Transitioning to the Real World Through Problem-Based Learning: A Collaborative Approach to Teacher Preparation

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ABSTRACT

Problem-based learning (PBL) creates opportunities for authentic learning in teacher preparation programs. In addition to developing content knowledge and pedagogy, problem-based learning affords students the framework for a holistic, collaborative approach to solving several interconnected problems. As students move through the process of problem-solving, they take ownership of their learning and build self-confidence. This in-depth, guided learning opportunity with peers provides benefits beyond the university classroom and transfers directly into the real world. Students internalize problem-solving methods and are prepared to apply this knowledge not only in their classrooms, but in their personal lives as well.

INTRODUCTION

Problem-based learning requires students to use content knowledge to solve real-world problems. It is an instructional tool that actively engages prospective teachers and forces them to approach problems from a teacher's standpoint. Learning becomes active and on-going as students seek additional resources to answer problems and to plan strategies (Levin, 2001).

The work of PBLs can often be traced back to the work of John Dewey. Dewey and his progressive movement asserted that students should be encouraged to investigate and create. When teachers link learning to real-life activities, learners are motivated and involved. Therefore, real learning becomes a natural result (Dewey, 1944).

Many medical schools are expanding on the work of Dewey by utilizing PBLs in their courses. PBLs were adopted by medical and dental schools originally in the 1960's as the preferable choice over the traditional medical school model (Polyzois, Claffey, & Mattheos, 2010). Instead of memorizing volumes of material, students were asked to participate in groups where they reviewed cases, conducted research, asked questions, and proposed treatment. This type of real-world learning helps students develop their diagnostic skills, while putting their content knowledge into practice. The goal is not solving the problem, but rather using the problem to increase medical students' knowledge base and ability to find the answer, much like they will be required to do as physicians (Wood, 2003).

PBLS IN HIGHER EDUCATION

Although PBLs were first implemented in medical education, Walker and Leary (2009) concluded that "PBL students either did as well as or better than their lecture-based counterparts, and they tended to do better when the subject matter was outside of medical education." Although PBLs have become a part of the K-12 curriculum, they have also found a home in higher education classrooms. The loose structure of the PBL offers opportunities for students to wrestle with complex levels of knowledge through analysis of the problem and synthesis of the research. PBLs enlighten students as to what they do not know, whereas lecture and limited hands-on classroom activity promotes the notion that students know more than

they really do. The metacognitive frame of mind, essential to mature learning, is promoted through PBLs (Felder and Brent, 2004). Students identify needed information, retrieve it, analyze it, and synthesize it to determine if it is applicable to the problem. This in itself provides practice in developing skills that are portable to a variety of teaching and learning opportunities. Additionally, extended opportunities to participate in roles and performances in less structured environments prepare students for the real world of teaching (Lave and Wenger, 1991).

Current learning theories emphasize the deep learning that derives from situated learning in a social context. PBLs naturally adopt this approach to learning and provide the necessary practice and engagement for teacher candidates while they internalize this practice and hence are able to model this learning strategy in their own classrooms (Lave and Wenger, 1991). In addition, PBLs offer effective methods of assessment for teacher candidates. Students are given the opportunity to apply their knowledge, utilize critical thinking skills, and demonstrate understanding (Flynn, 2008).

The Tennessee Board of Regents (TBR) is the sixth-largest state university and community college system in the United States and prepares more than half of all teacher candidates in the state in the TBR six universities and thirteen community colleges. TBR has initiated a teacher education redesign called Ready2Teach with the goal of preparing future teachers who are ready to teach from the moment they enter the classroom. An important component of the Ready2Teach initiative is to incorporate PBLs in education and methods courses.

PARADIGM SHIFT

Transitioning to PBLs in the College of Education was predicated by the need to engage teacher candidates in authentic learning, collaboration, and analytical thinking during the final phase of their program. The ultimate goal was to develop teachers who value collaboration, solve problems, and have internalized methods of research and ways of thinking that will benefit them throughout their careers and lives.

 The majority of coursework encountered by students during their freshman, sophomore, and junior years at the university follows the lecture, note-taking, and memorization model. This static model is not suitable for teacher candidates preparing for extended field experience and careers in teaching. PBLs provide an opportunity for engagement in deep learning through social support and collaboration. As students increase their content knowledge and analytical thinking skills, they adopt these habits for a life of learning. This is the key for success in the classroom.

READING METHODS CLASS

During the 2011 spring semester, students in a reading methods class in the College of Education in a university in middle Tennessee had the opportunity to fully engage in a multi-layered problem. Utilizing PBLs in pre-service reading methods classes is an effective strategy to prepare future teachers because it gives them many opportunities to work collaboratively to solve common problems they will face in their own reading classrooms.

Students were divided into teams of four and worked in these teams throughout the semester. Prior to receiving the PBL that would require much research, analysis, critical and creative thinking, students were given two brief warm-up problems to practice (Appendix A). After reading the problem, teams worked together to list what they knew based on the information they have been given, what they needed to find out, and identified any additional learning issues. One student was designated as the scribe to write down key points of the discussion and make notes to distribute to the rest of the groups. Another student was selected to be the leader to guide discussion and make sure everyone stayed on track. This activity was completed in class.

In addition to the warm-up PBLs, students learned about and practiced several reading strategies appropriate for students in kindergarten through sixth grade during the first six weeks of class. Brief case studies of individuals were also given out and analyzed by the PBL teams to determine appropriate reading strategies to use with each case. Three research articles were selected by the instructor to lay the groundwork for students to begin thinking about several aspects of the PBL. Students responded to the articles using the Six Habits of Comprehension (Zwiers, 2006). This process was previously modeled by the instructor and practiced by the students (Appendix B). As students worked toward solving the PBL, more research was initiated through the collaborative teams. A group discussion portal was set up for each team to post articles, comments, and notes from previous meetings, and allowed students to have virtual meetings and discussions outside of class meetings.

The actual PBL was given to teams during the sixth week of class (Appendix C). Five more articles were assigned and as students worked toward solving the PBL, more research was initiated and sought through the collaborative teams. A group discussion portal was set up for each team to post articles, comments, and notes from previous meetings.

At the end of the semester each team presented its final project to the class. Although all teams had the same problem, each project was unique. Teams successfully identified the problems and determined a variety of ways to address them based on their research. District teaching guides developed by the teams provided strategies for improved reading instruction based on research and state standards.

As teams presented their projects it became clear that students had learned to link research-based reading strategies to state standards and classroom instruction. Projects indicated an understanding of the purpose of assessments. The rubric given to students early in the development of the project assisted them as they planned and explored the research (Appendix D). While carefully reading and assigning a score to each project with this same rubric, the significant learning fostered by the PBL became even more evident. The writing was fluid and thoughtful. Academic language was used appropriately and woven seamlessly throughout all aspects of the project.

In addition to the reading content knowledge students gained through this process, they were also compelled to think about and address other facets of teaching they will likely encounter in their own schools and classrooms. Students learned how to collaborate and work as a team. They had to think about involving parents, soliciting their input, and keeping them informed not only about their child's progress, but also about curriculum decisions. They learned how to address successes as well as failures in an inclusive, tactful manner.

As the demands and expectations of beginning teachers increase, teacher preparation programs must continually look for relevant ways to prepare teacher candidates. Utilizing PBLs in a reading methods course is one strategy that can encourage active learning, creative thinking, and practical application.

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APPENDIX A		
Luisa is in the third grade at Stonybrook Elementary School. She came to America last year from Mexico with her parents who are migrant workers. She speaks broken English and does not associate with other children. Luisa loves to draw and paint, but does not seem interested in reading. There are few books in the classroom and when she goes to the school library, she must select books on her Accelerated Reader level. When she has time on the computer, Luisa likes to visit virtual art museums and look at paintings.		
Facts List	**Possible Problems**	**Need to Know**
Reading Instruction Needs	**How will I assess?**	**Reflection/ Next Steps**

APPENDIX B

Comprehension Habits: There has been much research on reading comprehension strategies. You are familiar with the strategies of questioning, clarifying, predicting, and summarizing. Additional strategies that aid in comprehension are building schema, inferencing, synthesizing, and metacognition. Zwiers (2006) synthesized the research related to comprehension into six comprehension habits for students to internalize in order to monitor their reading comprehension. The habits Zwiers (2006) recommends are:

1. Organizing text information by sculpting the main idea and summarizing.

2. Connecting to background knowledge.

3. Making inferences and predictions.

4. Generating and answering questions.

5. Understanding and remembering word meanings.

6. Monitoring one's own comprehension.

Practice these habits with the following poem by Robert Frost:

Stopping By Woods On a Snowy Evening

Whose woods these are I think I know.
His house is in the village though;
He will not see me stopping here
To watch his woods fill up with snow.
My little horse must think it queer
To stop without a farmhouse near
Between the woods and frozen lake
The darkest evening of the year.
He gives his harness bells a shake
To ask if there is some mistake.
The only other sound's the sweep
Of easy wind and downy flake.
The woods are lovely, dark and deep.
But I have promises to keep,
And miles to go before I sleep,
And miles to go before I sleep.

1. In one to two sentences state the main idea of the poem, then write a summary of the poem.

2. Do you have any schema (prior experience or knowledge) that helps you understand the meaning of the poem? Describe your experiences.

3. What inferences and predictions did you make as you read the poem?

4. What questions do you have? What answers do you have?

5. What strategies did you use to understand word meaning?

6. What steps did you take to monitor your comprehension?

APPENDIX C

PBL RDG 4030 Spring 2012

The Tennessee State Board of Education has established learning goals for students. The curriculum coordinator for the school district that employs you as a fifth-grade teacher notes that the district has been doing a good job promoting some of the components of a balanced literacy program. Some students come to fifth grade reading fluently. They are able to summarize what they have read and answer literal questions about fiction and non-fiction readings. The curriculum coordinator has also noted there are some gaps in students' reading and thinking abilities. Students do not dig deeper into what they are reading and vocabulary scores on state tests are somewhat low. They do not ask questions and are willing to accept things on face value. Students do not offer support for their viewpoints and have difficulty appreciating other viewpoints. Students believe that reading is for the reading class. The district administration has decided that there has been too much emphasis on basal readers and covering the material. The superintendent feels that asking each grade-level team to design a plan that incorporates a variety of innovative literacy techniques and higher-order thinking skills into classroom instruction will address this problem. Funds are available for purchasing books and other materials to accomplish these goals. The superintendent has asked that parents and interested others in the community be well-informed about the changes because some communities have been reluctant to support school reform.

You are on a team of fifth-grade teachers charged with integrating these goals into the district curriculum for fifth grade. Such work entails designing a district teaching guide in which you identify aspects of reading comprehension that need to be developed and how they can be fostered in fifth grade. Explain why the methods you have selected "fill the gaps" in students' reading and thinking abilities. You should include state standards that are addressed and how reading is integrated into other subject areas. Explain how you will know if students are learning and using the processes you identified, and provide a plan for keeping parents informed about the goals, process, content, and assessments presented in your restructuring.

APPENDIX D **DISTRICT TEACHING GUIDE PBL**			
Identifies the problem and six sub problems.	Identifies the problem and four to five sub problems.	Identifies the problem; three of less sub problems are identified.	10
Thoroughly addresses how each deficiency will be addressed. Research is provided to support each decision.	States how each identified deficiency will be addressed. Research supports some decisions.	States how each identified deficiency will be addressed. Research is missing.	30
Includes several state standards that are aligned with the strategies included in the teaching guide.	Includes a few state standards that are aligned with the strategies.	Includes a few state standards that are not aligned with the strategies.	5
Includes several methods to integrate reading into other subject areas. These methods are supported with research.	Includes a few methods to integrate reading into other subject areas. There is little research to support decisions.	Does not include methods to integrate reading into other subject areas.	10
Thoroughly describes how student learning will be assessed to determine if the plan is working.	Provides a general description of how students will be assessed.	Fails to address how students will be assessed.	10
Includes a detailed plan to initially inform parents of the curriculum change. More than one method to inform parents is included.	Includes a general plan to initially inform parents of curriculum change. Only one method to inform parents is included.	Does not include a plan to inform parents of curriculum change.	10
Clearly addresses how parents will be informed of their child's progress in the new curriculum.	Lacks specifics about how parents will be informed of child's progress.	Fails to include information about how parents will be informed of child's progress.	5
Is well-written and free from spelling and grammatical errors.	Is not clearly written and contains some spelling and grammatical errors.	Is poorly written and contains several spelling and grammatical errors.	10
GROUP PBL PRESENTATION:			
Is creative and all team members participate. Team uses a visual aid and provides a handout to audience.	Is creative, but not all team members participate. A visual aid is part of the presentation, but there is no handout.	Lacks creativity and not all team members participate. There is no visual aid, nor handout.	10