

Why use Project-based Learning? PBL-FAQ

PBL provides a format for implementing several very powerful instructional principles, including differentiating instruction, scaffolding instruction, and facilitating socially constructed knowledge. This approach fosters the development in students of a sophisticated understanding of content-area subjects, as well as sophisticated development of effective and efficient strategies for informational-gathering and processing, communicating, critical, analytical, and creative thinking, collaborating, and goal setting and self-evaluating. Each of these dimensions are briefly explored below.

PBL = Differentiating Instruction

One of the greatest advantages of project-based learning is that it naturally allows for differentiated instruction. Because every student is different -- has different background knowledge, forms and degrees of intelligence, learning styles, interests, goals, and motivation -- teaching all students at the same level and in the same way and maintaining the same expectations, and using the same reinforcement structures for all students makes little sense. Conversely, teachers can differentiate instruction (i.e., use a wide array of teaching and motivation techniques, match expectations to each student's developmental levels) according to the characteristics of each individual student. Three key dimensions of differentiated instruction are targeting students *Zone of Proximal Development*, capitalizing on students' intellectual skills and talents, and fostering authentic motivation.

Targeting students' Zones of Proximal Development (ZPD)

The ZPD of a student is that level of performance that is just above what the student can do effectively without some assistance from a more skilled person such as the teacher or a peer (Vygotsky). For example, while a student may have a basic working knowledge of how to access the Internet, a more knowledgeable student might coach this student in the use of a few tricks for more readily pin-pointing a specific topic while surfing.

ZPD addresses two key "student" dimensions of prior knowledge -- the student's skills (i.e., decoding skills, paragraph writing skills, etc.) and the student's knowledge of the subject matter being learned (i.e., how much the student already knows about the topic of a text passage or the topic about which is being written). ZPD addresses two key "source material" dimensions: the complexity of format (i.e., the number of multi-syllabic words in a sentence and degree to which the words in the sentence are commonly used in the English language) and the complexity of content (level of detail and sophistication of the content subject-matter).

To illustrate this, consider the *Independent*, *Instructional*, and *Frustration* levels associated with reading tasks. The Independent level involves reading material that the student can readily decode and comprehend without outside assistance.

Typically, the student has a good “working” background knowledge related to the content of the material being read. Conversely, the Frustration level involves the student attempting to read material that is simply too complex. The words may be too difficult to decode, there maybe too many unfamiliar terms in the text, or the topic might be addressing information that is too complex for someone who has only limited knowledge about the topic. Even with assistance from another, the level of text is simply too difficult.

The Instructional level is reading text that a student can read, but the reading task is challenging and some assistance is needed to enable the student to decode and/or comprehend the material. For example, the student might be reading about a topic about which s/he has limited knowledge. Someone else might explain a concept from the text to the reader by providing an analogy of the concept using familiar language as well as explain what an occasional unfamiliar term means. As a result, the student’s subsequent comprehension of the text greatly improves. The Instructional level of text is analogous to the students ZPD for reading instruction. Naturally, since each student will demonstrate different levels of reading competence or knowledge of the text subject-matter, each student’s instructional level, or ZPD, differs.

Differentiating reading instruction requires that the teacher not require all students to read the same passage about a topic regardless of their varying reading abilities; rather, the teacher guides each student toward reading material that reflects a better match with the students’ reading skills and background knowledge of the topic. Thus, some students with sophisticated content knowledge of the topic and sophisticated reading skills might be guided toward relatively sophisticated text that is challenging to them. Likewise, the less skilled or knowledgeable readers in the class might be guided toward reading material about the same topic, but written at a level that is challenging for them, but not frustrating. Here, each student’s unique ZPD is targeted as all of the them increase their relative knowledge about the topic of study.

The great advantage of PBL is that while all of the students on an team might be reading to learn more about the topic of their investigation, the actual text each student reads differs; the teacher can guide each individual on the team toward passages commensurate with that student’s ZPD. Likewise with PBL, students also practice self-monitoring and selecting text themselves based on their metacognitive awareness of their own ZPD. Here, the student selects a text passage and begins reading it while monitoring. If the text contains too many unfamiliar words or is addressing the topic in a manner that is too complex to understand, the student discards the text to search for material written on a level that is a better match for his/her reading skills or knowledge about the topic. On the other hand, if the text contains little information that is not already known by the student, it too is abandoned so that more informative material can be found.

The examples above discussed ZPD within the context of reading. ZPD however, is important to any skills being developed (writing, oral speaking, analyzing, problem solving, etc.) or subject-matter being learned (social studies, science, mathematics, etc.).

HOME – FREQUENTLY ASKED QUESTIONS

Capitalizing on students' Intellectual Strengths and Talents

Differentiated instruction is grounded in the notion that all students learn differently -- each student has an approach to developing new skills and understandings that is unique and largely affected by internal characteristics (i.e., type and degree of intelligence, unique talents, inherent skills at various modalities such as visual or auditory information processing) and external characteristics (influences of social/cultural habits; prior instruction in specific learning strategies). Since each student learns differently, differentiated instruction is employed so that (a) students can capitalize on their unique existing strengths to more readily acquire new skills and knowledge; and (b) can develop and broaden their repertoire of learning strategies.

Differentiated instruction is perhaps most commonly associated with targeting students' learning strengths as a means to enhance new learning (e.g., use of graphic organizers for students whose learning style is "*concrete/spatial*"). The learning styles approach intuitively makes sense to teachers, thus it has high face validity and may be of considerable value for some students. While there is much anecdotal and testimonial evidence for targeting learning style modalities (e.g., Rita Dunn, Maria Carbo), this approach has little empirical evidence to support its use (i.e., evidence from research using control groups, replicated studies, etc.). Two alternative models with considerable more empirical support is Howard Gardner's "Multiple Intelligences" theory, and Carol Schlichter's "Talents Unlimited" model. Important to note about the Multiple Intelligences theory is that although there exists good evidence in support of the notion that there are at least seven categories of intelligence that learners' may possess, few of the practical educational techniques commonly advocated in the literature that are based on this model have actually been empirically validated -- nearly all of these techniques are based on intuition. The specific teaching techniques associated with the Talents Unlimited model have been extensively researched and validated on a wide range of students, including those who are gifted, normal achieving, and those with mild learning problems.

Important for PBL teachers to realize, however, is that if differentiated instruction only focuses on capitalizing on students strengths, then opportunities to develop weak skills can be minimized to the detriment of the students. For example, if the strong writer on the team produces the written documents because that is how s/he can best contribute to the effort, the poor writer on the team is denied opportunity to develop writing skills. Thus, *another important dimension of differentiating instruction concerns targeting for development specific areas of need for each student.* For example, one student on a team may have undeveloped writing skills, while another

might have poorly developed reading comprehension skills. Here, the teacher might vary expectations of team members by differentiating assignments; the student with undeveloped writing skills might be required to produce a written document while the other student with poor reading skills might be required to paraphrase passages of text about the topic of investigation that is written on her instructional reading level. Alternatively, all team members are required to produce written documents, but the expectations for performance are varied, according to each student's ZPD (this way, both the sophisticated writer and the one with poor writing skills have opportunities to further develop their respective skills); all students are required to paraphrase text passages, but the text each student reads is commensurate with the individual student's prior knowledge and reading skills.

[HOME – FREQUENTLY ASKED QUESTIONS](#)

Fostering Authentic Motivation

Different students have varying levels of interest in a topic and draw upon different modes of motivation. Thus, the third dimension of differentiated instruction focuses on both identifying students' interests and using these as a form of authentic motivation, and also understanding the psychological forces impacting each student's motivation.

To a great extent, traditional approaches to teaching rely on artificial, extrinsic approaches to motivate students to engage in learning. Students are typically motivated by the anticipation of making a "good grade" as well as from the fear of attaining a "bad grade." Thus, the economics of learning quickly becomes doing as little as possible in order to get a good or at least adequate grade. Meaningful learning becomes secondary to effectively playing the school-compliance game.

In contrast, PBL is more consistent with instructional approaches advocated by John Dewey. Teachers strive to create environments responsive to students' questions as well as their desire to be active learners through inquiry. With PBL, students work in teams to discuss their ideas, knowledge, hypotheses and how they think and feel about what they are learning. While they are helping each other, they are also developing self-direction and responsibility for their learning (Sharan & Sharan, 1994) as well as develop essential collaboration skills.

PBL enables the student to actively play a role in determining how and what they will learn as they make choices and decisions based on their own curiosities. The approach is based on student identification of goals and student/teacher co-evaluation of how well they attained these goals. As a result, students experience greater ownership of what they are learning, and thus are more invested in the learning process.

PBL also fosters authentic motivation because attention is under the student's own control and not directed by the teacher's *need* to control. That is, as students engage in projects, they spend the amount of time they need to in order to make sense of ideas they are encountering.

With traditional instructional approaches, **academic risk-taking** (i.e., employing creativity and thinking of unusual ways to view or understand a concept or communicate an idea) is often punished because the emphasis tends to be on memorizing “correct” answers. The only real risk is memorizing the wrong information when preparing for a test. With PBL, intellectual risk-taking is strongly fostered as students construct understanding of their topics.

With traditional approaches, the audience of a research project typically is not an authentic audience -- it is the teacher (or rather, the teacher’s grading system). With PBL, the focus is on targeting authentic audiences (i.e., people who have a real interest in learning more about the topic of the team’s investigation) for the consumption of the information developed by the PBL team. Since the audience is real, motivation to effectively communicate ideas becomes authentic or more real as well.

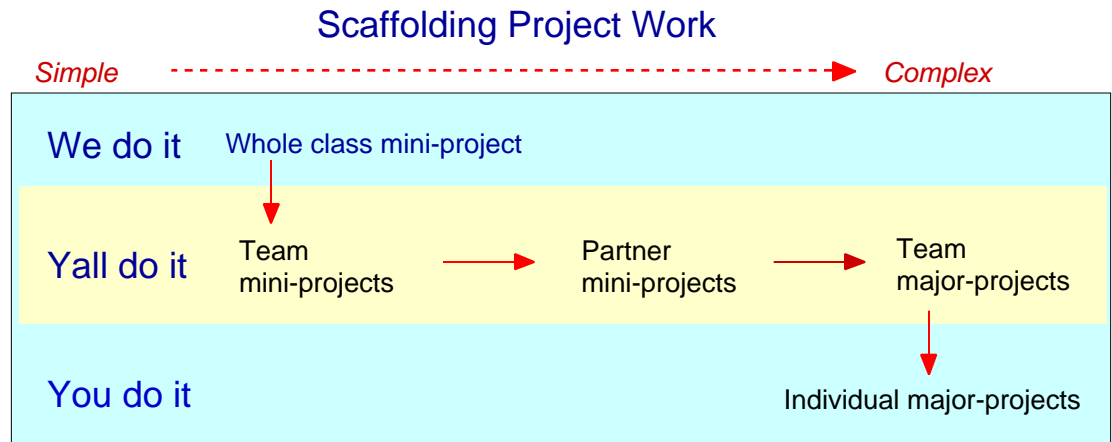
To summarize, PBL is an excellent way to provide differentiated instruction. Students representing a wide range of abilities can learn together as each of their respective ZPDs can be targeted. PBL is very conducive to targeting students learning styles to enhance learning as well as targeting weaknesses to enhance their development. PBL promotes authentic forms of motivation rather than use of artificially contrived techniques.

[HOME – FREQUENTLY ASKED QUESTIONS](#)

PBL = Scaffolding Instruction

Scaffolding instruction is based on Vygotsky’s notion of socially mediated learning and in many ways is analogous to providing “guided practice” where the teacher first models a procedure for students, and then guides students as they practice a skill. Practice is initially mediated by the teacher by providing extensive cues, prompts, and feedback to ensure correct practice. These are gradually faded as students begin to self-mediate their performance. In short, external mediation (guidance by the teacher or peer) gradually gives way to self-mediation (independent performance by the student). “Scaffolding” is an effective metaphor because just enough external structure (or mediation) is provided to enable the student to succeed. As the student gains experience and strengthens his/her own internal structure, external props are gradually removed until the student can “stand alone” (perform the task independently).

External support can reflect a three stage process as support shifts from initial teacher mediation, to peer-mediation, and eventually to student self-mediation. Thus, a continuum of scaffolded support might look like:



We do it

The teacher and the students co-construct the project. The teacher acts as an expert member of the project-development team, and performs essential tasks *with* students, providing just enough modeling, structure and guidance to allow other team members to actively participate in performing the tasks.

Y'all do it

Here, teams composed of student peers work together to develop the project. Support and guidance comes from each other. The teacher is largely removed from performing any of the tasks, but may provide occasional prompts, cues, or feedback as needed or when invited by the team to do so. These prompts rarely are “directive” (i.e., “*You should do this...*”); rather, they are “reflective” and usually come in the form of questions designed to prompt student-reflection (i.e., “*What might be another way of doing that?*”).

You do it

Here, students perform project work largely independently. They are responsible for self-mediating their investigation. Peers can be used as consultants and for feedback on an “as-needed” basis.

Scaffolded instruction is recursive and conceptually redundant because of a skill is structured by the teacher along a simple-to-complex continuum. That is, students first learn a very simple version of the skill, and then they learn increasingly more sophisticated versions or applications of the skill. The figure below illustrates how a series of projects can be designed so that they reflect a gradual shifting from

external support to self-support and at the same time, reflect the recursive nature of PBL as projects become increasingly more complex.

Whole class mini-project 1-3 days

- * All members involved in single teacher-selected project
- * Teacher acts as expert team-member
- * Lots of... modeling ... guidance ... structure ... feedback
- * Teacher models brief summary of presentation

Team mini-projects 1-3 days

- * Each team involved in same teacher-selected project
- * Teacher guidance, structure & feedback as needed
- * Share out/present - all can see each others' projects
- * Can rotate - different groups do same project around a topic/theme

Partner mini-projects 1-3 days

- * Students in pairs - limited student choice of topics
- * Teacher assistance as requested (mostly reflective prompts)
- * Each pair doing projects related to a larger theme
- * Brief summary presentations

Team major-projects 1-4 WEEKS

- * 4 students per team
- * Structured investigation of key questions (limited student choice of topics)
- * Use of structured PBL investigation strategies
- * Clear rubrics detailed BEFORE students begin
- * Weekly bench marks minimum (can be more frequent)
- * Presentation to authentic audience
- * Multiple evaluators using same rubric(s) if possible

Individual major-projects 1-4 WEEKS

- * Structured investigation of key questions -student choice of topic (with teacher guidance as needed)
- * Use of structured PBL investigation strategies as needed
- * Clear rubrics detailed BEFORE student begins
- * Weekly bench marks minimum (can be more frequent)
- * Presentation to authentic audience
- * Multiple evaluators using same rubric(s) if possible

HOME – FREQUENTLY ASKED QUESTIONS

PBL = Socially constructing knowledge so there is more understanding *and* remembering

Students develop understandings of reality out of their experiences, feelings, and information as they assimilate or accommodate personal knowledge and experiences with new information acquired. This process can be greatly enhanced via social interaction. A number of powerful learning-enhancing activities occur, such as exchanging information, opinions and interests, elaborating on the ideas of others, challenging other's perspectives on a topic, collaborating to organize, confirm, and consolidate, extend or apply findings.

During the process of negotiating ideas among the team members, students are having to define the critical features or elements of an idea. They have to determine what constitutes evidence of whatever point they are claiming. Project work also requires students to negotiate the interpretation of project parameters as they determine what to do and how to do it. In addition, all skills and knowledge are brought to bare and come into play simultaneously as students continuously re-conceptualize everything they know as they solve each new problem they encounter when doing a project.

If you think back about what you learned in grade school, and then think about how you learned it, chances are great that you think of **experiences** you had as a student. This is because you have *episodic knowledge* gained from episodes or experiences, and you have *semantic knowledge* gained from information provided to you in the form of language -- spoken or written (i.e., most of the social studies information we teach is semantic knowledge). Simply put, episodic memory is many times more powerful than semantic memory. The challenge, however, is that so much of what students are expected to learn in today's curriculum is semantic information. Thus, the trick is to capitalize on the power of episodic memory in order to enhance learning of semantic information. PBL does this by fostering socially interactive experiences as students grapple with making sense of semantic information. This "grappling" process promotes **elaboration** -- one of the most important cognitive strategies students can use to promote understanding and memory of a concept or process.

Elaboration of an idea occurs when one transforms an idea in some manner without losing the essence of the concept's meaning and relates it to prior knowledge. Examples of elaboration include: paraphrasing a definition, identifying the gist of a story, creating a visual image, generating questions, prioritizing importance, or debating.

Semantic knowledge can be *formal* or it can be *intuitive*. Students may have memorized information to create formal semantic knowledge, but have not really come to understand it within a meaningful context of experience. An example would be memorizing the U.S. Constitution's Bill of Rights. When students integrate experiences with semantic information (i.e., experiencing what it means to lose freedom of speech), then semantic information tends to become understood on an intuitive level because the new information naturally makes sense. The elaboration of the new information is taking place within the context of experience.

Unfortunately, the school day does not allow sufficient time for students to actually experience all of the concepts they are expected to learn. A different form of experience, **socially interacting to understand new semantic information**, creates episodes that naturally promote elaboration and the development of intuitive knowledge.

HOME – FREQUENTLY ASKED QUESTIONS