Project Based Learning: Mathematics in the Real World

Introduction

Since 2001, the Intel Corporation and others have supported technology-training opportunities for higher education faculty to address “true technology” integration for pre-service teachers utilizing a Project-Based Learning (PBL) approach. Curriculum development integration is infused from a “backwards design approach” to highlight subject content rather than technology. This paper provides a descriptive overview of an exemplary unit developed during a four (4) day training session. The project is directly correlated to PBL and the constructivist’s model of mathematics learning as espoused by state and national standards.

Project-based Learning (PBL) and related learning practices have been investigated for the past twenty (20) years. In two past reviews (Albanese & Mitchell, 1993; Vernon & Blake, 1993), it was shown that medical students involved with PBL activities perform as well or better than students involved with traditional, conventional knowledge activities. Additional studies, (Blumenfeld et al., 1991; Coley, Cradler, & Engel, 1996; and Means and Olson, 1997) indicate PBL is especially effective when enhanced by educational technology.

The themes of the Intel Teach to the Future Professional Development program include: (1) effective use of technology in the classroom; (2) focus on the ways students and teachers can use technology to enhance learning through research, communication, and productivity strategies and tools; (3) emphasis on “hands-on” learning and the creation of curricular units and evaluation tools, which address state and national academic and technology standards; and (4) promoting engaging opportunities for students through access to technology; and encouraging teachers to work in teams, problem-solve and participate in peer review of units (Candau, et al, 2001).
Methodology

Beginning with pedagogical discussions related to project-based learning (PBL), the authors framed a unit plan template around essential and unit questions. The development of the essential question led to the production of the multimedia introductory unit presentation. Next, several student samples (i.e. multimedia presentation, publication, and sample web site) and faculty support materials (i.e. unit plan, evaluation tools, publication, and classroom management documents) were creating using various Microsoft Office products, specifically correlated to essential and unit questions. Subsequently, a highly motivating, multi-sensory project spanning the realm of multiple intelligences to actually make classroom mathematics “come alive” while demonstrating various aspects based on the essential question – “Where is the Mathematics in the Real-World” evolved as the comprehensive, final multimedia project. Scaffolding in the form of unit questions enhanced by technology integration directly linked to the essential question provides a fascinating unit on mathematics in the real world, presented via CD-ROM media.

Conclusion

Numerous research findings and documentation compare the impact of PBL on student learning and achievement. Since PBL emphasizes performance-based, higher order thinking skills with direct real-world connections, current assessments may not fully document overall impact. However, observing the overall creation of the PBL activity and on-going self-directed learning experiences, it is extremely clear to the instructor (facilitator) that the final product (unit) is an authentic demonstration of acquired learning and achievement.

Bibliography


