



Center for Talent Development
Northwestern University
School of Education and Social Policy

Talent

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Director's Message

Problem-Based Learning & 21st Century Skills

Change is a constant, and the challenges we face today will surely continue to evolve and increase in complexity. Our future, then, requires a cadre of experts interested in and able to solve problems, both locally and globally.



How do we train these experts? How do we ensure that our nation's brightest students grow, mature and develop expertise in the subject areas about which they are most passionate?

Two models of curriculum and instruction well-suited to educating the 21st century workforce and fostering expertise include Problem-Based Learning and Project-Based Learning. Neither model is new, but both are being widely discussed in today's education circles.

In this issue of *Talent*, we explore Problem-Based Learning (as well as its distinction from Project-Based Learning), with gifted education and Problem-Based Learning expert, Shelagh Gallagher, PhD.

PBL has the potential to energize teachers, keep students fully engaged and lead to creative solutions to real-life problems.

If you are an educator and this issue sparks your interest, we invite you to the upcoming CTD Educator's Conference, where Dr. Gallagher will deliver the workshop.

If you've led a successful PBL unit, or your child has participated in one, we'd love to hear about it. Write us at ctd@northwestern.edu, and you could be featured in an upcoming *Talent Talk* blog post!

Paula Abuzuski-Kubilus

Problem-Based Learning 101 An Interview with Shelagh Gallagher, PhD

In Room 10, a teacher stands tall at the front of the classroom, conveying his or her knowledge in a lecture format. Students sit quietly at their desks, listening...or not.

Down the hall in Room 101, the classroom is alive with movement and discussion, and the teacher works amid the students. Students seem invested and engaged in the learning process as they conduct online research, make phone calls to experts and pursue the resolution of a real-life problem.

More and more classrooms across the country are mirroring Room 101 above, which is engaged in Problem-Based Learning. Below, CTD talks with Shelagh Gallagher, PhD, a nationally recognized expert in gifted education and Problem-Based Learning, about the renewed attention PBL is receiving as a model for educating the 21st century workforce.

What is Problem-Based Learning?

Problem-Based Learning is a model of curriculum and instruction in which learning starts with an ill-structured, or open-ended, problem that is designed to lead students to specific content in the curriculum. An ill-structured problem for kindergartners, for example, might be choosing what should go into an aquarium for display in a pet store, while middle-school students might learn about an endangered animal and be charged with its recovery.

PBL's goal is to take the teacher out of the information dissemination role and facilitate students becoming increasingly self-directed learners. Howard Barrows, medical doctor and PBL founder, started PBL with the goal of having medical

students thinking like doctors, or thinking like experts. PBL, done right, is simply training in expertise.

Why is PBL gaining traction in education, and how is it particularly suited to gifted learners?

The emphasis on 21st century skills and the pressure to prepare students for an information-rich, multicultural and technologically complex world compels consideration of PBL. Additionally, the resonance between what the model has to offer and gifted students' learning capacity is incredibly strong. Gifted students distinctly prefer open-endedness and inquiry, and they have a capacity for seeing far-reaching implications inherent in real world problems.

You can't, however, just put together a problem and say it's appropriate for gifted kids. PBL needs to be differentiated, just like anything else. PBL for gifted students needs more challenging content, an emphasis on conceptual orientation and good management to ensure that students are spending time in higher-order thinking.



School districts seriously interested in helping students acquire the knowledge, skills and habits of mind associated with expert thinking would have PBL as a signifi-

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Problem-Based Learning 101

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cant portion of their multi-faceted gifted program. PBL is integrally connected to gifted learners fulfilling their full potential.

Problem-Based Learning is used interchangeably with Project-Based Learning. Is there a difference?

If it is done very well, Project-Based Learning can be quite similar to Problem-Based Learning. The danger with Project-Based Learning is that sometimes, if the project is to build a bridge, kids end up simply building a bridge—that is, making the product can take precedence over significant thinking.

In Problem-Based Learning, the focus is on inquiry. Given a scenario where an engineer must present a plan to build a bridge connecting two sides of a town we ask questions: Why build a bridge? Where should the bridge go? Who will benefit? We intentionally build in the larger context around the problem.

Something else that distinguishes PBL from Project-Based Learning is the purposeful assignment of a stakeholder role, creating a form of apprenticeship. Students might be designated as the engineers whose job is to design and build the bridge. A key aspect of PBL is to experience what it's like to think like an engineer.

"I know now that your mind can change throughout the problem solving process."

– High school student

This also distinguishes PBL from simulation learning. We want students to have the benefit of the collective thought on what it's like to be an expert — whether an engineer, scientist or activist — rather than having them sectioned off in groups taking different stakeholder roles. In the latter scenario, kids sometimes stop listening to each other. They try to fight it out and prove who is right. In PBL, we want them to discuss together the advantages and limitations of the viewpoint through which they are addressing the problem. Collaboration is essential.

Walk us through a successful PBL experience.

It starts when students are presented with the opening scenario that introduces the ill-structured problem. Next, kids list what they know and what they need to know, and they



PBL v. PBL: Differences & Similarities

The lines between Problem-Based Learning and Project-Based Learning can easily blur. Here are a few key distinctions.



	Problem-Based Learning	Project-Based Learning
Roots	Medical education	Science and engineering
Learning Prompt	Ill-structured problem	Open-ended, driving question
Teacher Role	Facilitate and then fade into the background	Coach/ facilitate throughout the project
Key Characteristics	Collaborative, learner-centered, inquiry-based, experiential Begins with a problem in mind	Collaborative, learner-centered, inquiry-based, experiential Begins with end-product in mind
Resources	Illinois Math & Science Academy's PBL Network – Collaborative Inquiry in Action Problem-Based Learning at University of Delaware Problem-Based Learning Units by Shelagh Gallagher William & Mary School of Education, Center for Gifted Education – PBL Science Units	Buck Institute for Education Edutopia Scholastic

come up with an action plan which they record on a "Learning Issues Board," or a modified KWL (Know, Want, Learn) chart. So students control what they learn. Over time they learn how to choose when they learn and how they learn. But not right away. Just as you wouldn't send a child



out driving on ice their first time behind the wheel, teachers can't send students off to be immediately self-directed with PBL. They become self-directed over time. Early on in the process, the teacher does a lot of scaffolding and modeling.

Once the kids have done their research, which might include reading, Internet searches, a science lab or conversations with an expert, they come back to the Learning Issues Board and say, "What questions have we answered? What new questions do we have as a result of our research?"

The teacher, who is always in control of the story and the problem, can decide how much time to allot for understanding the situation. In the end, the ill-structured problem becomes structured because the kids have defined the problem.

Lastly, students come up with a solution to the problem. Solutions can take a variety of different forms, and might involve, for instance, presenting recommendations, building a model or writing a memo. One of the beauties of PBL is that there is so much flexibility.

Studies show that students find PBL more motivating, engaging, and satisfying than traditional classroom teaching. Why?

Brain-based research tells us that we are hard-wired for open-ended problems. And, kids like the idea that they get to be an adult—or experience what it's like to think like an adult. They thrive on being self-directed learners.

How does Problem-Based Learning help students meet Common Core State Standards?

I think meeting Common Core State Standards (CCSS) is, if anything, easier

through PBL. It's a great way to meet Next Generation Science Standards, as well. There is strong alignment between what the Common Core requests of teachers and what PBL provides with regard to collaboration, critical thinking, close reading, research skills, communication, interdisciplinary study and authenticity. Additionally, PBL is an organic process. The skills and learning required by the CCSS flow naturally from the presentation of the problem, and the question of relevance, or 'why do we have to learn this?' is immediately resolved.

What about testing? Does PBL lower scores on high-stakes tests?

Because it was generated from medical school, PBL has a research base like no other in education. There are hundreds of studies documenting the efficacy of PBL. The research on content acquisition is really clear. If the problem is well-constructed around meaningful standards, kids acquire as much information as they do under didactic instruction.

What obstacles prevent successful PBL implementation?

Sometimes, administrators will want to try PBL, but they fall short of full implementation. They might choose a problem that is too limited or structured, or they rush through it so it won't take so much time. Either mistake can cause PBL to fail. As with all inquiry-based approaches, professional development is crucial.

For an administrator who wants to implement PBL for the first time, but is fearful of how it will go, I recommend using what I call the "dead zone" between testing and the end of the school year. Alternatively, administrators could test PBL in a summer

program, when there is a little more latitude. By following up with faculty workshops on how to translate the summer experience into a regular classroom year experience, the transition to PBL can be seamless.

What is your advice for those who are fearful of PBL?

Many teachers with whom I've worked are fearful of PBL. There is a common misperception that "ill-structured problems" lead to chaotic classrooms and unpredictable outcomes. One teacher literally bit her lip black and blue before starting her unit, only to find that the kids loved the experience and learned more than she imagined was possible.

Running your first PBL experience is, for many, a scary leap into the unknown that no amount of data can assuage. I think experience is the best teacher in this case. For most teachers, once they see PBL in action, their fears dissolve.

"It is refreshing to see a few of my traditionally underachievers (although I have been telling them for months how bright they are) really succeed. I am wowed by them! We are getting some excellent dialogue out of the experience."

— Teacher



Dr. Shelagh A. Gallagher is a nationally recognized expert in gifted education and in Problem-Based Learning. She has received the National Association for Gifted Children award for Article of the Year and is

a four-time winner of the NAGC Curriculum Division award for exemplary curriculum. To learn more or access free downloads, visit Royal Fireworks Press at www.rfwp.com/pages/shelagh-gallagher/.



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Northwestern University™
School of Education and Social Policy

617 Dartmouth Place
Evanston, Illinois 60208

NEWS, DATES & OTHER IMPORTANT CTD INFORMATION

Northwestern University's Midwest Academic Talent Search (NUMATS) provides research-based assessments to identify exceptional academic ability and tailored resources to develop talent areas.

Register by:

Nov. 5 to take SAT® on Dec. 7

Nov. 5 to take ACT® on Dec. 14

Dec. 17 to take EXPLORE® on Jan. 25

Gifted LearningLinks (GLL) offers rigorous online courses for all ages. Nine-week enrichment courses for students in K through grade 8 start on January 15. Credit bearing honors, honors elective and AP® courses begin on the 15th of every month.

Weekend Enrichment Programs

engage students age 4 through grade 9 in hands-on, in-depth activities. The wide variety of advanced and unique courses range in duration from a single weekend to eight consecutive Saturdays.

- **The Saturday Enrichment Program**
Winter Session begins on January 11 in locations throughout the Chicago area.
- **Accelerated Weekend Experience**

programs explore topics in science, technology or engineering with an expert in the field. Sessions are offered in locations throughout the Midwest.

Educator's Conference: Register now for the CTD conference on Saturday, January 25 in Evanston. **Dr. Shelagh Gallagher**, an expert in gifted education and curriculum development, will focus on Problem-Based Learning. CTD's **Ann Gadzikowski, MS**, will lead a workshop on challenging exceptionally bright children in early childhood classrooms.

Upcoming Gifted Conferences:

National Association for Gifted Children, November 7-10, 2013 in Indianapolis. More information: <http://nagc.org>

Minnesota Council for the Gifted and Talented, November 16, 2013 in Minneapolis. More information: <http://mcgt.net>

Illinois Association for Gifted Children, February 9-11, 2014 in Naperville. More information: www.iagcgifted.org

**Center for Talent Development
Northwestern University**

phone: 847/491-3782 • fax: 847/467-4283

e-mail: ctd@northwestern.edu

website: www.ctd.northwestern.edu



Center for Talent Development has been accredited as a nonpublic supplementary school by the North Central Association Commission on Accreditation and School Improvement (NCA CASI) since April 1, 1994. NCA CASI is recognized by the U.S. Department of Education and has more than 100 years of experience in improving educational quality.



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