

**Summary:** This method of engagement and inquiry based instructional technique involves the use of an in-depth assignment/project where students work in groups to address an authentic, real-world, challenging problem. Students are given a high level of autonomy in deciding how to best approach and properly research the problem with some general guidance/requirements. Each group is then required to present their problem solutions through a finalized agreed-upon end-product (document, video, live presentation, other, or combination).

A key aspect of this technique is that the instructor functions more as a guide/advisor and final evaluator, not as a constant teacher/manager. Students learn important processes, relevancies, and content relationships by having to consider the problem, ask questions, think critically, consider different perspectives, reflect, design courses of action, research/investigate, analyze, evaluate possibilities, and create their final solutions.

**Benefits:** Project Based Learning has been used and studied across virtually all fields to include STEM (Science, Technology, Engineering, Mathematics) and the Humanities (Barron et al., 1998; Bhakti et al., 2020; Feldt & Petersen, 2021; Kokotsaki et al., 2016). Findings have indicated many long-lasting benefits (expressed below) due to the self-directed, hands-on, highly impactful nature of this involved learning experience:

- high student engagement
- increased self-reliance & self-regulated learning
- enhanced collaboration/social/teamworking skills
- improved intrinsic motivation
- development of investigative skills
- greater creativity and deeper thinking
- more positive attitudes
- better grasp of topic theory and application

**Process:** To help ensure the proper implementation of Project Based Learning (PBL), the Buck Institute for Education developed the *seven key PBL project design elements* (Larmer, 2015; PBL Works, 2021), often-cited as the gold standard for PBL consisting of:

- 1) **A Challenging Problem or Question:** The project is framed by a meaningful real-world problem or question to be addressed/solved, at an appropriate level of understanding and challenge (not too easy or hard) for the students involved.
- 2) **Sustained Inquiry:** Students are engaged in a rigorous and extended process of reflecting on the issue, asking questions, finding resources, and applying information.

- 3) **Authenticity:** The PBL project deals with real-world issues and involve hands-on tasks and tools, quality standards, with an impact, and/or the project addresses personal concerns, interests, and issues in the students' lives.
- 4) **Student Voice & Choice:** Students are allowed to make some decisions about the project to include how they work and what they create. Students are given options whenever possible to allow them to express their own ideas in their own voice.
- 5) **Reflection:** Intentional and periodic time is made for both students and instructors to reflect on the learning, effectiveness of their inquiry and project activities, quality of student work, and obstacles along with strategies for overcoming them.
- 6) **Critique & Revision:** Project procedures include an ongoing mechanism for students to give, receive, and apply feedback to improve their process and products.
- 7) **Public Product:** For greatest impact, students make their final project product public by sharing it with and explaining or presenting it to people beyond the classroom. This is important to enhance motivation and authenticity.

**Key Aspects to Incorporate:** in conjunction with the seven key PBL project design elements, the Buck Institute for Education in conjunction with research done by Stanford and Vanderbilt University professors (Barron et al., 1998) created the following gold standard **seven PBL Teaching Practices** (PBL Works, 2021). These teaching practices are designed to avoid adverse issues such as cognitive overload, disinterest, or negative learning experiences.

- 1) **Design & Plan:** Instructors develop an overall adaptable plan that is specific to their field/topic, correlates with student's comprehension levels, has proper phases of implementation, culminates in a proper end state, and allows for some choice and freedom for students to gain autonomy and allow for their own views to be expressed.
- 2) **Align to Standards:** Instructors use specific standards/requirements (rubrics) for the PBL project, making sure that it properly addresses the intended student learning outcomes. Additionally, instructors ensure that students completely understand the main reasons, the purpose (how & why) of the activity. Instructors verify that students fully realize that although the actions and processes are beneficial and educational in themselves, there is an actual learning outcome that needs to be understood and achieved. Students need to grasp that it isn't *doing for the sake of doing* something, but for the purposes of obtaining deep understanding from a hands-on experience.
- 3) **Build the Culture:** Instructors implicitly and explicitly enhance students' autonomy and self-reliance. Instructors highlight a growth mindset, the benefits of building a community of learning, the value of quality scholar work, and open-ended inquiry to help one another as well as the greater world. This will typically require specific

instruction and practice on how to properly work within a team, methods of independent study/research, etiquette/netiquette, and conflict resolution.

- 4) **Manage Activities:** Instructors guide students in organizing and helping them understand better resources, processes, and important deadlines and requirements for their end products. The key for this technique is to have students research/investigate, analyze, and develop solutions on their own.
- 5) **Scaffold Student Learning:** Instructors identify key skills that students should know to properly succeed in the PBL project. Requiring a prerequisite might be warranted but doesn't necessarily ensure needed skill mastery. Including different types of scaffolding (learning support) will help students be fully able to achieve. Refresher classes, checklists, guides, identifying campuses resources, other online resources, or additional/optional online course modules can be great aids for students' understanding and to help reduce frustration and anxiety with the project.
- 6) **Assess Student Learning:** Use of ongoing formative assessment is an important aspect of this technique in helping students fully reflect, understand, achieve deep learning, and improve their ongoing work. Additionally, summative assessment will give students a final appreciation of their total work and developed skills in presenting their final product. Use of different assessment techniques via self-assessment, peer-assessment, and instructor-assessment (and possibly even outside assessment) give students as well-rounded view of their accomplishments as possible.
- 7) **Engage & Coach:** Instructors ensure a proper teaching presence throughout the project by periodically checking for appropriate group progress and identifying when individuals or groups need additional skill-building, more guidance, and additional encouragement. Ongoing motivation and expression of relevancy is needed to help maintain student interest, engagement, and ensure long-term knowledge retention.

Project Based Learning is a powerful technique that can be incorporated into many different courses in that it provides a lot of benefits such as critical thinking, has real-world relevancy, and allows students to actively engage in their learning. Additionally, PBL helps students develop many soft skills needed to compete in the 21<sup>st</sup>-century jobs market.

### References

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