



Unleashing Student Agency with **Project-Based Learning**

How to Design Authentic Experiences
That Solve Real-World Problems

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Foreword by Scott McLeod

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How to Find Project-Worthy Problems

Alignment to Transformational Learning Principles and ISTE Standards

TLPs

Guide: Spark Curiosity

Empower: Ignite Agency

ISTE Standards for Students and Educators

Knowledge Constructor (1.3.d)

Designer (2.5.b)

Students in a rural community participated in an ambitious, multi-year project to redesign their tired playground into a thriving green space for local gatherings. When I asked a community leader and longtime educator what students gained from the experience, he replied with one word: “Hope.”

Real-world learning has the potential to generate a multitude of outcomes. Perhaps most importantly, authentic contexts increase

relevance. When students make a connection between what they are learning and the world around them, schoolwork is no longer about compliance. It's about engaging with meaningful problems and contributing their own ideas and solutions.

With increased engagement comes motivation to tackle big challenges and persist through difficulties. Capable teachers provide essential support for real-world learning, helping students to set—and reach—ambitious goals. Not surprisingly, researchers have documented increased academic achievement resulting from high-quality projects that emphasize authenticity. Results not only span grade levels and content areas but also show benefits for diverse learners. (See Resources in the appendix for links to supporting research.)

Along with academic gains, real-world learning experiences can help students develop important competencies they will need for college, careers, and civic life. Collaboration, critical thinking, and effective communication are among the most highly prized qualities in surveys of employers. With the emergence of artificial intelligence and automation, the ability to generate original ideas and adapt to a changing world are more important than ever. These abilities do not develop overnight; real-world learning experiences across grade levels give students opportunities to cultivate these future-ready competencies over time and in developmentally appropriate ways.

Some projects exceed even the most ambitious learning goals. They inspire students to see themselves as capable problem-solvers and leaders. They lift up student voices. At a time of increasing polarization in our politics, they remind us of the power of community. They even have the power to inspire hope.

The stories ahead show what's possible when we engage students in tackling problems that matter to them. "Students to the rescue" is not just a phrase to describe Part II of this book; it's a strategy for forging stronger connections between students and community, and,

in the process, engaging students in deeper, lasting learning. These examples paint a picture of what education can be when the goal is high engagement and high impact.

Making learning motivating for students and meaningful for communities may seem like a high bar for educators. But it's a necessary goal if students are going to be prepared to navigate the uncertainty ahead. The Learning Compass developed by OECD offers an aspirational vision of education, pointing toward the competencies today's students will need to thrive in 2030 and beyond. Along with curiosity, imagination, resilience, and self-regulation, students "will also need to care about the well-being of their friends and families, their communities, and the planet" (OECD, 2018, p. 2). Developing these competencies is not expected to happen in isolation. Rather, it will take collective effort with peers, teachers, parents, and communities.

As you will discover, educators across the United States and around the world are already finding opportunities to create high-engagement, high-impact experiences. Some projects are tightly tied to the curriculum and regular classroom learning, aligned with core content and important standards. Others happen on the edges of the school day, involving clubs or leadership opportunities for students that may not happen in traditional classrooms (Mehta & Fine, 2019).

Throughout the book, you will hear references to project-based learning (PBL) as a framework for problem-solving. Projects typically start with a challenge or question that is not easily answered—not "Googleable." There may be multiple solutions, not just one right answer. To arrive at a final product or solution, students will likely have to master new content, manage deadlines, collaborate with teammates, and improve results through feedback and iteration.

These processes for problem-solving mirror how important work happens in the world outside school. The complexity of problems often requires experts from different disciplines to build on each other's thinking, navigate differences, and reach consensus. As a

recent example, consider how the sudden emergence of the COVID pandemic required collaboration from experts in medicine, public health, data analysis, pharmaceutical development, education, politics, and more.

Over the past quarter-century, PBL has gained traction across the United States and in many other countries. This movement has been driven in large part by pressure to prepare students with future-ready skills, including fluency with technology. Researchers and practitioners have collaborated to define high-quality PBL and document its effectiveness. Project examples are readily available in a growing shelf of books and online collections—and even from chatbots. (See Resources in the appendix for a research summary and links to project libraries.)

Yet despite its increasing adoption, the fullest expression of PBL remains the exception for many students. Structural barriers persist, keeping content areas siloed and preventing the authentic problem-solving that requires thinking across disciplines. The focus on achievement scores has only heightened post-COVID, with many teachers feeling pressure to emphasize test prep over student agency. With limited prep time for themselves, teachers may struggle to find time for project planning. They may not know how to connect with potential partners in the community.

In the examples ahead, you will hear how teachers in different settings make room for meaningful projects. Some start small, by redesigning a familiar unit to bring in community partners or experts. Some teachers wait until high-stakes tests are over before launching an engaging project to end the school year on a high note. Others prototype projects in electives or enrichment activities before introducing them to more traditional courses. Many teachers develop confidence with PBL by connecting with a community of practice, learning alongside colleagues who share their commitment to providing students with more engaging, meaningful learning.

Starting with a ready-made project can be a time-saver when it comes to planning. Rather than following a ready-made project as a script, however, consider using it as a starting point. Modify and adapt to meet your students' interests and connect to local context, including potential partners in your community.

Chapter 10 offers more troubleshooting strategies to help overcome potential roadblocks.

Real-World Learning

In *Reinventing Project-Based Learning, 3rd Ed.* (Boss & Krauss, 2018), co-author Jane Krauss and I used the phrase “real-world projects” to describe learning experiences that engage students, connect schools and communities, and leverage technology. This emphasis on authenticity informs which problems to solve, how problem-solving unfolds, how technologies are integrated, and how students make an impact by sharing their products and solutions.

When tackling authentic problems, students need to think in the ways that experts do in fields ranging from engineering to creative writing to video production. They work collaboratively, just as experts do, to conduct research and design solutions. They leverage digital tools for discovery, collaboration, creation, and communication, “taking learners places they could not otherwise go and helping achieve essential learning goals in new ways” (Boss & Krauss, 2018, p. 20). That includes making purposeful use of new tools, including generative AI, to “think deeper, create better, and solve problems more efficiently,” according to Richard Culatta, CEO of ISTE+ASCD (2025).

The call for authentic learning is echoed in the Transformational Learning Principles from ISTE+ASCD:

To internalize and deepen their learning, students need to apply their knowledge and skills to scenarios that are realistic and compelling to them. Hands-on or active-learning projects that draw on real-world problems or

issues can help students make sense of and build on their learning, as well as deepen inspiration, discovery, and engagement. As students engage in genuine inquiry and problem-solving, they also develop complex thinking, collaboration, and self-direction skills. Technology tools are integral to authentic learning tasks and projects and can enhance students' capacity as creators and problem-solvers.

Frameworks for project design, which you will hear more about in chapter 2, also emphasize real-world learning. In defining Gold Standard Project Based Learning, PBLWorks identifies authenticity as one of the essential design elements for teachers to incorporate (Larmer et al., 2015). Similarly, the framework for High Quality PBL, focusing on the student experience in PBL, describes authentic projects as meaningful and relevant to students' culture, their lives, and their future, further explaining (HQPBL, n.d.):

To motivate students and show them the relevance of what they are learning in school, projects should be experienced as “real.” A high-quality project reflects what happens in the world outside of school. It uses the tools, techniques, and technology found there. It can make an impact on other people and communities, and it can connect to the interests and concerns of young people. Students' voices should be heard in a project, and they should be able to make choices about their work.

The Problem with Real-World Problems

Across the many frameworks and formulas for PBL, there is a unifying focus on students as problem-solvers. An open-ended question or challenge typically frames each project, setting the stage for students to ask questions, build understanding, and apply what they learn to solve a problem or design a solution.

But finding project-worthy problems can be challenging. Author Daniel Pink has identified what he describes as a “problem with problems” (2009):

In school, problems almost always are clearly defined, confined to a single discipline, and have one right answer. But in the workplace, they're practically the opposite. Problems are usually poorly defined, multi-disciplinary, and have several possible answers, none of them perfect.

PBL can create the necessary space for learning experiences that are open-ended, with "several possible answers, none of them perfect." So can projects that students undertake in clubs and leadership experiences, where they apply the processes of project management and problem-solving outside traditional academics. Both kinds of experiences have the potential for high engagement and high impact.

Determining which problems are worth the time and energy for students to tackle can bring up questions: Which problems are right-sized, so that students will be challenged but not overwhelmed? Which problems will set the stage for students to deepen their understanding of important content and concepts? Which problems will engage students enough to persist through difficulties?

Let's consider three sources of inspiration for real-world learning that can lead to high engagement and high impact:

- Students' interests and concerns
- Teacher creativity
- Community needs

Students' Interests and Concerns

At Alliance High School in Portland, Oregon, teacher Joe Ferguson looks for what he calls "that spark" for every ambitious project he undertakes with students. "Student interest drives whatever else is done," he said, "and sustains inquiry over several weeks or months." Over the years, Alliance students have followed their interests to build a solar-powered electric boat, created a field guide for mushroom hunters, and shared design ideas for their new campus.

Finding that spark starts with knowing your students. What are their interests outside of school? What concerns them? Which movies, music, books, or social media do they care about? If they could change something about school or their community, what would that be?

Building a classroom culture of belonging and respect—knowing your students—is a core practice among veteran project-based teachers (Boss & Larmer, 2018). This aligns with the call to nurture students in the Transformational Learning Practices by cultivating belonging, connecting learning to the learner, and ensuring opportunity.

Strategies to discover students' interests are applicable across grade levels, including:

- Surveys, chalk talks, wonder walls
- Listening, observing
- Peer interviews
- Morning meetings
- Writing and discussion prompts
- Advisories

Identifying students' interests can provide inspiration for projects, but don't expect students to be proficient project designers. "Once we figure out what's interesting to students," Ferguson explained, "then we [as teachers] bring in the curricular aspects that students will need."

Teacher Creativity

One of the enduring roles of educators is to open students' eyes to issues and ideas they didn't know would interest them. Projects offer opportunities for teachers to leverage their own passions, interests, knowledge, and concerns as starting points for student inquiry.

“An engaging teacher doesn’t just follow students’ existing interests or passions,” remind authors Dennis Shirley and Andy Hargreaves in *Five Paths of Student Engagement* (2021, pp. 86–87). “That teacher also introduces students to new interests or timeless subjects that may engage them for the rest of their lives.”

Projects that start with teacher inspiration can prompt students to get curious about everything from stormwater remediation to immigrant stories to food justice. These are just a few examples of high-interest projects that started with a teacher’s idea and resulted in deep learning and community collaboration.

In Columbus, Indiana, veteran English teacher Joe Steele mines his own interests, passions, and even his family as inspiration for meaningful projects. He co-designed a project about American history, for example, by thinking about his own father, a Vietnam veteran. “He never tells his story,” Steele said, “but I knew he would talk to my students.” Students eventually interviewed Steele’s father plus dozens more veterans and organized a Veterans’ Day event to honor them. (In chapter 4, you will hear Steele describe how he leveraged his carpentry hobby in a project where his students designed little libraries to improve literacy rates in their community.) “The power of PBL is engagement. If I’m passionate about it,” he said, “that carries to the kids.”

Strategies for teacher inspiration:

- **Borrow and adapt:** Keep your eyes open for compelling project ideas that you can adapt to meet your learning goals and local context. Part II: Students to the Rescue is filled with examples, along with suggestions for modifying them for your context. The Resources section includes links to searchable project libraries. Generative AI offers another tool to research project ideas developed by other educators.

- **Remodel existing units:** Think about a familiar unit that has rich content and plentiful resources but lacks student engagement or community impact. How could you remodel it to incorporate real-world problem-solving and an authentic audience?
- **Teach from the headlines:** What’s happening in your community or the wider world that has students talking? Go deeper than a current events discussion by designing projects with a ripped-from-the-headlines feel (Boss & Larmer, 2018).

Community Needs

Projects can also start with community members identifying a need and enlisting students to help solve it.

In the coming chapters, you will hear how students contribute to local problem-solving in a variety of ways. They gather and analyze data as citizen scientists. They fill information gaps in news deserts by creating locally relevant content. They improve literacy and address hunger in their communities with concrete solutions. They take action as informed citizens on issues ranging from voter turnout to perceived injustices.

In these examples, students are supported by community allies who welcome their contributions and listen to their ideas. Anecdotally, students tell me they appreciate being taken seriously by adults.

At Iowa BIG, a project-based high school program you will hear more about in the coming chapters, community-generated projects are called “inbound projects.” These start with nonprofit organizations, businesses, or government programs recognizing students as potential collaborators to address real issues.

Inbound ideas can also start within the school community itself. School staff who focus on maintenance, engineering, nutrition, and technology can all be sources of inspiration for student problem-solving. School leaders can serve as clients as well, if they are working to solve a problem that could benefit from student insights.

In chapter 3, we will explore strategies for identifying potential partners and preparing them to engage with students.

Make It Your Own: Create a Project Bank

Science and technology teacher Rich Lehrer has seen firsthand how students respond to solving problems for real clients. In his case, it was his own son who became the client for Lehrer's middle school students at Brookwood Middle School in Massachusetts. Inspired to help Max, who was born with his hand not fully developed, the students used 3D printing and their inquiry into pediatric medicine and biomechanics to create a prosthetic hand for the then-preschooler.

"That project opened up the world to me," said Lehrer. "I saw how students could use technology and makerspaces to solve problems and see themselves as problem-solvers." Max is now in high school, pursuing his own interests in design.

Lehrer's students went on to design assistive products for senior citizens, using 3D printing to produce prototypes for client feedback. They connected with other schools around the world using makerspaces and open-source design for humanitarian design projects in a project called Enabling the Future (enablingthefuture.org).

In hindsight, Lehrer can see how those early successes motivated him to develop an approach he calls client-connected projects. "It gave me proof of concept. As a teacher, I had assurance that amazing stuff comes of this." Initially, Lehrer looked for opportunities in student clubs and after-school programs to connect students with clients. During the regular school day, he had to align learning with science standards. On the edges of the daily schedule, he found time and space to innovate.

Lehrer had the opportunity to further refine his approach when he moved to the Alexander Dawson School in Nevada and was invited to create a middle school elective called Tech for Good.

Students run the class as a company, building their design skills and entrepreneurial know-how by taking on projects for clients—for a fee. Profits generated by Dawson Design Company turn into philanthropic gifts to organizations that students select.

Potential clients pitch their requests through an online Problem Bank, suggesting products for students to design and fabricate with laser cutters, 3D printers, and other technologies. Client proposals have come from family members, local businesses and non-profits, and even the school maintenance department. As Lehrer observed, “We have more problems than we can solve.”

Students choose which projects to take on, but Lehrer sets expectations. “It’s important for kids to have rigor, to see that what they are doing is challenging and difficult,” he told me. Lehrer guides students away from projects that involve predefined, repetitive tasks and toward those that involve creative problem-solving.

Students document their design process with reflections. Lehrer has them share their documentation with clients as part of the prototyping process. Clients give feedback and also gain insights into how learning is unfolding, but they may have to adjust their expectations “in the interest of an amazing learning experience.”

Some of the best learning experiences have come about when client and students are equally invested. For example, the Nevada-based Tyler Robinson Foundation supports families impacted by pediatric cancer. It’s one of the organizations that Lehrer’s students had supported philanthropically in the past by donating profits from Dawson Design Company. The relationship deepened when the foundation asked to share with students how the funds had been used—to show them the impact. “They showed our kids what happened with the money they had raised—helping a family pay for a hotel room during their child’s treatment or funding a fun day away from treatment.”

Before long, Tech for Good students were hosting a design lab experience for young patients who had finished treatment. Their

design projects became more tightly connected to the foundation's needs, such as designing trophies for a foundation gala or swag for special events. "We've found a partner as interested in us as we are in them." Together, both client and students have seen the benefits of high-engagement, high-impact learning.

Conclusion

Real-world learning experiences increase student engagement and motivation by connecting school with the world beyond the classroom. Along with delivering academic gains, such experiences build students' competencies to tackle future challenges. Project-based learning provides a framework for problem-solving that mirrors how important work happens outside school, building students' abilities to collaborate, communicate effectively, and think critically.

Identifying project-worthy problems for students to tackle can be challenging. Inspiration can come from considering students' interests, building on teachers' passions, or responding to community needs. Teachers who are motivated to bring meaningful learning experiences to their students and communities overcome structural barriers to innovation by starting with small steps, finding opportunities in electives or activities without high-stakes assessments, joining a community of practice for professional growth, or adapting existing projects to meet their students' interests and reflect local context.

Time to Reflect

Clearly, problems for students to tackle are all around us. Before moving forward with project design, it's worth taking a critical look at your initial idea or problem to be solved.

Consider these questions to ask yourself or to discuss with colleagues:

- Does a starter idea for a project generate “that spark” of student interest? If the idea didn’t originate with students, now is the time to invite their feedback.
- Will tackling the problem lead to important learning goals? Consider both academic goals and other competencies that prepare students for the future. If students could reach the same goals in a short lesson or activity, it’s not a project-worthy idea. If a potential client is asking students to perform repetitive tasks that don’t require them to be creative problem-solvers, it’s not a project-worthy idea.
- Would problem-solving require interdisciplinary thinking? Share your idea with teachers from other content areas; invite collaboration across disciplines.
- Will the project matter to anyone outside the classroom? What impact will the experience have on students and the wider community?

In the next chapter, we will consider project design strategies to get you—and your students—on the road to problem-solving.

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