

Technology and Problem Based Learning (PBL)

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### Abstract

Problem-based learning utilizes an approach to education that focuses on students being actively engaged in “doing” rather than passively engaged in “receiving” knowledge. Technology is not a necessary element in this process but there are advantages to using technology in all phases of a learning project, and technology provides resources and tools that were not previously available to the classroom. Technology can support problem-based learning by offering sources of information and contacts that would otherwise not be available, providing a multitude of ways students can present their findings and providing tools that help students manage and organize ideas, information, data and results.

### Technology and Problem Based Learning (PBL)

Problem-based learning (PBL) is an approach to education that engages the student as an active learner. “PBL uses real-life problems to engage students as they pursue specified learning outcomes that are in line with academic standards or course objectives.” (Guhlin, 2003, ¶4). The student works through a process of outlined steps in which he is required to make and refine questions, debate ideas, make predictions, collect and graph data, draw conclusions and communicate ideas to others through discussion or the creation of a product. (Blumenfeld, 1991). “The teacher acts as a guide or adviser as students explore the issues involved, formulate questions, conduct research, and consider possible solutions to the problems.” (Guhlin, 2003, ¶4). The benefits of using problem-based learning in the classroom are widely documented and students perform as well or better on standardized assessments but excel in higher-level thinking skills over time. Students are more involved in their schoolwork and become proficient in problem solving, self-directed learning, and team participation (MCLI, 2001).

Utilizing technology is not a necessary component of problem-based learning. In assessing the use of technology, teachers must consider lesson goals and desired outcomes. “If computers enrich, extend or facilitate learning, they should be used.” (SEDL, 1999, ¶1). Through each step of the PBL process, there are opportunities to utilize technology resources and tools that were previously not available to the classroom and as technology progresses the opportunities increase. Technology provides so many opportunities for each of the steps a student goes through in a PBL project that it would be doubtful that today a student or teacher would not avail themselves of using various technologies through at least some, if not all, of the steps in the process.

The first step of a problem-based learning project is to define the problem. There are registries on the web that have sample projects indexed by subject, topic, and grade level that

teachers can use to obtain ideas, check out samples, and learn from and share projects with other teachers.

The internet has become a rich and varied source for research. A few years ago websites were considered questionable as credible research sources, but today the use of online databases that provide access to abstracts and full text of periodicals, newspapers, professional, creative and business journals, encyclopedias and other reference sites, and the proliferation of online professional journals and websites allow students to readily access information from around the world that is current and credible. The web also provides access to museums, libraries, and remote physical locations for research (Solomon, 2003). The University of Melbourne found that “the use of graphics, Shockwave movies and video to enhance online patient encounters afforded a greater degree of student interactivity with the problem than what was possible through print alone.” (Elliott, 2001, *Future Directions*, ¶3).

Technology also provides means of communications that promote collaboration and may provide access to professionals and experts beyond what a student could access locally. Group scheduling can be managed using online tools that facilitate small meeting groups, chatrooms, filesharing and meeting scheduling and utilizing these tools make an excellent context for students to “develop skill in mastering tools for electronic collaboration”. (Watson, 2003). E-mail, e-mail list servers, forums and other online applications facilitate communication and collaboration with the world outside the classroom (Solomon, 2003).

Computerized graphic organizers provide a tool that assists students in collecting and organizing ideas. Databases and spreadsheets are used to collect, analyze and chart data and keep track of collected information. Word processors are used to outline and draft text and promote the revision process that students often resist.

Students are attracted to using multimedia computer programs to present their results. Using presentation slides, video, audio, and websites students create, revise and integrate and synthesize compared to the summarize process that occurs in traditional paper writing (Simkins, 2001). Simkins found that the complexity of work produced using multimedia software was far more complex than work created in comparison classrooms that did not utilize technology (Simkins, 2001). Work can be published on the web for review by real audiences, not just a single teacher, class or school. (Solomon, 2003)

In the last several years, schools have vastly improved the availability of technology and the infrastructure and support required to maintain and utilize it. There is also considerable emphasis being placed on technology-oriented professional development. It is a natural progression that problem-based learning will incorporate more and more technology components as students, teachers and technologies move forward. (Moursand, 1997). Schools geared toward encouraging more use of technology find that problem-based learning is a natural approach to integrating technology into the curriculum.

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