Seven Essentials for Project-Based Learning
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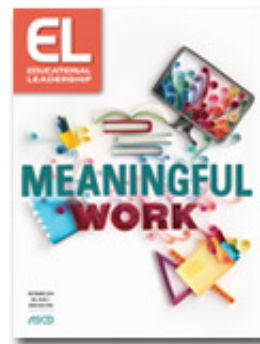
> **Some "projects" border on busywork. Others involve meaningful inquiry that engages students' minds.**

As Ms. McIntyre walked around her high school science classroom, she plopped a packet of papers on each student's desk and announced a "project." Each student would create a poster about a water-borne bacterium that can be harmful to humans, the bacterium's effects, and disease prevention and treatment. The handouts included an assignment sheet with due dates and grading policy, a guide for designing the poster, and a list of websites and books. The teacher would display the best posters.

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Sound familiar? When you were in school, did you make posters, dioramas, and models of buildings or volcanoes? If you are a teacher, have you asked students to research a topic and present information with PowerPoint slides? These are all-too-common examples of the kind of meaning-lite assignments that teachers bill as projects. A classroom filled with student posters may suggest that students have engaged in meaningful learning. But it is the process of students' learning and the depth of their cognitive engagement— rather than the resulting product—that distinguishes projects from busywork.

What Every Good Project Needs

A project is meaningful if it fulfills two criteria. First, students must perceive the work as personally meaningful, as a task that matters and that they want to do well. Second, a meaningful project fulfills an educational purpose. Well-designed and well-implemented project-based learning is meaningful in both ways.

As educators with the Buck Institute for Education, we provide professional development to help schools set up a sustained program of in-depth project-based learning throughout a district, network, or state. In our work with teachers, we have identified seven essential elements of meaningful projects. Let's look at each element by considering what the fictional Ms. McIntyre could have done to create a meaningful project instead of handing out prepared packets.

1. A Need to Know

Imagine that on the first day of the infectious disease unit, Ms. McIntyre showed a video depicting a beautiful beach, which ended with a shot of a sign reading, "Beach Closed: Contaminated Water." Suppose watching this video led to a lively (and sometimes disgusting) discussion in which students shared their experiences with suspicious water quality, discussed times when beaches had been closed and why, and talked about how much pollution bothered them. The teacher could then introduce the project by telling students that they would be learning more about ocean pollution and proposing actions to combat it.

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Teachers can powerfully activate students' need to know content by launching a project with an "entry event" that engages interest and initiates questioning. An entry event can be almost anything: a video, a lively discussion, a guest speaker, a field trip, or a piece of mock correspondence that sets up a scenario.

In contrast, announcing a project by distributing a packet of papers is likely to turn students off; it looks like a prelude to busywork.

Many students find schoolwork meaningless because they don't perceive a need to know what they're being taught. They are unmotivated by a teacher's suggestion that they should learn something because they'll need it later in life, for the next course, or simply because "it's going to be on the test." With a compelling student project, the reason for learning relevant material becomes clear: I need to know this to meet the challenge I've accepted.

2. A Driving Question

After the discussion about beach pollution, Ms. McIntyre led students in brainstorming possible solutions, such as enacting laws, designing better waste-treatment systems, and raising public awareness about the need to reduce contaminants. Students created a driving question to focus their efforts, focusing on a specific local area: How can we reduce the number of days Foster's Beach is closed because of poor water quality?

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A good driving question captures the heart of the project in clear, compelling language, which gives students a sense of purpose and challenge. The question should be provocative, open-ended, complex, and linked to the core of what you want students to learn. It could be abstract (When is war justified?); concrete (Is our water safe to drink?); or focused on solving a problem (How can we improve this website so that more young people will use it?).

A project without a driving question is like an essay without a thesis. Without a thesis statement, a reader *might* be able to pick out the main point a writer is trying to make; but with a thesis statement, the main point is unmistakable. Without a driving question, students may not understand why they are undertaking a project. They know that the series of assigned activities has some connection with a time period, a place, or a concept. But if you asked, "What is the point of all these activities?" they might only be able to offer, "Because we're making a poster."

3. Student Voice and Choice

Once her students' interest was piqued by a challenging question, Ms. McIntyre explained the requirements for the "Don't Close the Beach" project, which included an individually written paper, an oral presentation of students' work accompanied by media technology, and a product of students' choice created by teams. Students chose to develop media kits, public service announcements, web pages, brochures, and letters to government and industry officials, among other products.

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This element of project-based learning is key. In terms of making a project feel meaningful to students, the more voice and choice, the better. However, teachers should design projects with the extent of student choice that fits their own style and students.

On the limited-choice end of the scale, learners can select what topic to study within a general driving question or choose how to design, create, and present products. As a middle ground, teachers might provide a limited menu of options for creative products to prevent students from becoming overwhelmed by choices. On the "the more, the better" end of the scale, students can decide what products they will create, what resources they will use, and how they will structure their time. Students could even choose a project's topic and driving question.

4. 21st Century Skills

Once Ms. McIntyre's students had decided on actions that would help them respond to their driving question, they got to work. Collaboration was central to the project. Students formed teams of three or four and began planning what tasks they would do and how they would work together.

As they worked, each team regularly paused to review how well they were collaborating and communicating, using rubrics they had developed with the teacher's guidance. To boost collaboration skills, Ms. McIntyre used role-playing and team-building activities. She showed students how to use time and task organizers. They practiced oral presentation skills and learned to produce videos and podcasts. In writing journals, students reflected on their thinking and problem-solving processes, which they knew they would need to explain in their oral presentation.

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A project should give students opportunities to build such 21st century skills as collaboration, communication, critical thinking, and the use of technology, which will serve them well in the workplace and life. This exposure to authentic skills meets the second criterion for meaningful work—an important purpose. A teacher in a project-based learning environment explicitly teaches and assesses these skills and provides frequent opportunities for students to assess themselves.

5. Inquiry and Innovation

After their discussion about encounters with pollution, in addition to choosing a driving question, Ms. McIntyre's students as a whole class generated a list of more detailed questions about diseases, bacteria and their effects, and sources of water contamination. Questions included, What diseases can you get from water? Do you have to drink it to get sick? and Where do bacteria come from? The teams fine-tuned their questions and discussed how to find answers from the teacher, books, articles, websites, experts, and visits to Foster's Beach.

As these learners found answers, they raised and investigated new questions. Students synthesized the information they gathered and used it both to inform their individually written papers on the driving question and to help create their team's product related to that question.

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Students find project work more meaningful if they conduct real inquiry, which does not mean finding information in books or websites and pasting it onto a poster. In real inquiry, students follow a trail that begins with their own questions, leads to a search for resources and the discovery of answers, and often ultimately leads to generating new questions, testing ideas, and drawing their own conclusions. With real inquiry comes innovation—a new answer to a driving question, a new product, or an individually generated solution to a problem. The teacher does not ask students to simply reproduce teacher- or textbook-provided information in a pretty format.

To guide students in real inquiry, refer students to the list of questions they generated after the entry event. Coach them to add to this list as they discover new insights. The classroom culture should value questioning, hypothesizing, and openness to new ideas and perspectives.

6. Feedback and Revision

As they developed their ideas and products, student teams critiqued one another's work, referring to rubrics and exemplars. Ms. McIntyre checked research notes, reviewed rough drafts and plans, and met with teams to monitor their progress.

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Formalizing a process for feedback and revision during a project makes learning meaningful because it emphasizes that creating high-quality products and performances is an important purpose of the endeavor. Students need to learn that most people's first attempts don't result in high quality and that revision is a frequent feature of real-world work.

In addition to providing direct feedback, the teacher should coach students in using rubrics or other sets of criteria to critique one another's work. Teachers can arrange for experts or adult mentors to provide feedback, which is especially meaningful to students because of the source.

7. A Publicly Presented Product

In Ms. McIntyre's class, teams presented their analyses of water contamination issues and proposals for addressing the problem at an exhibition night. The invited audience included parents, peers, and representatives of community, business, and government organizations. Students answered questions and reflected on how they completed the project, next steps they might take, and what they gained in terms of knowledge and skills—and pride.

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Schoolwork is more meaningful when it's not done only for the teacher or the test. When students present their work to a real audience, they care more about its quality. Once again, it's "the more, the better" when it comes to authenticity. Students might replicate the kinds of tasks done by professionals—but even better, they might create real products that people outside school use.

The Rest of the Story

The hypothetical project described here was inspired by a real project, "Media Saves the Beach," carried out by students at High Tech High in San Diego, California. In this real-life project, students worked alongside established local groups to advocate cleaner seashores. Several government agencies eventually came through with funding for water monitoring at local beaches.

In truth, one of the products students created was a poster. What made that poster different from the meaning-lite one Ms. McIntyre assigned? The High Tech High students chose to do their poster because it was an effective way to communicate their message at Exhibition Night—and the team stood nearby to explain it. To create the poster, students engaged in an extended process of inquiry, critique, and revision. They learned important things in the process. In short, even a poster can be meaning-heavy if it's part of a project embodying the seven essential elements of project-based learning.

Authors' note: Individual and some place names in this article are pseudonyms.

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