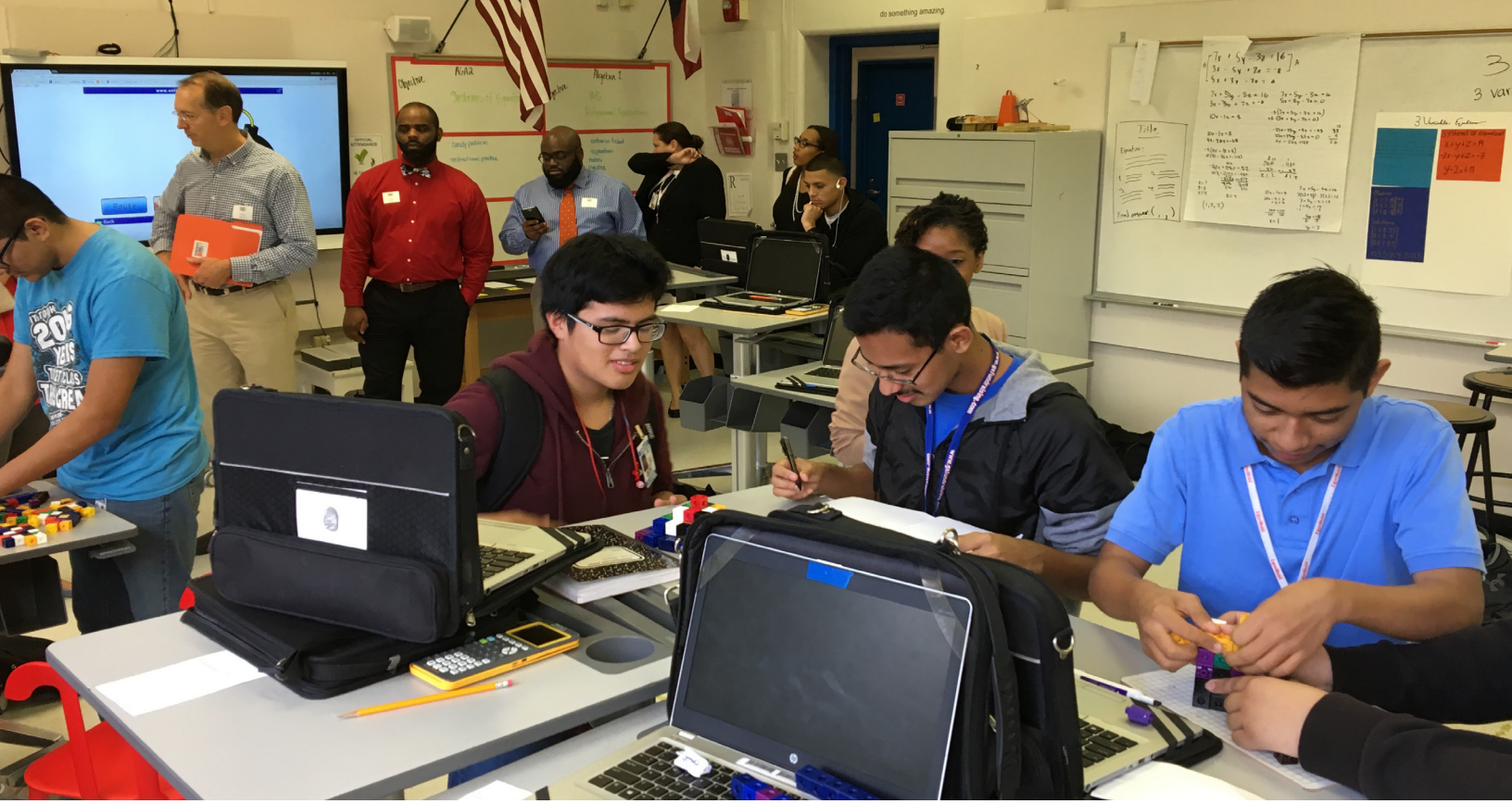
ENERGY INSTITUTE HIGH SCHOOL

HQ PBL
High Quality Project Based Learning

CASE STUDY 2018



Intellectual Challenge and Accomplishment

Authenticity

Public Product

Collaboration

Project Management

Reflection

The Framework for High Quality Project Based Learning (HQPBL) describes PBL in terms of the student experience. It describes six criteria, each of which must be at least minimally present in a project in order for it to be judged "high quality." The six criteria were chosen as a necessary starting point for providing students access to HQPBL because they are an essential baseline, but they are not all-encompassing.

Projects that are the most memorable, and that have the greatest impact on student learning and development, will be those with the highest quality implementation of each criterion. The case study that follows highlights the six criteria and is intended to provide readers with a real-world example of HQPBL.

For more information and resources, visit the HQPBL **Energy Institute High School** page:

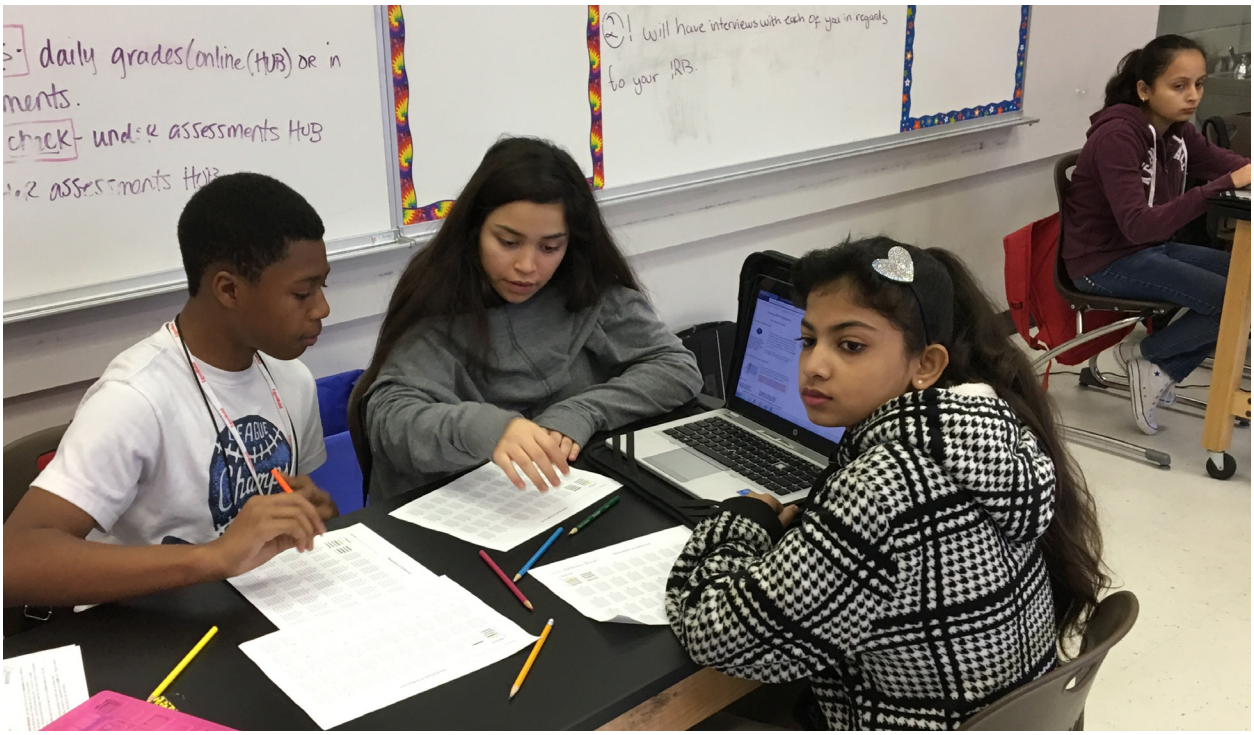
To some, the thought of industry and education working in sync might sound like a faraway idealization; to others, it might seem to be an odd, if not antithetical, pairing.

Yet an increasing emphasis on the strategic use of finite resources—and the development of more sustainable solutions—has led one U.S. high school toward a specific focus. It started with an acknowledgement of the needs of area employers, and the best job opportunities for local students.

Mixing Pragmatism and Pedagogy

The Energy Institute High School is the first-ever high school devoted to preparing students to enter careers in the energy field, and high quality Project Based Learning (HQPBL) is at its core. As part of the curriculum, all Energy Institute students are exposed to engineering and technology typically reserved for college-level courses, and they also receive instruction from teachers as well as industry professionals.

The magnet school is part of the City of Houston district—the largest in the State of Texas. It was launched with support from the U.S. Department of Education's Innovation Office, which offered funding through a Magnet Schools Assistance program grant. The district applied for the grant requesting support for six of its magnet schools; the Energy Institute represents one of its all-new schools with infrastructure and curriculum built from the ground up.



Principal Lori Lambropoulos conducted research with employers regarding what skills they felt their current employees were lacking. Their response indicated that soft skills, such as giving and receiving feedback, showing perseverance, and effective collaboration, were areas that could be much stronger.

Working with Energy Institute faculty, Lambropoulos uncovered methodologies that could potentially be thoughtfully incorporated to help students develop build these skills. To them, HQPBL was far and away the most relevant approach—and it soon became the mission and backbone of the school, where curriculum is rolled out entirely through projects.

The Energy Institute employs a cohort model, which offers:

- Freedom to gather all students together for project launches
- Flexibility in terms of timeframe, as in the lifecycle of a project, more time can be taken for weeklong builds
- Adaptability with regard to learning spaces, as these can be negotiated to make projects come together

The ultimate goal: By the time an Energy Institute student completes four years of HQPBL experiences, the learner will have worked in 20 different groups, on 20 different projects, and given over 30 different presentations.

Ensuring Depth and Breadth with an Energy Focus

Naturally, teachers must participate in extensive planning in order for all of this to run smoothly within the course of a traditional academic year.

The Energy Institute has invested in several avenues of effective training for its academic team. With support from a grant, its teachers have participated in the Buck Institute for Education PBL World conference, and also have engaged in a four-day training session with teacher leaders and an external PBL coach. They've subsequently received requests for PBL training from other schools within their district and around Greater Houston.

The school has served as a host to educators and school leaders, offering tours to showcase its model's inner workings. Those at the Energy Institute acknowledge that while it can be replicated, their situation is unique: they have developed this school concept and physical location from the ground up, rather than retrofitting a traditional school building or transforming an existing culture.

Elizabeth Harris is an English teacher who serves on the school's junior team, where she regularly collaborates with other faculty members in environmental sustainability, history, science and engineering to lead HQPBL instruction.

Harris explained that teachers "have to be specific when thinking about cross-curricular PBL" –as in, which state accountability requirements align with other courses. Over the summer, teachers produce an overview of learning outcomes for their respective courses.

They ask and answer two critical questions:

- What skills are we building through these projects? (These could include communication, writing, collaboration, research, or leadership.)
- What's the best way to align or order these projects via sequential skill-building?

  (Scaffolding for this initial process takes roughly three weeks, and then teaching faculty have a general map of what the year could look like.)

Then, they develop the draft of what they call a "driving question," defining the heart of the real-world problem they'd like students to solve.

"After that, we hammer out the first project," Harris said. "We decide what the day-to-day will look like, determining which involve a 'mega-teach' with sessions including two, three, or four teachers from different disciplines. We also identify our desired guest speakers and where we can incorporate their insights throughout the course." Here, students actively participate in authentic learning experiences, taking into account expert feedback toward a public product or solution that could be implemented in a real-world setting.

Project Based Learning at Energy Institute

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Navigating Logistics in an Untraditional School Environment

Planning then shifts into concrete deliverables and established milestones. Rather than being fully teacher-led, Energy Institute students are engaged in the decision-making and planning processes, as well as project management, which empowers them to shape their own educational experiences.

"Our goal is to build realistic timelines, with checkpoints as fail-safes for our students," Harris explained. "We encourage them to embrace the revision process, ensuring that there are enough check-ins so that they can iterate upon their ideas after receiving feedback. Of course, if there are 24 student groups that can be mentored in one day, it's impossible to have meaningful check-ins as an educator with each one—so adding in enough time is critical. We realized that we don't need to complete a project within each grading cycle, and from that we've built in more time for discussion and revision. As a result, students get to go deeper, and don't feel as rushed."

From a logistics perspective, the above scenario requires a different approach to time management and scheduling because of its more fluid nature. Each cohort has its own thematic name (the "snow foxes," for example), and teachers post signs on doors to indicate which classes are meeting where and when. They also have employed Google Sheets and Google Docs, which students have access to in order to know where they need to report the following day.

"This imbues habits of self-management in our students, which are critical to the new workforce," Harris said. "Your day won't always look the same; it will change based on what you need to get done, and you'll need to adapt to that. It's something different in that our kids are learning to manage and develop these skill sets in high school."

In the first year of offering HQPBL student experiences, teachers at the Energy Institute conducted lighter research and students engaged in a single large project.

The following year, classes were co-taught, which enabled teachers from English and history, for example, to guide students as they worked on projects that touched upon both disciplines.

In the third year, teachers assembled into cohorts, in which their classes were blocked together in three-hour increments and they taught the same 100 students. This setup gave rise to a lot of cross-curricular project work. There were two cohorts within each grade (9, 10, and 11). Seniors aren't part of the cohort model, however, as they require more flexibility with regard to electives, internship and externship programs.

Harris adds that within the PBL model, students are incentivized to think about their impact on the collective; as such, they're expected to arrive prepared in support of their groups. "In terms of attendance, a student who consistently misses class would feel as if they're letting their group down," she said.

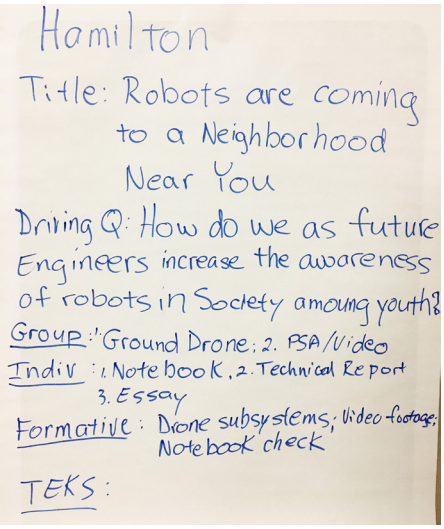
Perhaps not surprisingly, truancy has decreased sharply. "We've found that there's a lot more accountability with this model," Harris said. "Sure, PBL won't solve every challenge—but if you can come up with an engaging project, the kids will be interested. And we don't 'recycle' projects, from year to year, so our current students are intrigued by past projects and seek to learn from peers in different years as well. The conversations they have and how they talk about school is really inspiring."

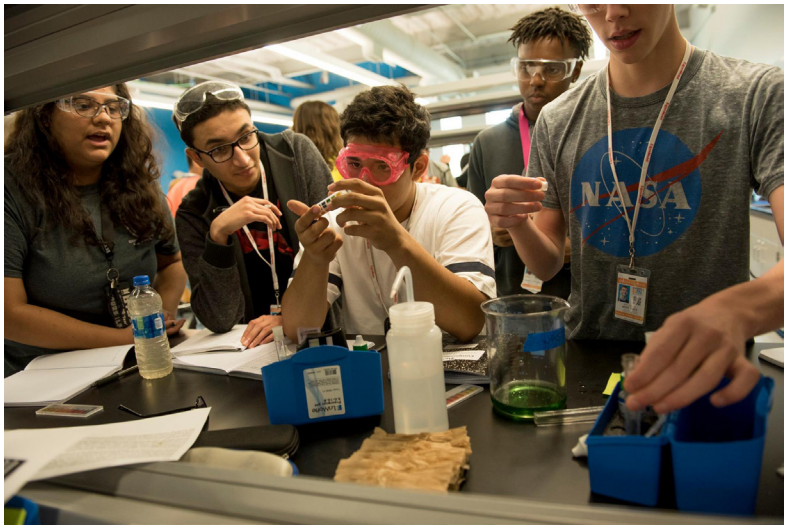
Although the Energy Institute previously was housed in a traditional building—an old elementary school—the faculty was excited teaching in their new building, which opened its doors in 2018. The school's new layout is much more flexible with "pods" for each cohort consisting of adjoining laboratories with removable walls. Humanities classes, also with removable walls designed to accommodate large group meeting spaces, are across the hall.

Building Excitement Around PBL

It is in one of these large spaces that students are first introduced to PBL. Launch events, as they're called, are whole-school interactive experiences where teachers open the floor with a problem or logic puzzle. This serves as a creative ice-breaker that also uncovers students' diverse skill sets.

A recent event centered on the question: can you revitalize an area without gentrifying it? It's an issue that's close to home, as many Energy Institute students have been displaced from their neighborhoods due to rising rent prices. In small groups, students had to find ways that revitalization could take place while still embracing local community culture and without encouraging further displacement. Students brainstormed lists of elements present in "successful neighborhood"—culture, walkability, school quality, accessible healthcare, and the like—and assigned weight to each. It was a fitting springboard activity for the students to begin thinking outside of their four walls.





Project topics are selected based on a number of factors, including inspiration, timeliness, and local connection, with an emphasis on energy (both traditional and alternative sources) and soil science. Many are geared toward energy sustainability, such as wind, solar and alternative energy projects, harvesting algae for biofuel, and cleaning oil spills in large bodies of water.

> ***"Through a recent project, our students have learned that in the next 20 years, we're going to have to produce the same amount of food that has taken humanity 8,000 years to produce in order to accommodate our growing global population."***
>
> —Elizabeth Harris, 11th grade English teacher

A junior level project focused on food supply and production. Students were challenged to reimagine Texas' agriculture and farming methods, and how they might increase food productivity—not only through gardening, but at a larger scale. Students had already discussed food deserts as part of their freshman-year human geography course, and could now actively engage in research of growing methods, including new systems and technologies that might work locally. Teachers got the idea for this project by following National Geographic on Instagram, where images of self-watering hydroponics technology in the Netherlands brought them in touch with one of the company's professional photographers, who now serves as a virtual content expert for their students.

Connecting Energy Institute with Industry

The Energy Institute employs a magnet coordinator and corporate liaison who recruits students, participates in school choice fairs, and facilitates the application, registration and onboarding processes, in addition to cultivating industry partnerships.

Jenna Moon is a former teacher who serves in this role. Her job involves a lot of discussion with parents and kids, which she admits initially was challenging. "We were a new school without a proven track record, SAT data, or college placement statistics. Yet parent support for the Energy Institute has been huge in helping us to create momentum."

She emphasizes that this is not the traditional high-school experience—and that's an advantage. "I've told parents of prospective students that this is a very specific type of school environment: we don't have varsity sports, homecoming dances, or the other events common to most American high schools. Nevertheless, our curriculum is a major draw. Not all kids want to pursue STEM; yet even if their children end up deciding to pursue journalism or public policy, the strength of our curriculum will help them to be competitive when exploring postsecondary options."

"I help to set our students up for college and career success, by ensuring they gain a deeper understanding of the fields that will shape the future of the workforce and innovation," Moon said. "Our teachers collaborate with industry connections to support our projects. These subject matter experts interact with students and ideally offer feedback prior to our final presentation day, which often includes working prototypes. It's a great opportunity for companies' corporate social responsibility initiatives. Some have sent geoscientists over and exposed our kids to industries and roles they didn't know existed."

Expanding academic experiences beyond four walls is a sentiment echoed by Harris. “Our goal is to enter our students into a conversation that matters; one that is applicable to the real world.”

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This case study was produced by Getting Smart as part of the High Quality Project Based Learning campaign. The goal of the campaign is to identify what HQPBL student experiences look like and work to ensure all students have access to this type of learning. The campaign is supported by Project Management Institute Educational Foundation (PMIEF) and the William and Flora Hewlett Foundation and sponsored by the Buck Institute for Education.