WHAT IS PROJECT-BASED LEARNING?

Project-based learning (PBL) is a teaching method that encourages learning by actively engaging in real-world and personally meaningful projects.

Students will typically work on a project over an extended period of time – anywhere from a week up to a semester – that engages them in solving a real-world problem or answering a complex question. They then show what they learned by creating a public product or presentation for a real audience.

By working in this way, project-based learning enables students to develop deep content knowledge as well as skills like critical thinking, collaboration, creativity, and communication. PBL has also been known to unleash a contagious creative energy among students and teachers, leading to increased student engagement and improved learning outcomes for all.

Project-based learning is becoming increasingly used in schools and other educational settings, in different ways and varying degrees. However, you may wondering what the difference is between students simply “doing a project” and engaging in rigorous project-based learning.

According to experts at PBLWorks, it can be helpful to think about typical school projects as a ‘dessert project’ – the project served up after the teacher covers the content of a unit in the usual way. Project-based learning however, is more like the ‘main course project’, in that the project is the unit itself and the vehicle for teaching the important skills student need to learn.

Robert Schuetz, Technology Coordinator for Palatine High School in Illinois and writer for Schoology, says that an increasing number of educational experts are recognising

we live in a modern world sustained and advanced through the successful completion of projects. In other words – everything from our weekend chores to an upcoming presentation to organising a fundraising event are all essentially projects.

This way of working is reflected in the modern career trajectory too. For most workers, their career will be marked by a series of projects rather than years of service to a specific organisation.

CHARACTERISTICS OF PROJECT-BASED LEARNING

Project-based learning is often differentiated by the following characteristics:

INTER-DISCIPLINARY

Real-world challenges are rarely solved using information or skills from a single subject area. In PBL, projects require students to use content knowledge and skills from

multiple academic domains to engage in inquiry, solution building, and product construction.

RIGOROUS

Challenges set out in PBL often require the application of knowledge and skills, not just recall or recognition. Typically, students' first steps will be to engage in a process of inquiry. This leads to deeper learning, not just of the academic content, but also the use of the content in real world applications. This then leads to the development of solutions that address the problem/challenge of the project, and the creation of products to communicate solutions to an audience.

STUDENT-CENTRED

In PBL, the role of the teacher shifts from content-deliverer to facilitator, coach or project manager. Students work more independently, with the teacher providing support only when needed.

BIE & PROJECT-BASED LEARNING

The Buck Institute for Education (BIE) has done years of research and literature review on project-based learning. It explains that with PBL, students “investigate and respond to an authentic, engaging, and complex problem, or challenge” with deep and sustained attention.

Following ts research, BIE identified seven elements of PBL, focused on product design. Collectively these elements are called Gold Standard PBL.

The seven elements are:

- A challenging problem or question
- Sustained Inquiry
- Authenticity
- Student Voice and Choice
- Reflection
- Critique and Revision
- Public Product.

PROJECT-BASED LEARNING OBJECTIVES

The desired outcomes of project-based learning stretch far and wide and can vary by school, teacher and institution. However, project-based learning objectives aren't all that different to the characteristics outlined above, and its purported benefits.

Still, here are some of the common objectives of project-based learning:

- Integration of knowledge and kills from various areas through more complex investigations and multi-disciplinary projects
- Autonomous learning encouraged through independent research of unstructured problems
- Teamwork, which helps prepare students for a social environment
- Self-evaluation and self-criticism, which encourages students to see beyond their own ideas and knowledge.

THE DIFFERENCE BETWEEN PROBLEM-BASED LEARNING AND PROJECT-BASED LEARNING

Problem-based learning and project-based learning are often both are referred to as PBL, so it is easy to conflate or confuse the two.

However, while they share some similarities, problem-based learning and project-based learning also have significant differences that set them apart.

Problem-based learning originated in the 1960s and is student-centred teaching pedagogy. Students learn about a topic through the solving of problems and generally work in groups to solve a problem where there may not necessarily by any one correct answer.

Project-based learning, meanwhile, is an instructional approach where students learn by investigating a complex question, problem or challenge. It promotes active learning, engages students, and allows for higher order thinking (Savery, 2006). Students are tasked with exploring real-world problems and finding answers via the completion of their project. Students also have some control over the project they are working on, particularly in terms of how the project will finish and the end product.

When students complete a problem-based learning task, they often share the outcomes with their teacher and learning goals and outcomes are set jointly. With project-based learning, goals are set from the beginning and it is also quite structured in its teaching.

One big difference is that project-based learning is typically multi-disciplinary – meaning it utilises skills and knowledge from a variety of subjects. Problem based learning is more likely to be a single subject, and shorter too.

Finally, project-based learning follows general steps while a problem-based learning activity follows specific steps to complete.

While this article focuses on project-based learning, both problem-based and project-based learning have a rightful place in today's classroom and can promote 21st Century learning.

BENEFITS OF PROJECT-BASED LEARNING

Below are some of the widely cited benefits of implementing project-based learning in the classroom.

- Presents opportunities for deeper learning in context and for the development of important skills relating to college and career readiness

- Boosts student engagement and achievement and helps students develop the 21st-century skills they need to succeed in their future careers. These include critical thinking, communication, collaboration, and creativity, among others

- Makes room for student choice, allowing students to feel like architects of their own learning journey

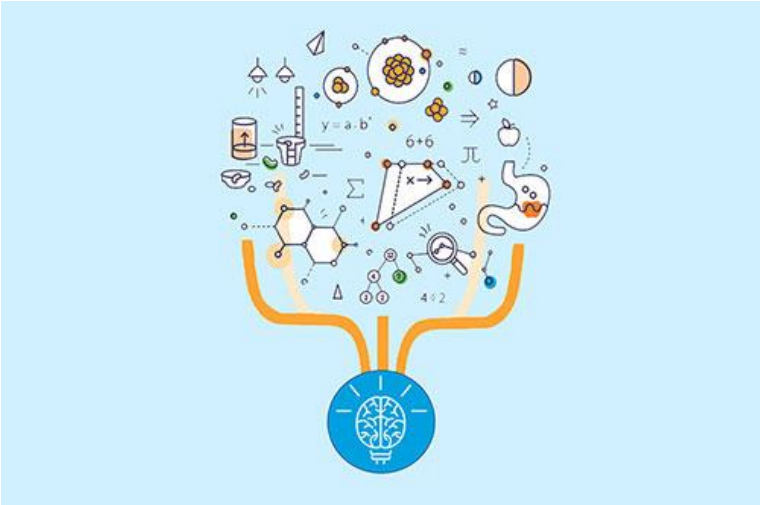
- Improves student attitudes toward education, thanks to its ability to keep students engaged

- Provides plenty of opportunities for feedback and revision of the plan and the project

- Encourages students to make meaningful connections across content areas, rather than thinking about each subject area in isolation (multi-disciplinary pedagogical approach)

- Engages students in real-world learning, giving them a deeper understanding of concepts through relevant and authentic experiences. This prepares students to accept and meet challenges in the real world, mirroring what professionals do every day

- Engages students deeply with the target content, helping to increase long-term retention.



EXAMPLES OF PROJECT-BASED LEARNING

There are countless ways that project-based learning can be implemented into various subjects in the classroom.

Here are just a few examples:

PROJECT-BASED LEARNING IN ENVIRONMENTAL SCIENCE

In one science-based project, students begin with a visit to a zoo, learning about animal habitats and forming opinions on which habitats best suit a selected animal. For this example, the project component includes teams of students collaborating to develop a research-supported habitat plan for presentation to professional and student zoologists.

PROJECT-BASED LEARNING IN ENGLISH LANGUAGE TEACHING

In an example that blends English language arts and social studies, students answer the classic essential question, “What role does censorship play in society?” Following this introductory instruction, students select a banned book, read it, compose a persuasive essay and take part in a censorship-related mock trial experience conducted in the presence of experts.

Project-based learning has also been utilised in English language learning settings too. In 2012, education practitioners from Stanford University launched a new initiative, ‘Learning English in action’, designed to help classroom teachers of English learners understand and embrace the Common Core State Standards. Rather than focusing on vocabulary and other aspects of language acquisition, as in traditional methods, the Stanford initiative outlined ways for students to ‘show what they know’. This particular effort was connected to ELA standards, and included such assignments as asking students to do a “deep dive” into the Gettysburg Address.

After tackling Lincoln’s famous Civil War speech, students would then delve into other challenging documents, such as Martin Luther King Jr’s ‘I Have a Dream’ speech.

Finally, students would be given the chance to create their own persuasive texts, after working closely with their teachers and peers.

Stanford education professor Kenji Hakuta described the benefits of this approach, reporting that it helped speed up language acquisition by moving the classroom “beyond the old, sequential mode of teaching grammar and then having students apply their language knowledge to the real world.”

PROJECT-BASED LEARNING MATH EXAMPLES

Break the code

In one riveting Maths example, students assumed the role of a National Security Agency code breaker, with a life-or-death project scenario in which they had to decode a message potentially revealing the location of a planned terror attack on the United States.

Students had to decrypt the message, send a coded message of their own and then present their work. A professional in a related field visited the class to launch the project and connect it to real-world experience.

Selling Geometry

Janet Pinto, Chief Academic Officer at Curriki, writes about ‘selling geometry’. In this example, students make a real life connection between geometry and their everyday lives, learning that it is not only theoretical, but practical and necessary.

Students are introduced to a brief history of geometry, as well as terms, shapes and the transformation and manipulation of those shapes. They will then form marketing teams to ‘sell’ geometry to their classmates by explaining key terms, key shapes and describing geometry’s significance.

House for a spider

In this example, students are able to learn about measurements and spaces by building a doll house for a spider they have captured. They need to know the sizes of doorways, walls, roof, rooms and so on for their house, and those dimensions must be obtained from the spider (or type of spider) so they can be applied to the house design.

The students will first figure out what type of spider it is, then research typical dimensions and house designs and draw up a set of plans. Finally, the students build the house out of craft materials. They will then present the house, showing the plans and the spider and the process they went through to complete it.

CLIMATE CHANGE PROJECT-BASED LEARNING

Sarah Field, Senior Curriculum Manager for PBLWorks, says one way to think about the climate crisis is as “the project to end all projects”. It is a massive, collaborative, interdisciplinary endeavour with an incredibly high-stakes outcome: the future of our planet.

The project requires every single person on Earth to work together to deepen their knowledge and skills to achieve a beneficial outcome. Project-based learning is often used to equip young students for the future – so what could be more preparatory than designing projects that teach core skills in the context of climate action?

In Maths class, teachers may have students analysing energy use and developing an action plan and budget for transitioning their community to renewable energy sources.

In an ethnic studies class, students may learn about environmental racism and study proposed climate mitigation strategies according to their impacts on front line communities, or they may study methods that indigenous people have been using to fight for climate justice.

A homemade polar habitat model.

In P.E or health & social studies, students may research the health and climate impacts of walking and biking vs. driving everywhere, or of plant-based diets vs. omnivorous diets, and create social media campaigns to share what they learn.

You can read more climate change project-based learning ideas from Sarah here.

BUSINESS PROJECT-BASED LEARNING

At Palatine High School in Illinois, technology coordinator Kevin Schuetz describes how students use project-based learning in their Business Incubator class.

Teams of students propose and design a product based upon a challenging need or intricate problem. These young entrepreneurs then pitch their ideas to business and community leaders in an effort to gain support for launching their product.

CHALLENGES OF PROJECT-BASED LEARNING

PBL can difficult for some teachers to get used to, as it requires them to coach more and instruct less; to embrace interdisciplinary learning instead of teaching subjects in silos, and to be more comfortable with uncertainty and discovery during the learning process.

This is a stark contrast to the traditional education most teachers have experienced and been trained in. Change takes time and is rarely without apprehension or challenges. The good news, however, is that these challenges can most certainly be overcome.

Teachers can take inspiration for problems or ideas from students, parents, or other members of the school community. Instead of lectures and books, they can simply think through the steps required to solve a problem and use those steps as project-learning activities. Instead of planning a large project, they can chunk the project into smaller parts with frequent checkpoints along the way, to make the learning process more manageable.

Meanwhile, authentic assessments can be developed by communicating with professionals in the field regarding what a presentation would look like related to a particular project, instead of the usual unnatural exam setting so many students are used to.

HOW TO IMPLEMENT PROJECT-BASED LEARNING IN THE CLASSROOM

It can seem daunting when using project-based learning in your classroom for the first time. However, small steps can lead to huge strides.

Project-based learning isn't something schools master in a matter of weeks, or even months. Instead, it's more a journey that unfolds year over year, as teachers develop their practice, learn with their students and grow through experience.

Here are some tips to help you implement project-based learning in the classroom.

1. START WITH SMALL, WELL ORCHESTRATED CHANGES

Carol Ann Tomlinson, when writing about differentiation in the classroom, advised teachers to start with “small, well orchestrated changes”.

Select a few targeted goals you wish to work on this year with regards to project-based learning, and focus on doing those things well, concentrating on growth. This might mean keeping the scope and duration of a project to a minimum; using or renovating an existing project, and taking the time to get meaningful feedback from both students and relevant professionals.

2. LOOK AT THINGS FROM A STUDENT’S POINT OF VIEW

You can gain insight into how to get started with project-based learning by flipping your perspective and looking at it from a student’s point of view.

Think about what questions they might have when it comes to this new way of learning. Provide them with valuable, easy-to-understand resources to help them make sense of PBL as a concept and the practical steps once they are engaged in the process.

Project-based learning often requires many skills that students may not be used to, such as researching, summarising, problem-solving, working as a team, learning to spot fake news etc. A good idea is to use any early foray into project-based learning to build these skills in a fun way.

3. HOLD AN IMMERSIVE, MULTI-DAY WORKSHOP

Many educators who have been successful with PBL say that the ideal way to get into it is through an immersive, multi-day workshop. This can be facilitated independently with somebody familiar with PBL practices at your school. However, in most cases it will be necessary to bring in an external facilitator – who is an experienced PBL practitioner – into the mix.

4. GENERATE POTENTIAL PROJECT IDEAS

There are plenty of places online teachers can find inspiration for possible project ideas to kick off their PBL journey. For example, you can find over 60 Gold Standard PBL project ideas over in the PBLWorks database.

However, online is not the only place to look to for ideas. Common types of project include:

- addressing a real-world problem (e.g. climate change);
- meeting a design challenge (creating a physical or digital artefact, or piece of writing; developing a plan; producing an event or providing a service);
- exploring an abstract question (e.g. when is violence justified?)

- conducting an investigation (e.g. a historical event or natural phenomenon)

- Taking a position on an issue (such as a present day or historical controversy).

Inspiration can be found from all around us, such as current events, business needs in the local community, or even the current curriculum or ‘content standards ‘ (what is it you looking to teach?).

Remember, if it doesn’t fit, don’t force it! Selecting a theme is important but don’t force subjects where they don’t belong. If things aren’t gelling, find another theme. Ideas such as fair trading and immigration can open up many topics.

It may also help to be mindful of teachers working outside their specialism.

5. THINK ABOUT ASSESSMENT

It’s important to also think about how any project-based work will be assessed. Plan and communicate the success criteria for students – the most common way in PBL is to give a rubric or success criteria at the start. Don’t make it too ‘wordy’ however, or with too many granular checkpoints.

Laura George, teacher and writer for Teacher Toolkit, says to think about having a product that would be made with the final assessment, such as a book or piece of art. You might invite local people to have a look around an exhibition, or read something the students wrote. Students tend to be much more invested when they feel their work is going towards something.