Project-Based Learning in an Information Technology Environment


Project-based learning (PBL) has long been an important part of the repertoires of many teachers. Information technology (IT) has added new dimensions to PBL and increased its value in curriculum, instruction, and assessment.

In this column, I describe nine general characteristics of a PBL activity that is designed to be carried out in an IT environment. A project need not have all of these characteristics to provide a valuable learning experience for students, but you will likely find that the most successful IT-assisted PBL lessons have many of these desirable characteristics:

1. They are learner-centered.
2. They have authentic content and purpose.
3. They are challenging.
4. They involve the design and development of a product, presentation, or performance.
5. They require collaboration and cooperative learning.
6. They allow incremental and continual improvement.
7. They are teacher-facilitated.
8. They have explicit educational goals.
9. They are rooted in constructivism.

The following nine sections provide more detail on the nine considerations.

1. Learner-Centered Lessons
   - Students have some choice of topic as well as the nature and extent of the project’s content. Students shape their projects to fit their own interests and abilities.
   - Students conduct research using multiple sources of information, such as books, online databases, videotapes, personal interviews (in person or conducted using telecommunications), and their own experiments. Even if their projects are based on the same topic, different students likely will use considerably different sources of information.

2. Authentic Content and Purpose
   - Many projects focus on authentic, difficult, and current real-world problems, such as environmental or social problems. The purpose of the project is to help solve such problems, which are complex and have no simple solutions.
This sort of project requires students to do research that draws from many sources of information. Such sources may be complex and contain contradictory pieces of information. Many projects require empirical research.

3. Challenging Projects
   - The project extends over a significant length of time, usually from several class periods to an entire school year. Students plan the effective use of their time and share resources such as computers, camcorders, and network access. One goal in project-based learning is for students to increase their skills in budgeting their time and other resources.
   - The process of doing a project allows and encourages students to use experiments, to do discovery-based learning, to learn from their mistakes, and to encounter and overcome unexpected and difficult challenges.
   - The focus is on higher-order skills, including problem solving, learning to learn, becoming an independent researcher, setting personal goals, and self-monitoring (self-assessment).

4. Product, Presentation, or Performance
   - The project involves the design and development of a product, presentation, or performance that can be used or viewed by others. Students may create products of significant and lasting value, such as environmental assessments or permanent displays of information.
   - A project may produce a product, presentation, or performance that becomes a component of a student’s portfolio.

5. Collaboration; Cooperative Learning
   - A team of people may work on the project. The team may be an entire class, several classes, or even students from several remote sites. In these cases, individuals or small groups work on different components of a large task, and their joint efforts are often coordinated through technology. Multi-site projects often rely on email or video conferencing.
   - Peer instruction is explicitly taught and encouraged. Students learn to learn from each other and how to help their peers learn.

6. Incremental and Continual Improvement
   - The definition of what is to be accomplished as well as the actual components and products in the project allow of continual revision and incremental improvement.
   - A project is viewed as a process rather than as a product. There is a strong parallel between process-based writing and project-based learning.

7. Teacher Facilitated
   - The teacher’s role is often described as being “A guide on the side, rather than a sage on the stage.”
   - The teacher looks for and acts on “teachable moments.” Often this will involve calling the whole class together to learn about and discuss a particular situation that one student or a team of students has encountered.
• The teacher is also a learner. The teacher and the students learn together, and the teacher role-models being a lifelong learner.

• The teacher is in charge of the class. The teacher acts as a facilitator and mentor, providing resources and advice to students as they pursue their investigations. The teacher bears the ultimate responsibility for curriculum, instruction, and assessment.

8. Explicit Educational Goals

• The project is designed to facilitate learning. It is designed to help achieve the overall goals of education as well as specific content goals.

• The project is designed to facilitate students learning about IT and how to make effective use of IT in carrying out a project.

• The project is designed to help increase student ability to carry out complex, challenging, “real world” projects.

9. Rooted in Constructivism

• The design of the curriculum, instruction, and assessment is rooted in constructivism. Constructivism is a theory about knowledge and learning that is based on the idea that individual learners construct their own knowledge, building on their current knowledge.

• There is considerable individualization (learner-centered) of curriculum, instruction, and assessment.

Retrospective Comments 12/19/04

This editorial was written at a time when I was getting quite interested in Information and Communication Technology-Assisted Project-Based Learning. The eventual result was the book:


I created a Website to support my work in this area. Accessed 12/19/04: http://darkwing.uoregon.edu/~moursund/PBL/. In addition, I have developed a 1-credit course on this topic, and given many workshops on this topic. A detailed syllabus for the course is available at (Accessed 12/19/04): http://darkwing.uoregon.edu/~moursund/PBL/Syllabus641.html. For quite a few years, now, all of the courses I teach make extensive use of ICT-Assisted PBL. Thus, I role model what I want my preservice and inservice teachers to be learning about this important component of teaching. See the syllabi at (Accessed 12/19/04): http://darkwing.uoregon.edu/~moursund/dave/teaching_courses.htm.