Photo by ANDREW MILLER

From left, teachers Lillian Wu, Stephen Venema, Kathy Lynch, Ivy Wang, Mary Burns, Phil Kittower, and Misti McDaniel of the Shanghai American School in China participate in a protocol exploring a problem of practice.

PROCESS FOR DISCOVERY

PROJECT-BASED LEARNING BUILDS
TEACHERS' COLLABORATION SKILLS

BY ANDREW MILLER

Project-based learning is a successful way to engage students in learning in the classroom. Research reports increases in student achievement data on tests such as Advanced Placement (Edutopia, 2013) as well as increased critical thinking and problem-solving skills (Beckett & Miller, 2006).

Students are more engaged in learning as they grasp with problems, challenges, and questions to investigate in an authentic context (Thomas, 2000). In addition, teachers report

Grade 3 — Mouse Trap
SCIENCE LITERACY

Grade 7 — Working Conditions
SOCIAL STUDIES
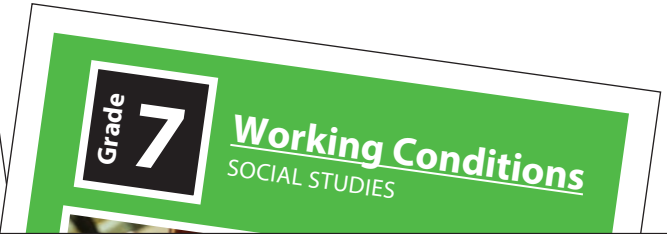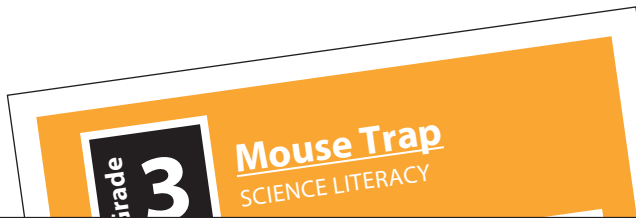
Grade 8 — Beanz Meanz Mathz
MATH

Driving question: What's the variance in heights of your data of beans?

PROJECT DESCRIPTION:

In order to learn about standard deviation, students were given a variety of beans of different lengths. Sample data sets included the same type of beans of different lengths, as well as a mixture of beans of different lengths. Students measured the lengths of green beans and determined the mean, median, and mode, and then discovered the standard deviation and variance. Students worked in teams to accomplish this task, but then showed what they knew independently.

STUDENT PRODUCTS

- Participate in a table team measuring activity and determine the standard deviation of varying lengths of beans.
- Complete assessment independently to show understanding.

TEACHER REFLECTIONS

"It was very visual to see how standard deviation works. Without us telling them about what standard deviation is, the students were able to develop their own understanding. They moved the concrete to pictorial to the abstract, an essential part of mathematical thinking."
— *Hank Claassen and Misti McDaniel*

STUDENT REFLECTIONS

"The most enjoyable part of this activity was being able to measure tangible items instead of having a premade data set, allowing us to understand the full process of calculating the standard deviation. The most important thing I learned was to go over all of the collected data with my team afterward to prevent mistakes in the calculations. The most difficult part of the bean activity would be making sure that everyone had the same data and came to a consensus with each calculation before moving on." — *Elle*

"My favorite part of the activity was learning hands-on by doing an actual experiment to learn how standard deviation works. I liked learning this way because I had more fun doing the work, therefore I remembered it better. The most important thing I learned was that 67% of the data falls within the first standard deviation." — *Ella*

SHANGHAI AMERICAN SCHOOL

Example of a discovery card from Shanghai American School. To learn more about the project at Shanghai American School and see the discovery cards, visit: **http://cards.buildingculturebybuildingpractice.com/story-discovery-cards.**

increased satisfaction in their practice when they use project-based learning (Hixson, Ravitz, & Whisman, 2012).

This last finding is striking when we consider the potentials for applying project-based learning to professional development. If both students and teachers are more engaged when they use project-based learning, why aren't we using the elements of project-based learning to engage teachers in professional development?

Project-based learning provides a framework for transforming professional learning with innovative instruction and can be a model for designing job-embedded professional development for all teachers.

WHAT IS PROJECT-BASED LEARNING?

When many of us think of the word "projects," we might conjure up images of creating a volcano for a science fair or dressing up for a '70s fair in social studies class. These are what many of us working in project-based learning refer to as "dessert" projects.

Traditionally, projects are often used as a culminating experience after the majority of teaching and learning has occurred. We might teach important content and skills on

How to design project-based learning

Instructional leaders have a number of factors to consider in designing project-based learning professional learning. The project needs to have goals and outcomes connected to the school and/or district, appropriate voice and choice, and should be an ongoing investigation over time.

The project should be manageable and have specific priorities to develop and assess. The learning for the project should also be tangible and meaningful so that it can be assessed, including a public component or demonstration of learning. It is also important to include times for collaboration and times for independent learning.

Use the following questions to facilitate your own design.

These questions can provide a framework for planning and implementing project-based learning professional development. As we continue to improve our professional learning practices, we need to use learning methods that work for our students. Project-based learning can be a powerful tool to increase teacher learning and engagement in reflecting on and improving professional practice.

1. **What are the goals and outcomes for the project?** Teachers should be engaged in learning about professional practice. These could be goals related to specific instructional strategies, student achievement data, or even collaborative and school culture goals.

2. **How will the project be meaningful, authentic, and challenging?** The professional learning project should be connected to the classroom, and teachers need to see it as directly applicable to their daily work. The project should also be a challenge and push teachers outside of their comfort zone in appropriate ways.

3. **How will teachers have voice and choice?** While there may be specific goals for all teachers in the professional learning project, teachers need voice and choice throughout. This might take the form of teams investigating similar problems of practice, choice in what products they will produce or share, or even when they choose to do specific components of the project.

4. **How will teachers be assessed?** The project should include specific products or deliverables, including authentic work units, discovery cards, or presentations. There should be formative assessments that might include feedback sessions, protocols, or even ongoing reflection journals.

5. **How will teachers share their work and learning?** A public component is critical to any project. It helps build accountability and culture. Teachers should share their work with each other and perhaps with an even larger audience.

6. **How will the project be inquiry-based and sustained over time?** Instead of just a one-time work, the project must be a sustained inquiry process. There must be an effective launch and driving question for the project to focus the work. The launch could be a video, a provocative article, or an engaging workshop to start the process. In addition, there needs to be a focus on deeper learning through questioning.

7. **What variety of strategies and structures will be embedded in the project?** Project-based learning leverages a variety of instructional strategies. An effective professional learning project should include protocols, workshops, classrooms visits, and other effective adult learning strategies.

argumentative writing and then have students choose a project to show what they know. Engaging, yes; but not quite true project-based learning.

Instead of waiting for the project, project-based learning makes the project the main course of learning, not simply the dessert at the end (Larmer & Mergendoller, 2010a). As the project is engaging and meaningful, learners learn and apply in a cycle of inquiry. Learners are given voice and choice in what they

might learn and how they will show that learning and share it with a public audience (Larmer & Mergendoller, 2010b).

Direct instruction might occur, but it comes from the meaningful inquiry of the project. The project is also centered around a meaningful driving question, such as, "Is our water safe to drink?" or "How can we reduce poverty in our community?"

At Shanghai American School

in Shanghai, China, we have taken these components of effective project-based learning and applied them to professional development.

SHANGHAI AMERICAN SCHOOL

Shanghai American School is China's largest international school with students from over 40 countries in grades pre-K to 12. Teachers come from more than 27 countries, having experience both teaching in the United

States as well as numerous other international schools across the globe.

One of the challenges at Shanghai American School is what we call a "suitcase" curriculum. By this, we mean that teachers are doing engaging projects and units with their students, but it isn't often visible to all stakeholders.

While the school has adopted standards to focus on rigor and consistency, the implementation of these standards is made difficult by the continuous coming and going of international teachers. We celebrate this, as international teaching provides the opportunity to travel and learn in many countries, yet we also know this makes it a challenge for a consistent experience of teaching and learning.

While teachers at the school innovate in the classroom, we have been doing so through what already existed. All too often, orientation for incoming teachers has been hit or miss in defining what is taught and assessed. We knew we needed some baseline of curriculum to continue to innovate. Thus, the school has focused on having a guaranteed and viable curriculum that focuses on student learning.

In addition to this challenge, instructional coaching is fairly new at the campus. We needed to build a culture for coaching while working on the larger school goals of curriculum and instruction. As teachers focused on project-based learning in classrooms, we created professional development for teachers that would last a few months and mirror the project-based learning experience.

As coaches, our goals were to:
- Identify teachers' learning goals;
- Support teachers in building their collaborative skills and learn from each other about the experiences in which they engage their students every day;
- Make the hidden visible by capturing and curating powerful learning experiences, including projects, units, and performance tasks;
- Start the process of moving toward a guaranteed and viable curriculum by celebrating what was working in the classroom;
- Support teachers in building their reflective lens to improve their daily work with students; and
- Focus on both people and product.

To that end, we created a project with this driving question: "What is the story of learning at Shanghai American Puxi Middle?" Our products were discovery cards that included photos of student learning in action, teacher reflections, a task or project description, and student reflections (Miller, 2017).

As coaches, we were chief curators of the work, but we also partnered with teachers to help them identify what they wanted to curate. We launched our project during a Wednesday staff meeting. We showed teachers a video that explained our project and our goals. We also shared a timeline of what would be occurring. We elicited their likes and wonders to start the inquiry process and engaged them in brainstorming possible classroom experiences to curate.

Next, we met with teacher teams to discuss their initial ideas. To support our learning as instructional coaches, two coaches attended these meetings. One served as a meta-coach to give feedback after the meeting, while the other focused on facilitating the conversation.

We used the Seven Norms of Collaboration to build our collaborative skills, and they served as a tool for reflection throughout every interaction (Garmston & Wellman, 2016). These include "pausing, paraphrasing, presuming positive intent, and putting ideas on the table."

After teachers identified what they wanted to curate and reflect on, we set up specific times to visit classrooms to start the process of curation. The coaches interviewed students, held short conversations with teachers in action, and took photos of the learning occurring in the classroom.

Afterward, coaches created the discovery cards from the data collected and scheduled follow-up conversations to reflect further about the work. Teachers openly reflected about what worked and what they wanted to work on to improve their practice. Indeed, the discovery cards served as catalysts for conversations around teaching and learning.

After collecting many discovery cards and holding many conversations, we also held a staff meeting where teachers brought a problem of practice to get feedback from other teachers. Finally, we assembled and shared an anthology of the cards to display our learning.

FOSTERING AN EFFECTIVE LEARNING COMMUNITY

At its heart, this professional development project focused on fostering an effective learning community of educators, a critical component for effective professional learning (Learning Forward, 2011).

Not only did we have specific goals for building collaborative and reflective skills, but the project was aligned to the larger school goal of guaranteed and viable curriculum. Teachers engaged in collective responsibility to start the process of curating curriculum and reflecting on it to improve student learning. Teachers were held accountable to this project through the use of discovery cards, an anthology of student work, goals from administration, and, most importantly, from each other. Collaborative conversations were meaningful and celebratory rather than

taking a deficit approach.

The professional learning project itself was a collection of effective adult learning strategies and learning designs. Teachers engaged in project-based learning. We used protocols for professional practice to allow for equitable and structured conversations connected to student learning. Teachers developed their own goals and selected their own problems of practice to address.

Reflection was ongoing and critical to the project's success, and tools and norms increased teachers' reflective lens. The learning occurred in whole-group staff meetings, smaller team meetings, and through informal visits and conversations. Teachers were engaged from the voice and choice they had in their curation and through the fact that the work was directly related to classroom practice and student learning.

Finally, the professional learning was effective and sustainable because we used existing resources. Instructional coaches took the lead in designing and implementing the professional learning project. The project itself was job-embedded and not a one-time visit from a coach, but an extended inquiry in teaching and learning with multiple touch points and assessments.

Professional learning included whole-staff meetings as well as designated days on the school calendar. Overall, the project-based learning professional learning experience drew on best practices for adult learning and effective professional learning for all teachers.

OVERALL IMPACT

Our overall goals were to build a collaborative culture and start a dialogue around a guaranteed and viable curriculum through discovering what is occurring in the classroom. We wanted colleagues to learn more about each other, and we wanted to

Reflection was ongoing and critical to the project's success.

build clarity for learning outcomes and activities in our schools. The discovery cards themselves were a clear and transparent deliverable of student learning, but there were other powerful outcomes as well.

We collected comments from our celebration and sharing of our learning anthology and discovery cards. One of the comments addressed the power of learning what teachers are doing with students in their classrooms. "I'm already seeing curricular connections to other colleagues I hadn't seen before," one teacher said. "I'm looking forward to integrating my curriculum."

Another teacher said, "It was great to have a summarized snapshot of the learning experiences that students are having, and it will help us to upgrade our curriculum next year." Teachers gained better clarity of what students were learning in their classrooms as well as other classrooms. This data also helped teachers set goals for the next year, when they will continue to engage in the process of aligning curriculum and assessments to standards to improve student learning outcomes.

In addition to curricular outcomes, we noticed our teams are more willing to collaborate. Teachers regularly meet and protect that collaborative time to focus on student learning. Teachers want to learn from each other and, in the future, will engage in learning walks to continue to support this learning and collaboration.

In addition, coaches saw more teachers coming to the office to ask for support. Some teachers who never visited before came for the first time the whole year after completion of the project to have discussions and dialogues. Not only were there more direct curricular outcomes, but there

were cultural outcomes that positively impacted student learning.

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