

Interdisciplinary PBL Course Development in Higher Education

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ABSTRACT

This case study explores how a problem-based learning (PBL), graduate education course could be organized in ways that utilize the current knowledge of how people learn within diverse, real world community settings. Students were asked to identify an educational enterprise and a social problem within a culturally diverse, high-need community. Throughout the course, they designed a service-learning experience, which was linked to the mission and vision of the enterprise while providing a meaningful, sustainable service to the community. At the end of the course, students viewed themselves as potential agents of social change through project presentations and reflections.

The element of discovery has always been a vital part of the learning process. It is a key component of how people learn. Yet studies indicate that although a large percentage of faculty in higher education regularly use problem-based learning (PBL), most either use it very little of the time (Wurdinger, 2016), or as a superficial way to acquire predetermined knowledge (Hüttel & Gnaur, 2016), focusing on the irrelevant acquisition of knowledge rather than the active production of knowledge (Szulevicz & Jensen, 2013). Current studies indicate that there is a specific need for research studying the effective pedagogical design of interdisciplinary PBL learning that applies knowledge in real world contexts (Franks et al., 2007; Stentoft, 2017).

PURPOSE AND PBL MODEL OF INQUIRY

The course examined in this case study utilized an interdisciplinary PBL learning approach that was anchored in constructivism (Crotty, 1998). The purpose of the study was to understand how a PBL graduate education course could be organized in ways that

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utilize the current knowledge of how people learn within diverse, real world community settings.

Problem-based learning approaches date back to John Dewey's (1938) work on the relationship between experience and the learner. They are also strongly influenced by educational theorists such as Piaget, Lewin, Negt, Vygotsky, Kolb, etc. (Kolmos et al., 2004) who believe that learning is an active process rooted in experience. For this study, the instructor utilized a pedagogy framework in her PBL course development that was guided by the cyclical elements of learning found in the Stripling (2003, 2010) Model of Inquiry. The model incorporates six phases in which the students connect, wonder, investigate, construct, express and reflect on their learning (see Figure 1). In this constructivist model, students do not passively receive knowledge through a transmission-oriented model of instruction (Castronova, 2002). Rather they actively process information with teacher guidance and feedback from peers.

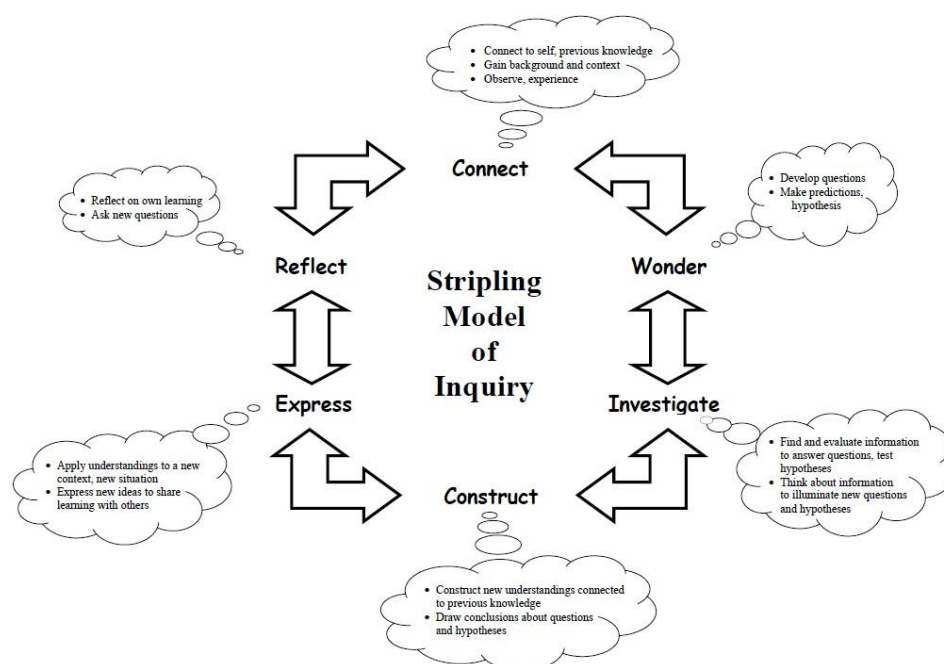


Figure 1. Stripling Model of Inquiry.

HOW PEOPLE LEARN FRAMEWORK

The research supporting the *How People Learn* (National Research Council, 2000) framework suggests that skills and knowledge must transcend the narrow contexts of initial learning. The framework explains that transfer occurs when learners know and understand the underlying principles that can be applied to problems in new contexts.

Additionally, learners are most successful if they are able to use metacognitive skills to see themselves as thinking learners.

The *How People Learn* framework is rooted in the belief that humans are predisposed to be both problem solvers and problem generators. However, designing effective PBL learning environments can be complex. It requires the application of four instructional perspectives that integrate a) learner-centered environments, b) knowledge-centered environments, c) assessments that support future learning, and d) community-centered environments.

In effective learner-centered environments, learners use current knowledge to construct new knowledge. Such environments make connections between previous and new knowledge, thus increasing learning relevance and the motivation to learn. In the construction of a successful PBL course, the *How People Learn* framework emphasizes that the instructor must consider formative assessments that effectively support these connections. Such assessments provide learners with opportunities to revise and improve the quality of their thinking and understanding through learning environments that promote a sense of community.

When these instructional perspectives are integrated into the design of a PBL course, an emphasis on understanding becomes the primary characteristic that defines learning. Focused on the process of knowing (Piaget, 1978; Vygotsky, 1978), learners are viewed as goal-directed agents who actively engage the co-construction of knowledge. They utilize prior knowledge, skills, beliefs, and concepts to organize and interpret new learning thus improving their ability to problem solve and acquire new knowledge.

SETTING AND PARTICIPANTS

This case study observed the PBL design of a blended, interdisciplinary, 5-week PBL course developed for a Jesuit graduate education program in northern California. Eight part-time candidates were enrolled in the course, six females and two males. Candidates brought to the course a wide variety of expertise in curriculum and instruction, technology education, and international education.

COURSE DESIGN

The competency-based, PBL course was developed as a blended learning experience through JesuitNET. The “e-Learning” platform included all elements of Competency Assessment in Distributed Education (CADE) instruction, shifting the focus from what students know, to what students can do with what they know. Philosophically, the course

was designed to follow the Ignatian Pedagogical Paradigm, which helps teachers and learners in a manner that is academically sound and at the same time is formative, “a person for others”. E-learning assignments included five modules which asked students to read chapters from the assigned text *Building School Community Partnerships* (Sanders, 2006) and discuss their thoughts through an online discussion forum.

The interdisciplinary nature of the course provided candidates with opportunities to develop their understandings of the interactions among biological, psychological, and social dynamics in diverse families and communities. It also encouraged them to identify and build on the funds of knowledge in families and communities, and to establish connections with support systems for vulnerable youth within diverse communities. These understanding were developed through in-class literature circle discussions (see Figure 2) that were based on weekly readings from the text *Empowering family-teacher partnerships: Building connections within diverse communities* (Coleman, 2013).

Meeting	Concepts	Chapter Readings
#1	Setting Up Literature Circles	* Assign roles and reading for each week
#2	Exploring Family Units ROLE SHEET #1	* Chapter 1- <i>Contemporary Family Lives and Early Childhood Learning Environments</i> * Chapter 2 – <i>Developing a Guiding Philosophy</i>
#3	Exploring Family Involvement ROLE SHEET #2	* Chapter 3- <i>Benefits of Family Involvement for Children</i> * Chapter 4 – <i>Benefits of Family Involvement for Families and Teachers</i>
#4	Exploring Diverse Partnerships ROLE SHEET #3	* Chapter 5- <i>Normed Families: Single Parent Families, Stepfamilies, and Grandparents as Caregivers</i> * Chapter 6 – <i>Emerging and Vulnerable Families: Gay and Lesbian Families and Families Living in Poverty</i> * Chapter 7 – <i>Families of Children with Disabilities</i>
#5	Exploring Cultural Responsiveness ROLE SHEET #4	* Chapter 8- <i>Immigrant Families and Families from Nondominant Cultures: Understanding the Adaptation Process</i> * Chapter 9 – <i>Adopting a Culturally Responsive Approach to Family Involvement</i>
#6	Exploring Family Involvement ROLE SHEET #5	* Chapter 10 – <i>Responding to the Challenges of Family Involvement</i> * Chapter 11 – <i>Empowering Families Through Family Involvement</i>
#7	Exploring Family Collaboration ROLE SHEET #6	* Chapter 12 – <i>Creating a Welcoming Environment for Families</i> * Chapter 13 – <i>Communicating with Families</i>
#8	Developing a Family Involvement Program Model	* Use Chapter 14 to Organize Your Family Involvement Model
#9	Program Model Presentations	* Present Your Family Involvement Model to the Class

Figure 2. Literature Circle Major Concepts and Chapter Readings.

During literature circle meetings #8 and #9 each group completed a culminating project directing candidates to design a *Family Involvement Program Model* incorporating strategies discussed throughout the quarter and suggesting ways to build on or improve

family-teacher interactions existent within their school or social enterprise. This project was constructivist in nature and embedded the following two perspectives from the *How People Learn* framework – learner-centered environments and knowledge-centered environments.

The signature assignment chosen for the course was a service-learning project, which at its core was project-based. Service-learning is a research-based, best-practice teaching strategy in which classroom learning is deepened through service to others. Researchers have found that combining PBL with service-learning increases (a) student motivation, (b) the connection between professional knowledge and social responsibility, and (c) a sensitivity to the sociocultural environmental consequences of professional decision making (Duffy et al., 2008; Swan, Rachell, & Sakaguchi, 2000; Vanasupa et al., 2008). The structured process involved student decision-making in preparation for and implementation of meaningful experiences; reflection time before, during, and after the service action; and respectful communication- understanding and valuing the diverse backgrounds and perspectives of those offering and receiving the service.

The project asked candidates to identify an educational enterprise and a social problem within a diverse, high-need community. As candidates connected their enterprise to a current social problem, they designed a service-learning experience, which was linked to the mission and vision of the enterprise while providing a meaningful service to the community. Utilizing the perspectives from the *How People Learn* framework, the instructor formatively evaluated the projects on a weekly basis using the *K-12 Service-Learning Standards for Quality Practice* (National Youth Leadership Council, 2008). To aide in project development, candidates used the *Service-Learning Project Planning Toolkit* created by the RMC Research Corporation for Learn and Serve America's National Service Learning Clearinghouse (2009) to design five core project components: a) investigation, b) planning and preparation, c) action, d) reflection, and e) demonstration of results. Each project component correlated with all phases of Stripling's (2003) Model of Inquiry.

The activities within the *Service-Learning Project Planning Toolkit* gave candidates opportunities to dive deep into practices characterized by the fourth perspective in the *How People Learn* framework. Candidates developed experiences which engaged their enterprise in the a) identification of a potential social problem, b) establishment of a meaningful partnership between enterprise participants and community recipients c) research of possible service solutions, d) development of project goals, learning objectives, and formative benchmark assessments, e) integration of reflection, civic knowledge, skills, and f) public celebration.

PROJECT PRESENTATIONS AND REFLECTIONS

On the last day of class, candidates presented their service-learning project designs to the entire class. Students interacted by asking questions and giving constructive feedback to each other. Project titles and partnership affiliations included: a) *Google's BOLD Teens Project* – A Google - Local High School Partnership, b) *The Huff Elementary School Fresh Food Exchange* - A Neighborhood - Local School Partnership, c) *The Building Bridges Between the Cashion Cultural Legacy (CCL) and the Community Project* – A School, Community, and Cultural Organization Partnership, d) *Partners in Arms: The CAMP College Program Buddy System Project* – A College Assistance Migrant Program and Local School District Partnership, e) *Recycling Your Success: Alumni Mentoring Program* – A LEAD Scholarship Program and University Alumni Partnership, f) *Building Water Consumption Literacy: Effective Ways to Reduce Your Water Use Footprint* – A Local Christian School and Community Partnership, and g) *Developing Community Relationships to Inspire the Innovator in Everyone* – A Tech Museum of Innovation and Local Community Partnership. At a later date, three of the students publicly presented their project designs at the 2018PBL International Conference (Bowen, 2018).

As candidates reflected on their service-learning project development, a majority expressed profound connections between service-learning and PBL in diverse community contexts. One woman wrote, “Helping others is a powerful tool that makes one feel valued, while at the same time benefitting the recipient.”

Another wrote, “My school is launching a PBL initiative next year. Service-learning and PBL align perfectly, and there may be a particular grade level that wants to take this on initially as a PBL unit, and then carry on with it throughout the year, showcasing their learning in public forum along the way.”

A third wrote,

I hope to help build the bridge between the CCL and the school systems in our area. I want the local students to take advantage of the activities the CCL has to offer and I really want the CCL to thrive in our community. I believe that there is no way around not acknowledging the great Latino presence in our community and I think the CCL is a great way to present the richness of our culture in a positive light to the outside world.

One young first generation migrant candidate wrote,

Being a first-generation migrant student my whole life, I was very fortunate to be able to qualify for the services that the migrant education program provided me from middle school to my first year in college. In a like manner, I would like to propose a plan where we can strengthen migrant programs. I would love for

the College Assistance Migrant Program (CAMP), a program that guides the transition of first-generation migrant freshmen and mentors them throughout their first year in college, to create a partnership with local school districts that also offer a component or Migrant education services in middle schools. My vision for this partnership is for College Freshmen, or CAMPers, to do their required service-learning at one of these schools and be a mentor to a migrant middle schooler - something like a buddy system for one whole semester.

CONCLUSION

Students do not learn in silos of isolation behind closed doors. The future of learning for university graduate students intersect and surpass boundaries of disciplines. It invades spaces of reality where people work together to solve critical social problems within diverse community contexts.

The future of learning for university graduate students views learners as agents of social change as they bring to each new learning experience the relationships they have forged within their own families, friends, and community contacts, the personal struggles they have overcome, and the relevance of what matters most.

The future of learning for university graduate students is personal, and problem based. It bridges the gap that exists between the micro-interactions that exist both inside and outside of school. People connecting with people on a personal basis creating networks of resources necessary for building thriving communities of hope.

The creation of this interdisciplinary PBL course has taught me that real school exists outside the walls of an institution. The intersection of discovery and learner/knowledge centered environments create democratic community learning spaces that advocate for equality and justice that are currently under explored in higher education. It is my hope that the future of learning for university graduate students advocate for inclusive community collaborations that embrace diversity, and a sense of connectedness to the human spirit.

References

- Bowen, C. (2018). *Active, project-based learning in diverse community settings*. Paper presented at the PBL2018 International Conference: PBL for the Next Generation, Santa Clara, CA.

- Castronova, J.A. (2002). Discovery learning for the 21st century: What is it and how does it compare to traditional learning in effectiveness in the 21st century? *Action Research Exchange, 1* (1), 1-12.
- Coleman, Mick (2013). *Empowering family-teacher partnerships: Building connections within diverse communities*. Los Angeles CA: Sage Publications, Inc.
- Crotty, M. (1998) *The foundations of social research: Meaning and perspective in the research process*. London, GB: Sage.
- Duffy, J., Moeller, W., Kazmer, D., Crespo, V., Barrington, L., Barry, C., West, C. (2008). Service-Learning projects in Core undergraduate engineering courses. *International Journal for Service Learning in Engineering, 3*(2), 18-41.
- Franks D, Dale P, Hindmarsh R., et al. (2007) Interdisciplinary foundations: Reflecting on interdisciplinarity and three decades of teaching and research at Griffith University, Australia. *Studies in Higher Education, 32*(2), 167–85.
- Hüttel, H. & Gnaur, D. (2016). If PBL is the answer, then what is the problem? *Journal of Problem Based Learning in Higher Education, 5*(2), 1-21.
- Kolmos, A, Fink, F.K. & Krogh, L. (2004). *The Aalborg PBL Model: Progress, diversity and challenges*. Aalborg, Denmark: Aalborg University Press.
- Laursen, E. (2004). Problem-based learning as a way of organizing and teaching at the university. Some contemporary problems and future possibilities. In A. Kolmos, F.K. Fink & L. Krogh (Eds.), *The Aalborg PBL Model: Progress, diversity and challenges*. Aalborg University Press. (pp. 57-71). Aalborg, Denmark: Aalborg University Press.
- National Research Council (2000). *How people learn: Brain, mind, experience, and school*. Washington, D.C.: National Academy Press.
- National Youth Leadership Council (2008). K-12 Service-Learning Standards for Quality Practice. Retrieved from https://nylcweb.files.wordpress.com/2014/08/standards_oct2009- web.pdf
- Piaget, J. (1978). *Behavior and evolution*. New York, NY: Random House.
- RMC Research Corporation for Learn and Serve America's Service-Learning Clearinghouse (2009). K-12 Service-Learning Project Planning Toolkit. Retrieved from [https:// www.yumpu.com/en/document/view/20602092/k-12-service-learning-project-planning- toolkit-national-ffa-](https://www.yumpu.com/en/document/view/20602092/k-12-service-learning-project-planning-toolkit-national-ffa-)
- Sanders, Mavis G. (2006). *Building school-community partnerships*. New York, NY: Skyhorse Publishing.
- Stentoft, D. (2017). From saying to doing interdisciplinary learning: Is problem-based learning the answer? *Active Learning in Higher Education, 18*(1), 51-61.

- Stripling, B.K. (2003). Inquiry-based learning. In B.K. Stripling & S. Huges-Hassell (Eds.), *Curriculum Connections through the Library* (3-39). Westport, CT: Libraries Unlimited.
- Stripling, B. (2010). Teaching students to think in the digital environment: Digital literacy and digital inquiry. *School Library Monthly*, 26(8), 16-19.
- Swan, C., Rachell, T. & Sakaguchi, K. (2000). Community-based, service learning approach to teaching site remediation design. ASEE Annual Conference and Exposition, June, St. Louis, MO.
- Szulevicz, T. & Jensen, M. (2013). PBL in educational psychology: Potentials and challenges. *Journal of Problem Based Learning in Higher Education*, 1(1), 19-35.
- Vanasupa, L., K.C. Chen, J. Stolk, R. Savage, T. Harding, B. London, & Hughes, W. (2008). Converting traditional materials labs to project-based learning experiences: Aiding students' development of higher order cognitive skills. *Journal of Materials Education*. 30 (3/4).
- Vygotsky, L. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.
- Wurdinger, S.D. (2016). *The power of project-based learning*. Lanham, MD: Rowman & Littlefield.