

Problem-Based Learning for the Pre-service Teacher

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As a part of the Ready2Teach teacher education redesign of the Tennessee Board of Regents, Problem-Based Learning (PBL) has been implemented in the Foundations of Education courses of some universities. PBLs require teacher candidates to work in groups to research best practices and strategies that they would use to deal with real-world situations as beginning teachers. This paper describes how a PBL was successfully utilized in a course, as well as guidelines for use, suggestions for implementation, and the challenges of group work. PBLs are presented as a viable method to help teacher candidates develop skills they will need to enter the teaching profession.

In 2008, the Tennessee Board of Regents (TBR) implemented a redesign of its six teacher preparation programs. The goal of the initiative, named Ready2Teach (R2T), is to equip graduates with the skills, experiences, and competencies to be a successful teacher. One of the components of R2T is to implement Problem-Based Learning (PBL). By utilizing PBLs in coursework, teacher candidates are presented real-world teaching situations that will encourage them to research and investigate best practices and strategies. In addition, the PBLs provide information about teaching as a future career choice. According to Hosokawa (2010), an effective PBL should include authenticity of scenario, progressive disclosure of scenes, source of knowledge generated by group members, learning through group dynamics, and curricular focus and progression through facilitator use of prompts, cues, and probing questions.

Rationale for Implementing PBLs

Problem-based learning activities, or tasks, provide a full spectrum of strategies for educators to determine the level of knowledge attained by students. PBLs are student-centered, typically consisting of small groups, involving the use of higher cognitive functions to complete tasks which are directly meaningful to a student's education (Burley & Price, 2003, Trauth-Nare & Buck, 2011). Collaborative learning environments created by PBLs can elevate a student's intrinsic motivation to learn more about a particular topic or subject (Performance-based assessment, 2008). Flynn (2008) emphasizes the ability of students to use critical-thinking skills to apply newly acquired knowledge into novel situations, providing insights into thought processes not demonstrated on traditional paper-and-pencil tests. PBLs provide students the opportunity to demonstrate knowledge attained during the course of the scenario and at the end during the final presentation. Logically then, problem-

based learning activities also serve as another form of assessment, which can be used to gather information regarding a student's ability to complete specific curricular-related tasks. Popham (2010) accurately states the basis for assessing students as:

[t]o make better decisions about the curricular ends we should be pursuing, the way our instruction is working, and-at the close of instruction-how successfully students have achieved our intended curricular aims. (p. 5)

Pilot PBL Project

Campuses involved in the R2T redesign were given various PBL models to use in piloting PBLs in selected courses. One of the PBLs, New Teacher at Midland Middle School, was selected to use in the Foundation of Education course. The PBL focused on curriculum related to student performance and assessment, teacher effect and evaluation, school performance, parental engagement, and school-wide collaboration and leadership. Candidates met each week during class time in groups of 6-8 members and, when available, university library faculty supported the course instructor by focusing on how candidates were applying the Information Literacy Standards for Teacher Education by the Association of College and Research Libraries (2011). Successful application of these standards resulted in candidates gaining new knowledge and concepts to build professional expertise in teaching and learning, and establishing a research-based foundation for the life-long learning of a teaching professional. Due to the large class size, it was not possible to assign one facilitator per group. Instead, one modification made to this ideal PBL construct was to have the course instructor circulate among groups when groups did not have an assigned facilitator. Two obstacles that emerged quickly were the availability of technology in the classroom and the ability of students to meet away from class to

discuss group responsibilities. To accommodate these challenges, students were directed to bring technology devices to class for wireless internet access to complete activities. Students were required to use cloud-based learning environments like Desire2Learn, Google Groups, and Google Docs.

Originally, candidates were instructed that they would meet weekly over a six-week period and investigate each scene in Table 1. They were directed to research and collaborate to build on their personal knowledge for each facet of the scenario as it progressively unfolded during the given timeframe. Members were explained the role of the facilitator and determined the roles of candidates in each group, including quarterback, scribe, and researchers. Members were also provided a list of responsibilities for each role. The facilitator acted as a guide to ensure full investigation of content. The quarterback coordinated processes during group sessions, read the current scene, and moderated discussions. The scribe took notes using the PBL Learning Grid and distributed appropriate information. Researchers were all candidates of the group and contributed to discussions, researched assigned topics, and presented results of investigations. In addition, candidates were given guidelines to complete individual learning. Group members were required to consider and act on the following questions:

1. What are the key points and known information given in the scene?
2. What additional information is needed for clarification and understanding?
3. What learning tasks are necessary for understanding and how will it be delegated and reported to ensure access by group members?
4. How were the facets of the scene analyzed and how were learning tasks modified to ensure appropriate and accurate new knowledge?

Along with the learning grid, candidates were directed to maintain a weekly record of individual contributions to the group and what the group accomplished collectively. This log of their personal insights provided a measure of individual accountability as part of overall team accomplishments. In addition, candidates were provided guidelines for a final group presentation. Each group presented one scene of the PBL and scene assignments were given in the last 15 minutes of class, after the final regularly scheduled group meeting.

While candidates met in their PBL groups, they assumed the role of an eighth grade Language Arts teacher hired to teach in a middle school in Tennessee. The progressive disclosure of the PBL activity was well suited to the general development of small groups described by Tuckman (1965) and the groups typically exhibited the stages of forming, storming, norming, and performing. The PBL activity provided an opportunity for candidates to focus on the task of being a first-year teacher who will need to meet a variety of professional and often unrehearsed challenges. Additionally, the timing of the PBL was scheduled while candidates were involved with their first field experience in teaching. The two activities complemented one another, cultivating richer discussions within the PBL group and in the field between the candidate and his or her mentor teacher.

Group work and PBLs

Group work has both an upside and downside for candidates as a learning strategy. The upside is that it may promote teacher teams working effectively together to promote learning gains for students. The downside is that it could hinder future professional development training. Therefore, situations promoting small group collaboration prepare candidates for future teaching expectations. Small groups follow a developmental process and while some groups develop more quickly to reach

desirable outcomes, others will not (Tuckman, 1965). Candidates were required to produce a final presentation for a course grade and facilitators considered the implications of how groups developed and navigated interpersonal relationships that strengthened learning outcomes rather than distracted from them.

The initial meeting of the groups was typical of Tuckman's (1965) forming stage where group members focused on orienting themselves to the idea of PBL and individual responsibilities for the first scene and the first week's requirements. Facilitation of the groups often began with the question, "What does the course instructor want me to do here?" or with the comment, "Just tell me what you want." The role of facilitator focused a great deal on encouraging candidates to use inquiry and discussion to determine their group's expectations about the task and how to accomplish group learning goals. Facilitators provided prompts and cues to ensure that candidates understood the learning tasks and specific PBL activity guidelines were met.

The forming stage also provided candidates the opportunity to use divergent thinking to transition from traditional learning to problem solving. Problem solving required the candidates to understand that professional decision making often requires multiple considerations of appropriate possibilities. Facilitators needed to reassure candidates that it was necessary for them to devise their own course of action based on the individual learning needs within the group and that diverging approaches were possible and appropriate. Upon completion of the PBL activity, one candidate commented that they were concerned over the lack of information given. However, when they reflected they realized it was helpful because it forced them to search for information, much like a real teacher. Candidates also expressed frustration at times in finding the necessary information. They were able to overcome this by putting themselves in the teacher's shoes and referring to the district

standards. As candidates became oriented to the activity, students developed a sense of active learning and responded to the goal of open-ended learning with multiple approaches.

In the meetings that followed, groups displayed characteristics demonstrating progression through Tuckman's (1965) second and third stages, storming and norming. During the second, third, and fourth group meetings, expectations about group interaction and communication became central to accomplishing learning tasks. In the storming phase, interaction among group members can often be emotional due to the differing attitudes, work habits, and approaches to problem-solving. The interaction within some groups was more cohesive than others and candidates came to understand the ability to communicate effectively and make adaptations are necessary skills for a teacher in a team addressing specific student needs and school goals. Candidates describe the cohesion of the group in different ways. Some felt that they quickly came to like each other and worked effectively together, while others discovered that their biggest unexpected challenge was actually interacting within the group. Still others were confident they possessed the necessary communication skills to be a teacher, but realized that effective communication could be daunting and difficult at times.

As candidates adapted to the idiosyncrasies of the other group members, groups were more unified with developed routines. This is representative of Tuckman's (1965) norming stage, characterized by candidates who are typically focused on getting along, listening, and exchanging ideas. Candidates found it interesting that they thought they knew familiar terms, but within the context of the PBL, realized that they did not. Not only can meaningful talk take place during the norming stage, but candidates can extend learning opportunities between class sessions. Candidates were required to set up and maintain a Google account as part of the PBL

activity to further communication among group members and continue the interactive learning between class sessions. Candidates remarked that one of the most helpful ideas in the PBL was using Google Groups because it could be emailed straight to their phones. They always had the knowledge or questions answered as soon as they received it.

Tuckman's (1965) final stage of small group development is performing. Candidates were originally notified that each group would be informed of the date of their group presentation at the conclusion of the sixth group meeting. It had been determined by the instructor that notifying candidates earlier would lead to groups not actively engaging with the final scene. The instructor also notified groups at the beginning that the groups for the first day's presentations would have a shorter turn-around time period to prepare and this was also part of the authenticity being represented. When candidates completed their group presentation, they also turned in their weekly log of personal contributions and group accomplishments. The scribe for each group submitted an official learning grid for each scene of the PBL.

Completion of PBLs

Successful completion of the PBL activity depended on the candidates' ability to use their knowledge and experience within the groups. Some groups were challenged more than others when halfway through the project, and several members dropped out. Candidates realized they had to pull together and learn more and dig deeper. As the groups progressed through the PBL, Tuckman's (1965) performing stage was detected by candidates' emphasis on constructive action and energy focused on a commitment to the culminating task (p. 387). Candidates expressed that they were able to understand and grasp the many things that can happen to a teacher.

New Teacher at Midland Middle School was a successful activity for these beginning teacher candidates. It was very evident from the outset of the activity that the candidates were intrigued by the fact that they could be the new teacher in the very near future. Candidates stated that being able to have a possible scenario for a future classroom was helpful because it gave them a chance to think about their future job. Candidates were provided the opportunity to collaborate as beginning professionals and ask questions where there were no clear-cut answers. They had to focus on understanding the importance of learning content to demonstrate meaningful achievement, the dynamics of various stakeholders involved with learning success, experiences needed to help learners connect knowledge, and the importance of collaboration to maximize critical thinking and strengthen meaningful relationships.

As candidates completed the various tasks to complete the PBL activity, they were more often working as a functioning team with strong purpose. Candidates found that working in a group brought many different ideas to the table. They realized that they sometimes had only one viewpoint, without considering others' thoughts and ideas. They understood the importance of understanding others and learning to collaborate. This is evidence of the 5th stage of the group's development, adjourning, identified by Tuckman and Jensen (1977). Candidates developed close relationships within each group while collaborating to achieve a common goal and gained an appreciation for the intricacies involved with a potential future teaching career. It was not uncommon to hear candidates remark during the week following their final presentation that they would miss the personal contact with one another. For a number of candidates, effective working relationships in future teacher education courses were established and skills for problem-solving were strengthened.

Evaluation of PBLs

In the last class session before the final exam, candidates responded to an instructor questionnaire, which included the following four questions:

1. What did you find most interesting or helpful in this activity?
2. What challenges did you face and how was it resolved?
3. What recommendations would you make for this activity?
4. How would you rate this activity on a scale of 1-5?

The candidate responses to the instructor questionnaire provided valuable feedback about processes and performance and it confirmed the need for a number of important adjustments to ensure that a precise and appropriate curriculum was in place. The candidates gave an overall rating of 1-5 with 5 being excellent. The results for the 40 candidates who completed the questionnaire were the following: 11 candidates (27.5%) rated it with 5, 24 candidates (60%) rated it with 4, 4 candidates (10%) rated it with 3, 1 candidate (2.5%) rated it with 2, and 0 candidates rated it with 1.

Reflections

In general, the recommendations submitted by the candidates to strengthen the PBL were insightful and confirmed facilitator observations. Examples of these recommendations included decreasing the total number of weeks for the scenes to unfold, ensuring each scene is more dense with topical situations, more whole class discussion after final presentations, greater weekly accountability to measure individual disposition and responsibility, and clearer guidelines about the PBL process and its role in promoting the need for critical thinking as a future teacher.

Candidate feedback and facilitator discussions were considered thoughtfully and used to strengthen subsequent PBL scenarios, with the focus being to deepen curriculum content, expect greater individual accountability, and improve assessment measures of the candidates during and after the PBL activity.

Reflection at the close of the pilot PBL was used to determine lessons learned, changes to be made, and how the PBL should progress going forward. Evaluation was the first and most pressing concern. The assessment process for performance was streamlined for the final group presentations to include application of information literacy skills. Content evaluation came in the form of a collaboratively developed final exam to assess the major topics of the course and PBL. Students were also evaluated on dispositions and the ability to work in a group to achieve a common objective. Finally, the weekly accountability was modified to include a log sheet and submissions to an electronic portfolio to exhibit individual contributions and group accomplishments. Social media was also utilized to promote group cohesion and discussions while away from class. Students had the choice of five different tools to use as the form of communication between group members. Due to the lack of classroom technology available, students were encouraged to bring in web accessible technology to increase the opportunity for task completion within the class time frame.

The improvement of several areas going forward will solidify this PBL as a method to incorporate real world experience in an environment that allows students to make mistakes and receive corrective feedback prior to stepping into the real situations teachers face. First, developing the PBL into a standards-based assessment process will strengthen student understanding of the importance in aligning objectives to specific standards and outcomes. Secondly, a well-developed rubric to allow students an understanding of performance

expectations must be constructed. Lastly, the refinement of the expected curriculum came to light.

Conclusion

If the goal of education is to better prepare students for life after school, then relevant and meaningful experiences gained during the course of their education will promote successful integration into society and employment. Problem-based learning allows educators the opportunity to create scenarios such as New Teacher at Midland Middle School, placing students in situations which mimic potential future situations. The implementation of PBLs in the undergraduate Foundations course has opened the students' eyes to what they may experience once they obtain employment in a school. PBLs have also created a much deeper level of thinking for many of the students as seen in the documents submitted in each of the students' weekly learning grids and final presentations. By implementing the PBL scenarios into the teacher preparation courses, students are able to gain a better understanding of expectations in the teaching profession, and in turn, can determine the level needed to be successful.

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Tables

Table 1

Key Elements from "New Teacher at Midland Middle School"

Scene 1: New hire, English teacher, urban school, little or no parental/community support, targeted for low assessment scores, meet principal and lead teacher
Scene 2: 8th grade language arts, TVAAS, previous teacher replaced for low scores, standards and pacing guide, student and faculty handbook
Scene 3: Emergency faculty meeting, State Report Card, move to high priority list, School Improvement I status, school choice for parents, effective teaching strategies in all subject areas to improve reading scores
Scene 4: Prepare for TCAP writing assessment, Writing Across the Curriculum, evaluate student writing samples at next faculty meeting
Scene 5: Difficulty with parents, principal recommends improved communication with parents, class newsletter
Scene 6: Summative evaluation by principal, re-hiring, tenure

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