

SUNY CORTLAND ACADEMIC PROGRAM INNOVATION GRANT 2016-2017 Application

Applications are due in the Faculty Member's Dean's Office by November 1, 2016.

Name of Applicant: Beth Klein Department: CECE Telephone Ext: x5682

Name of Applicant: Angela Pagano Department: Biology Telephone Ext: x2309

Name of Applicant: Maria Timberlake Department: FSA Telephone Ext: x5937

Name of Applicant: Dominick Fantacone Department: NYSMTP Telephone Ext: x4704

Name of Applicant: Alexis Abramo Department: School of Ed Telephone Ext: x4352

Name of Applicant: Kristina Maricle Department: Library Telephone Ext: x4577

Title of Project: **Strengthening Student Engagement and Learning in PBL Implementation Through the use of PBL Classroom Support Kits**

Funding Areas

Please identify which area is most closely aligned with your project

Innovation in Graduate Programming

Innovation through Equipment Procurement

Innovation Through Teaching and Learning

Purpose: The Academic Program Innovation Grant Fund has been created to support faculty led projects which demonstrate potential to improve academic programs so they are better positioned to attract, retain, and engage students. Funding typically will not exceed \$10,000.00 and should be expended within two years.

Applicant Eligibility: Tenure-track, tenured faculty, and full-time lecturers and professionals.

Project Proposal: The proposal should include a detailed project description (approximately 3-5 pages) which should include the following:

- Goals of the project
- Description of project activities
- How project outcomes will be assessed and disseminated
- Project personnel and timeline

The project proposal should include a detailed budget and budget justification.

Criteria: Proposal will be rated on the quality of the following elements:

- expected impact of the innovation on program quality as it relates to student recruitment, retention, engagement, and/or learning;
- extent to which proposed project builds or increases collaboration across the college;
- strength of the plans to assess and disseminate project outcomes;
- alignment of budget to project activities.

Strengthening Student Engagement and Learning in PBL implementation through of use of PBL Classroom Support Kits

Background

Problem Based Learning (PBL) is a student-centered pedagogical method aimed at engaging students with content through the investigation of real-world problems. Unlike more traditional, lecture-based instruction, PBL uses an active learning approach where students gain knowledge about discipline specific concepts within the context of the problem and further develop their understanding through the application of the acquired knowledge in developing a solution (Hmelo-Silver, 2004). The use of PBL aligns well with the recent focus in education on the teaching of the 21st Century Skills. These include critical thinking, problem solving, communication, collaboration, and creativity and innovation (Kivunja, 2014). Thus, PBL can serve as a powerful approach for both increasing student interest and more authentically preparing students who are career and graduate school ready.

When properly implemented and supported, PBL has been shown to positively affect long term retention of content, skill development, and overall student satisfaction (Strobel & van Barneveld, 2009). A study examining mathematics achievement in high school students also demonstrated that normally low-achieving students and minority students showed statistically significant gains in understanding when PBL was implemented (Han, Capraro, & Capraro, 2015). Additionally, retention of students has been shown to increase when PBL was used as a course approach suggesting that PBL may play a role in helping to integrate students into university life (Williams *et al.*, 2009).

Implementation of problem-based learning requires a shift in thinking with respect to both curriculum design and in its approach to teaching and learning. When considering the important elements of PBL, the following should be included (Hmelo-Silver & Eberbach, 2012 as cited in Tawfik, Trueman, & Lorz, 2014):

1. A project that includes student-centered learning goals
2. A challenging problem or question serving as the catalyst for learning
3. An inquiry approach that involves discussions centered on an ill-structured problem
4. Authentic, real-world connections
5. Student self-autonomy over some decisions or aspects of the project
6. Collaborative group learning opportunities

In order to properly implement the elements described, instructors must move from the more traditional role of expert or “sage on the stage,” to a guide or facilitator of learning. This may be a difficult switch for instructors as they begin to provide more of a support or mentor role (Jones, *et al.*, 2013). Therefore, training around what PBL is and strategies for designing and implementing problems is essential to success. Indeed, a pilot project conducted on our own campus found that participants required both initial and follow-up training to support them through the PBL process. In our pilot, supported by a Center Of Innovation in Education grant from the SUNY Chancellor’s office, we created a small group of PBL faculty fellows who received stipends and professional development through two PBL workshops between spring

2015 and summer 2016 (two workshops provided by Dr. Mark Serva, a higher education PBL expert at the University of Delaware; and Joanne Keim, an OMC BOCES PBL trainer for the area school systems). A recent survey (see Appendix) of the Cortland PBL faculty fellows found that, of the 22 respondents, 82% are currently using the PBL approach in their courses. Results from the survey also indicated the following key challenges or barriers PBL Faculty Fellows are having with technology, classroom set up, and equipment as they incorporate PBL into their classrooms:

1. Using existing technology to enhance the assignment
2. Classroom space/furniture not conducive to group work
3. Time – to plan, to allow time for group work, fitting it in the semester with other requirements
4. Student access to Laptops or iPads
5. Software/hardware needs to enhance student and business/community connections

The survey also asked questions relating to additional PBL Professional Development needs. All survey participants requested additional professional development with these key areas receiving the highest marks:

1. Utilizing technology in the PBL classroom
2. Flipped Classroom strategies

The purpose of this project is to expand on our PBL Fellows pilot to include work with technology implementation. Specifically, we propose an investment in technology enhancements that would allow students to interact and engage with authentic problems in a more modern way. Through the acquisition and use of these technologies, our goals are to 1) provide enhanced PBL professional development in the area of technology use; 2) enhance student engagement and support diverse student learning styles through accessible technology; and 3) to provide a multi-faceted assessment of PBL at the campus to measure extent of PBL implementation and student engagement and student learning outcomes resulting from use of PBL projects/problems.

Grant Project

Grant activities have been designed to address some of the technology needs identified by PBL Faculty Fellows along with providing a multifaceted assessment of PBL implementation with technology enhancements at SUNY Cortland.

Project Objectives. The objectives for this project are to:

- (1) enable full implementation of PBL via technology and equipment enhancements;
- (2) provide access to and training on acquired technology for PBL faculty;
- (3) provide a multi-faceted assessment of PBL at the campus to measure extent of implementation with technology enhancements and the effect on student engagement and student learning outcomes in PBL projects/problems.

Grant Activities:

Classroom PBL Support Kits. In order to provide for support for implementing PBL in the classroom we propose to put together two kits for faculty check out. The equipment for each kit has been reviewed by Information Resources. Information Resources has agreed to house the kits for checkout through the library services, reserved initially for PBL Faculty Fellows involved in the pilot. In addition, if results of faculty use indicate continued need, information resources will replace technology as needed.

Because of the large class sizes of some of the PBL Fellows, we budgeted for 2 large classroom kits. Note: we will work with IR to repurpose carrying cases and package kits for easy transport.

Kit 1 (for faculty with student access to tablets or laptops for groups within their department or other means)

- 8 micro-projectors
- 8 Lightweight Portable Whiteboards
- 8 Lightweight Portable Easels
- 8 Dry Erase Kits

Kit 2 (for faculty without student access to tablets or laptops for groups within their department or other means)

- 1 iPad Pro Tablet (for faculty – larger screen for easier reading/manipulating)
- 8 iPad Mini tablets (for student groups)
- 8 micro-projectors
- 8 Lightweight Portable Whiteboards
- 8 Lightweight Portable Easels
- 8 Dry Erase Kits

Professional Development. Grant Project team member, Kristina Maricle will dedicate a portion of her regular work time to provide support and PD training on technology enhancements. Extra service of \$1000 is budgeted for preparation and above normal work service for workshops for pilot group. The extra service work will include the development and testing of training modules for use of PBL Classroom Support Kits (to include apps that will enable sharing of information by the faculty and students projecting at each group station simultaneously). Additional trainings offered to support other technology enhancements will be open to all PBL fellows, not just those piloting the PBL Classroom Support Kits.

Assessment Plan:

Focus of assessment will be on (1) faculty perceptions of PBL technology enhancements, student engagement, and student learning and (2) student perceptions of engagement and technology enhancements in PBL courses

PBL Classroom Support Kits Tracking Data. The Library has agreed to provide us with usage data on the PBL Classroom Support Kits.

Student and Faculty Surveys. By using results of the National Survey of Student Engagement (NSSE) taken by SUNY Cortland students in 2016 and the Faculty Survey of Student Engagement (FSSE) to be collected by SUNY Cortland faculty in 2017, we will analyze individual data items (to be provided by Institutional Research (confirmed in an email to Associate Provost Van Der Karr and IR Director). We will use these items to survey faculty and students engaged in PBL activities with technology enhancements during the 2017-18 school year and compare those results with that from the larger population.

Classroom Observations. Project Team members will conduct classroom observations of PBL Faculty Fellows who are piloting technology enhancements. An observation protocol will be developed and implemented.

Participant Survey Data. Project Team will gather data from surveys on PBL technology enhancements and students engagement and learning from both Faculty and Students. Surveys will include sections that address student learning and engagement, overall implementation of PBL, and role of technology enhancements.

Dissemination:

Campus Dissemination: Sandwich Seminar and Public Report

Broader Dissemination: Conference Presentation and/or Journal Article Submission

Timeline

Date	Project Activities	Project Assessment
December 2016	Project Team meets to begin work	
December 2016/January 2017	Order equipment	Apply for IRB Approval for Assessment Plan
February 2017:	Begin work on PBL technology enhancement PD activities Determine PBL Fellows that will pilot use of equipment, train and make PBL Classroom Support Kits available for distribution	Look at SUNY Cortland NSSE/FSSE data Observation protocol for classroom visits developed.
March 2017-May 2017	Continue with PBL technology enhancement PD offerings and Pilot PBL Classroom Support Kits.	Project Team members observe PBL classrooms involving technology enhancements using observation protocol
September 2017-May 2018	Continue with PBL Technology enhancement PD offerings and Piloting PBL Classroom Support Kits.	Gather participant survey data on implementation of PBL technology enhancements in during the 2017-18 academic year Project Team members observe PBL classrooms involving technology enhancements using observation protocol

		PBL Faculty Fellows using technology enhancements and their students will be given a subset of questions from the NSSE and FSSE.
Fall 2018	PBL Technology enhancement workshops continue (without funding)	Assessment Data Analyses and Dissemination

Literature Cited

- Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology, Review, 16*(3), 235-266.
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- Jones, B. D. , Epler, C. M. , Mokri, P. , Bryant, L. H. , & Parette, M. C. (2013). The Effects of a Collaborative Problem-based Learning Experience on Students' Motivation in Engineering Capstone Courses. *Interdisciplinary Journal of Problem-Based Learning, 7*(2).
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- Vescio, V., Ross, D., and Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education, 24*: 80–91.
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Budget

Personnel:

Technology PD: Kristina Maricle @ \$1000 extra service for development and implementation of PBL Classroom Support Kit training modules = \$1,000
Assessment and Reporting: \$200 per person x 4 = \$800

Personnel Total: \$1800

Equipment:

Micro projectors: 16 x \$169 = \$2704
iPad Mini tablets: 8 x \$379 = \$3,032
iPad Pro tablet: 1 x \$579 = \$579
iPad Covers: 9 x \$40 = \$360
Lightweight Portable Whiteboards: 16 x \$45.04 = \$720.64
Lightweight Portable Easels: 16 x \$25 = \$400
Dry Erase Kits (makers eraser, cleaner): 16 x \$22 = \$352

Equipment total: \$ \$8147.64

Total Request: \$ \$9947.64