing this vision for every student in Grades 9-12 is a challenge. Building a school-wide system of performance assessment has helped the school to articulate "what we want for kids" and establish tools and practices that show "how we're going to measure" student learning. However, designing a performance assessment system—in which the parts of the system work together to form a complex whole—is an iterative and time-consuming process, especially when in the words of one teacher, "We're pioneers." As this teacher said, "There was no template for the project," and she described some of the challenges inherent in developing a project-based approach to teaching, such as discovering that her ninth-grade students "could not use a ruler." When she asked the students to create robots built to particular specifications, she discovered students were lacking the measurement knowledge needed to complete this task. From one perspective, then, this project was made up of mini formative performance assessments that pointed out areas where more teaching and student practice was needed. From another perspective, students were "not at the level that they should be," which made teaching difficult and the teacher was not able to have students complete the project as originally designed: "I had to simplify certain parts of the project" and "I remember running into a lot of problems." This example suggests both the value of knowing students' capabilities and having the capacity to respond to their needs as they arise in the context of doing the project work.

This teacher also described her own struggles to both build and use the tools of performance assessment, such as rubrics: "I think it is easier just to do a project and then grade it the way it's traditionally graded, just with a 95 or 100, but using the rubric is very challenging." Reading between the lines, this teacher's statement reveals a need for teachers to have sufficient assessment knowledge about how to evaluate the quality of student work according to a qualitative metric that is different than knowing if an answer is right or wrong. And it requires having rubrics that are aligned to and measure the project goals. Or, as one teacher said, their work involved "unpacking these pathway outcomes, and now making sense of them so that we can move toward this common rubric." Another teacher indicated the importance of having models to

guide teachers in their performance assessment work: "Having models and examples and helping teachers walk through a set of processes that have been shown to work is important." This comment, as well as realizing that teachers self-identified as pioneers, alludes to the difficulty of developing a coherent system of performance assessment without a model, template, or blueprint to guide the work.

Developing a new approach—trailblazing—is always difficult and uncertain work. Educational reformers have likened the invention process and its various difficulties to building a plane while flying it. The challenges associated with doing the pioneering work of building a performance assessment system within the context of a 9-12 Linked Learning pathway includes managing uncertain and unproven outcomes. Another teacher expressed her concern about this uncertainty in this way:

> I don't know if I have the confidence that this will work out in the end. I'm afraid that we're putting in so many hours to create this common rubric, I just don't want to end up 2 years later like, "Let's forget all of that, it didn't work, that was a waste of time."

This fear speaks to the need for sharing research findings about the effect of performance assessment on student learning with practitioners. And it suggests the need

for helping teachers put their assessment components into use quickly, conduct rapid cycles of implementation, and document and examine results in order to inform and refine their instruction and assessment practices.

The iterative work of building coherence

One of the PAHS teachers, a 5-year veteran, said, "When we first started off as a school, we were already doing interdisciplinary planning," but she stated the "process of Linked Learning . . . and . . . partnering with ConnectEd . . . [helped PAHS] to identify what is it that we want to get out of our model of instruction." In particular, this teacher described "defining those learning outcomes" as a valuable process for specifying what it is that students are expected to do, which helped teachers and students know what evidence of doing those things looks like. (A comparison of an early version of PAHS student learning outcomes [https://edpolicy.stanford.edu/sites/default/files/docsonly/pahs-outcomes.pdf] to the version the team created through participation in the demonstration project [https://edpolicy.stanford.edu/sites/default/files/docsonly/performing-arts-pathway-outcomes.pdf] indicates the degree to which these teachers re-worked and specified the pathway's student learning outcomes.) This teacher explained:

> We've used interdisciplinary rubrics before, but now we're trying to connect them to those outcomes, so now they're explicit so that the students know: "You're not just doing this project and being evaluated in this class because that's what we're doing, but it's connected to the larger picture."

The tool that PAHS teachers use to describe the project and outcomes to students is a *unit map* (https://edpolicy.stanford.edu/sites/default/files/docsonly/pahs-unit-map-example.pdf). The unit map is given to students to introduce the project and to communicate the performance skills the teachers want students to develop and demonstrate in a performance-based task.

Even though, according to a 4-year veteran teacher at PAHS, "We already have a project that's pretty solid," the ninth-grade teaching team found that engaging in this process of constructing a performance-based system of assessment instigated a collective process of critically reviewing not only the goals of this ninth-grade interdisciplinary project, but also the relationship among the project's goals, the overarching pathway goals, the assessment of this particular project, and how the design of this project enabled and constrained opportunities for student learning.

For instance, one teacher said, "Now we're coming back and looking at what are our pathway outcomes, and how are we monitoring or measuring the assessment of [those outcomes]." A second teacher named a goal of the performance assessment work: "[To bring] back some quality rubrics that the entire school can use . . . to really figure out . . . does [this assessment] really measure what we want it to measure." A third teacher raised the issue of the difficulty inherent in developing common rubrics that can be used across subject area disciplines: "It's hard to create a common rubric that makes

sure that it captures all the different content. . . . There [are] certain things that need to be addressed [in one discipline] that other subjects don't really address in their curricula." Another teacher expressed a similar concern about teaching and assessing discipline-specific knowledge, "Like, when do I have time to teach grammar?"

Building a coherent system, then, seems to require a shared understanding of what the student outcomes are as well as some common and some discipline-specific measures of student performance.

Core Principles

Our investigation into the performance assessment work that these three pathways engaged in highlighted the complexity of creating and implementing a performance assessment system. The process is not easy or quick; however, the rewards seem to be many. Our analysis of the process that pathway teams engaged in revealed insights and lessons that can be useful to other Linked Learning pathways getting started on this work or continuing to refine their assessment approach. We have organized these lessons into six core principles. Each core principle is followed by a set of questions intended to:

- Frame ways to get started working on this principle,
- Suggest organizational structures that will be needed to sustain this principle in practice, and
- Suggest ways to continuously deepen and spread this core principle.

The aim for these three types of questions is to provide a way for Linked Learning novices to get started, for administrators to discern the sort of structures that are necessary for enabling the initial work to continue, and, finally, for advanced Linked Learning practitioners to gain insights into how they might strengthen what they are already doing.

Core Principle 1: Educate teachers to use performance assessment to improve learning

Knowledge of what a good performance assessment looks like as well as how to use the component pieces of a performance assessment system is critical. For example, teachers need to know how pathway outcomes and grade-level benchmarks can be used to design instructional units or how to use common rubrics to evaluate student work in valid and reliable ways as well as how to use assessment information to improve instructional decision-making. Assessment expertise can get built through the use of performance assessment provided that teachers are supported to reflect upon how their use of performance assessments influences or guides instructional practice and supports student learning. For example, in the Law Pathway, creating the senior defense provided an opportunity for teachers "to look at . . . student outcomes and really see what [teachers were] doing and how they need to address outcomes more explicitly." In addition, by looking carefully at class projects and student work samples, these teachers began to wonder, "Are we really covering that [topic, skill, concept]? We cover it in little things that come up, maybe, but not with enough intentionality."

Teachers also need to make sure the students' project work results in evidence that demonstrates the pathway outcomes. To evaluate students' lab write-ups across science

disciplines in the Health Sciences Pathway, life and physical science teachers' joint use of a common rubric led to an important conversation about the pathway's expectations regarding students' use of quantitative data. The issue centered around differences in the scientific disciplines: "In physics and chemistry [students] have to have mastery over the numbers in order to be able to interpret them and use them effectively, whereas in life science that's not emphasized as much." In the words of one teacher, using the rubric helped teachers define "what our expectations are as a department . . . and also for the kids."

Finally, putting performance assessments into use requires particular knowledge. Some teachers in the Performing Arts Pathway, for instance, found "using the rubric . . . very challenging." They described the difficulty of using measures that evaluated qualitative dimensions of student learning, such as the overall strength of an argument, rather than assessing correctness. With support, leadership, and facilitated reflection, teachers can sharpen their insights about what students understand through the use of performance assessments, and they can gain insights about effective instructional practices.

Getting started on this principle
Do pathway teachers look together at student work samples for evidence of the stated pathway outcomes? Does the grade-level team assess student work with rubrics that focus on the quality of the work rather than solely on its completion? Are common rubrics in use?

Establishing conditions to sustain the principle
Do pathway teachers have regular time dedicated to examining student work for evidence of understanding? Does agreement exist about which benchmarks can be assessed through a particular task?

Deepening the principle in everyday practice
Are teachers able to demonstrate the relationship among student learning, the demands of the task, and how it is assessed? Are the constructs to be assessed either discipline- or career-specific? Do teachers have opportunities to receive feedback on their instruction and assessment practices and the effect on student learning?

Core Principle 2: Ensure coherence throughout the system of performance assessment

Coherence involves the idea that the various components of a performance assessment system are connected and work together. One example of coherence is vertical alignment, which involves the idea that coherence and connectivity between various assessment components exist between grade levels, ensuring that students' learning experiences reinforce and complement one another. Coherence of assessment systems can be facilitated through the joint creation of pathway outcomes, but developing coherence

depends on establishing routine assessment practices that are public and involve the joint examination of student work for evidence of student achievement of the pathway outcomes.

As demonstrated in the cases of the HSP and Law Pathway (LP), this work can begin when pathways focus on one component of an assessment system, such as deepening a culminating assessment or using common rubrics as a way to build a shared vision and practices. For instance, the process of creating aligned rubrics at HSP revealed varied beliefs about the skills and competencies students should possess relative to academic discipline and across grades. This process revealed the need to create a comprehensive understanding of the outcomes students should be working toward across all classes during their time in the pathway. Likewise, at LP the process of focusing specifically on the culminating assessment provided a starting place for teachers to begin thinking about other pieces of the system, including rubrics and performance tasks that needed sharpening to bring about the desired pathway outcomes.

Getting started on this principle

What are the pathway outcomes? What projects and assignments guide and assess student progress toward those outcomes? What scoring systems are used to communicate what mastery of those outcomes looks like and to assess student progress? Do teachers across different departments and grade levels share the same view of how these components fit together? How do you know?

Establishing conditions to sustain the principle
Do pathway teachers have a shared understanding of what evidence of pathway outcomes looks like? How will you take inventory of the pieces of your assessment system that are well-developed and working for your pathway?

Deepening the principle in everyday practice
Can teachers in the pathway compile a demonstration project with examples of student work that shows alignment across different assessment components? Do teachers at your school have regular cross-grade-level conversations about instruction, curricula, and assessment? Is there a structure for teachers in your district to share instruction and assessment practices with each other?

Core Principle 3: Provide instructional leadership at each level of the system

Leaders at each level of the system need to drive the continuous improvement of instruction through the use of performance assessments. There are distinct and important instructional leadership roles for actors at each level of the system—central office administrators, principals, and teachers—to assume in the complex process of developing and implementing a credible and valid system of performance assessment. For instance, central office administrators need to know what resources are required for pathways to be successful and what policies can help pathways succeed. Establishing the formal role of director of Linked Learning within a central office is a useful first step in educating central office about the essential requirements to establish and support successful Linked Learning pathways.

According to one Linked Learning director who spent the first 3 months on the job visiting pathways and examining their operation, at a minimum pathways need the following structural supports:

1. "Pure cohorts" of pathway students assigned to pathway classes, rather than filling some seats in pathway classes with non-pathway students;

2. A master schedule that allows a Career Technology Education course of study, such as engineering and design, to consist of a 9th-through 12th-grade sequence of classes, which may mean committing additional instructors to the pathway;

3. A work-based learning coordinator to "manage all those industry people pathway teachers are bringing in" to work with students; and

4. Sufficient professional development time and accompanying leadership so that teachers are supported in developing a shared repertoire of practice.

According to this Linked Learning director, "Oftentimes, schools don't have . . . a [consistent approach to] instructing or even look[ing] at each other's best practice" in a manner that enables teachers to learn from each other. Therefore, in addition to providing pathways with resources and structures necessary for enabling this work, this district administrator also highlighted the importance of providing instructional leadership at the school level.

The principal has an important role in establishing a vision for site-based instructional leadership. For instance, an administrator suggested appointing a "lead teacher for each of the grade cohorts . . . [within a pathway to] work with the instructional leadership team" led by the principal. According to this administrator, these teacher leaders become responsible for creating the agenda for grade-level teacher meetings, moving the work forward, understanding what's needed within grade levels, and providing feedback to the instructional leadership group.

A capable and knowledgeable principal, who is able to create site-based structures, such as a reduced teaching load for designated leaders, is integral to building a school's capacity for continuously improving instruction. As the vignettes illuminate, teacher leadership is critical for establishing a coherent performance assessment system and using performance assessments to improve learning outcomes. Teachers need support, autonomy, and some degree of accountability to be leaders in a process of creating and sustaining a successful system of performance assessment within a pathway. Because it is the teachers who "really know their students . . . [who are] really looking at what the kids need," teachers must have authority to make decisions and design tasks. As leading

members of grade-level and pathway teams, teachers can play a critical role in driving the iterative and reflective work that all teachers must do to implement a system of performance assessment.

The case of the Performing Arts Pathway demonstrates steps pathways can take to ensure that teachers are sufficiently supported in leading this continuous improvement process. These steps include, but are not limited to, regular time for teacher-led collaboration, a belief in and commitment to teacher professional learning, opportunities for authentic teacher leadership at each grade level, and strong school leadership that can shepherd a process that balances teacher decision-making with administrative guidance.

Getting started on this principle

How do teachers currently contribute to assessment processes at your school? What are teachers currently doing that can be incorporated into a coherent system of assessment?

Establishing conditions to sustain the principle

Is there agreement among district leaders, principals, and other administrators about the role teachers can and should play in building and leading assessment? What systems of support are in place to accommodate teachers' needs as instructional leaders? How do teacher-led efforts enhance or reinforce district and school-led efforts? How can assessment complement instructional practices in a way that enhances, and does not detract from, teachers' means to ensure that student learning is taking place in the classroom?

Deepening the principle in everyday practice

What mechanisms ensure that teachers have a role in driving and adapting the assessment process to meet the learning demands in the classroom? How are responsibilities for providing instruction that improves student learning shared among teachers, principals, and district leaders?

Core Principle 4: Create enabling workplace conditions

Schools and districts need to establish workplace conditions that support teachers' use of performance assessments to strengthen their instruction and improve student learning. These workplace conditions were not fully present in the pathways we studied. Examples of these necessary workplace conditions include:

Leadership roles for teachers that are formalized and include additional time (e.g., one less instructional period) so that teacher leaders have time to design and prepare for teacher meetings;

Regular meeting time for grade-level teams and pathway teams to look collectively at student performances and to assess student work together to ensure that teachers have expectations for student work that are in common and high;

Norms of joint planning, using common rubrics, and looking together at student work are essential for building a culture of common expectations for students' learning and for making sure that the performance tasks provide students with opportunities to learn and demonstrate targeted learning goals.

Getting started on this principle

Do teachers bring samples of student work and/or assignments to meetings to share with colleagues? What norms exist for collegial sharing? How will you structure teacher sharing to focus on student learning, work, and accompanying tasks? How would you know if a safe space for learning exists?

Establishing conditions to sustain the principle

Is there weekly time for professional learning as part of the negotiated teacher contract? What regular teacher meeting time for looking together at student work is available or needs to be established? What practices and routines exist for examining the relationship between the resulting student work and teachers' instructional practice?

Deepening the principle in everyday practice

What school-wide and district-wide structures exist or can be created to allow teachers (and administrators) in different grade-level or pathway teams to see how student work is examined and discussed in other teams?

Core Principle 5: Make work time meaningful

Time is always a factor for busy teachers, but providing collaborative time for this work, while necessary, is not sufficient. Concentrated work sessions that are characterized by a focus on classroom instruction and student learning, teacher choice, and access to exemplars and technical expertise can transform available work time into quality work time.

Whether through common preparation periods and early release days, or off-site workshops, teachers need substantial uninterrupted blocks of time to do this work. After being introduced to a blueprint of an assessment system and its constituent parts, teachers need to participate in choosing which piece or related pieces of this system they will focus on during these concentrated collaborative work sessions. The blueprint can serve as a tool to provide an advanced organizer for teachers' work and model thinking about assessment as a system rather than an independent or one-time event. Likewise, seeing exemplars of assessment components, such as sample rubrics or a senior defense, can help teachers develop quality products. Access to technical expertise works the same way. Most importantly, instruction and students' learning need to remain the focus of assessment work. Educators become engaged and dedicated to the work if it focuses on products, processes, and plans that they can use directly in their classrooms with students—and they see evidence of improved student learning as a result.

Students need sufficient time to learn concepts and skills too. When teachers are clear about the course learning outcomes and how they can support and assess students' progress toward those goals, they often need to spend more instructional time on a topic to adequately develop students' understanding, address misconceptions, or fill in knowledge gaps. Additionally, engaging students in richer and more extended learning tasks can require more time for students to deeply engage with and understand the topic.

Getting started on this principle

What organizational structures currently support teachers' collaboration? How? To what extent do these structures facilitate the ongoing development of a repertoire of quality instructional practices?

Establishing conditions to sustain the principle

What are the long- and short-term school and district plans for providing teachers with regular and substantial uninterrupted blocks of work time? What processes will you use to provide necessary supports and resources that educators need to move forward?

Deepening the principle in everyday practice

Do teachers use student work to learn more about their curriculum and instruction? Does your district involve teachers in joint scoring sessions of student work? Is there sufficient instructional time to allow students to explore topics in depth, conduct research, participate in project-based learning, and prepare for a senior defense?

Core Principle 6: Pay attention to disciplinary content

The content focus of the pathway and the role of different subject area disciplines in each pathway affect the implementation of a cohesive and effective performance-based assessment system in Linked Learning pathways. The content focus of the pathway has implications for which disciplines and subjects are fully integrated into the pathway and the roles that subject-specific courses play in the pathway. For example, the focus of the Health Sciences Pathway (HSP) lent itself to a focus on science courses, and scientific competencies were a primary consideration in the vertical alignment of projects, expectations for students, and assessment design. Humanities courses helped develop students' pathway competencies; coordination between different departments was necessary. The Law Pathway (LP) did not include courses outside the humanities; students still took math and science courses, but the curriculum in those courses was not integrated into pathway projects. The Performing Arts Pathway was more integrated, and in this pathway, students did interdisciplinary projects that included work from all subject areas with varying degrees of success. For example, math was a harder subject to integrate into the interdisciplinary projects in the Performing Arts Pathway, especially at an appropriate level of difficulty. Therefore, integration should not come at the expense of developing essential disciplinary skills and knowledge.

Getting started on this principle
How does the pathway attend to developing students' knowledge of various subject areas? How is pathway content aligned to the Common Core State Standards and the Next Generation Science Standards? Given the focus of the pathway, are there some disciplines/subject matters that are central to the pathway? When is it appropriate to use common rubrics and develop multi-disciplinary projects? When is it appropriate to have discipline-specific projects and rubrics?

Establishing conditions to sustain the principle
How can the master schedule enable teachers to share student cohorts? How will the pathway decide the appropriate number and sequence of interdisciplinary projects and discipline-specific projects? What time is available for teachers to discuss and evaluate the fit among specific disciplines, pathway outcomes, and specific projects?

Deepening the principle in everyday practice
How does your school know if particular projects meet subject-specific outcomes? Do pathway outcomes reflect a balance of disciplinary and industry sector outcomes?

How to Get Started

For those just getting started, we have suggested a way to put these ideas to work. We have organized the lessons learned around four strategic questions:

1. Why should your pathway engage in building a system of performance assessment?

2. Where should your pathway begin the work of building a performance assessment system?

3. What resources do you need to build a performance assessment system? How do you get these resources?

4. How should your pathway team define success?

For each question, several important decision issues are identified along with ideas that are worth considering at the outset of embarking upon this process.

How to Get Started

Strategy question	Decision issue	Worth considering
1. Why should your pathway engage in building a system of performance assessment? Knowing what your team wants to gain from this process and revisiting your goals along the way will increase your success.	What, specifically, does your team want to improve by building a performance assessment system? What might this improvement look like? How will you monitor your progress toward this improvement while building your system?	Purposes like better preparing students for college, career, and life are hard to measure in the short term. Evidence of what progress toward these goals looks like can and should be broken down into constituent parts that are tangible and measureable.
2. Where should your pathway begin the work of building a performance assessment system? Identifying short- and long-term goals for this work is usually a good starting place. Knowing where to begin this complicated work largely depends on identifying your pathway's greatest needs and determining the expertise and resources your pathway has at its disposal.	How will you determine if the pathway assessment components (e.g., common rubrics, pathway learning goals, and performance tasks) you build refine or improve learning? Which performance assessment components already exist in your pathway? How aligned are these components? How—and how well—are they currently being used?	A performance assessment system has several, interdependent components. Working on one component in isolation can have unintended consequences—like designing a rubric that does not match the learning demonstrated by a performance task. Using assessment components right away tests their efficacy and can inform the revision process.
3. What resources do you need to build a performance assessment system? How do you get these resources? Schools need to have the capacity to do this work. Often, too little attention is paid to the capacity that already exists within a school community and how doing the work can be designed for learning.	What knowledge, skills, materials, and organizational structures does your pathway team already have—or could it enlist from the larger community— to support this endeavor? Do pathway team members have experience working closely together? Is joint problem-solving typical?	Resources, like time, are always in short supply. Paying attention to how time is used and prioritizing its use are critical. Having the support of principals and other leaders is also critical. Recognizing that regular use of the assessment system can build internal capacity for its improvement is also helpful.
4. How should your pathway team define success? It is easy to forget to measure—and manage—the multiple dimensions of a system of performance assessment. Focusing on building the assessment components at the expense of using these pieces to improve teaching and learning along the way is a pitfall worth avoiding.	What performance assessment practices can pathway teams at each grade level reasonably expect to put into use during the fall and spring quarters? How will teams collect feedback on their performance assessment work along the way? What will the team do with this feedback?	Building something, especially without a blueprint or map, is creative and uncertain work. We have a tendency to keep such work hidden until all the kinks are worked out. However, the feedback we get from using imperfect tools, trying them out, and inviting others to see and respond to what we are doing usually speeds up the process of invention in productive ways.

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