Teacher Preparation Program Redesign:

Problem-Based Learning and Teacher Candidate Self-Efficacy

American Educational Research Association

2014 Annual Conference

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Abstract

Teacher preparation programs are under increasing scrutiny for relevance as legislators reconsider the training necessary to produce quality teachers. This study reports on the process of a state-wide redesign of a teacher education program, one that uses a problem-based learning model similar to that used in medical schools. Problem-based learning scenarios, combined with practical field work, provide experiences rich in both content and context and are meant to positively impact teacher candidates’ sense of self-efficacy. A mixed method research design includes teacher candidates’ reflections regarding their sense of preparedness as reported by a self-efficacy scale, along with interviews, faculty observations and journals. Implications for teaching, learning, and teacher preparation are reported in connection with the problem-based learning curriculum.
Introduction

In the usual model of teacher preparation programs, pre-service teachers experience one semester of student teaching, often split between two placements. The benefits of this professional internship vary, with many student teachers missing out on the realities of the profession. Public expectations, however, are that novice teachers should perform “flawlessly in the genesis of their professional careers” (Littleton, 2010). Many are not ready to experience real workplace pressures. Research (e.g., Ingersoll & Perda, in press) indicates that upwards of 50% of teachers entering the profession leave teaching after five years, and that attrition rates among first year teachers has risen by approximately 33%.

There are many reasons for these alarming statistics, but certain ones stand out. Novice teachers face a changing student population, budget cuts, and dramatic changes in teacher evaluation that tie teachers’ jobs to increases in student test scores. All the while, they are attempting to develop the skills needed to cope with day-to-day problems. Equally troubling is the fact that we don’t seem to be making adequate headway in resolving these issues. For example, a 1984 empirical study ranked beginning teacher problems. The top eight included: classroom discipline, motivating students, dealing with individual differences in learning, assessment, relationships with parents, organization of class work, insufficient and/or inadequate teaching materials and supplies, and dealing with individual student problems (Veenman, 1984). These results were markedly unchanged 15 years later (Britton, Paine, & Raizen, 1999).

Legislators and the public are understandably impatient with what they perceive as a lack of educational progress, and are demanding change. Colleges of education are under attack as not providing true value in teacher preparation. Teacher preparation programs, however, are reacting to this challenge. In Tennessee, the Board of Regents has undertaken a major redesign of teacher
preparation programs in six state universities. Dubbed Ready2Teach, this initiative addresses teacher retention and attrition problems by preparing pre-service teachers with many real-to-life work experiences on the site of public schools. Using the medical school model of problem-based learning, Ready2Teach sweeps aside assumptions underlying traditional teacher preparation, redefining experiences that teacher candidates need to succeed.

This redesign is informed by a conceptual framework that rests upon situated cognition, learning styles, and adult learning. The synthesis of these theories resulted in the development of a problem-based learning model for teacher preparation. It is an approach that appears more congruent with calls for the recasting of field-experiences in teacher preparation and heeds the call of critics like Zeichner (2010) who contend that “the old paradigm of university-based teacher education where academic knowledge is viewed as the authoritative source of knowledge about teaching needs to change to one where there is a nonhierarchical interplay between academic, practitioner, and community expertise” (p. 89).

**Conceptual Framework**

**Situated Cognition**

Educators and psychologists have long differed on whether it is more effective to teach from “part to whole” or vice versa. Advocates of the former prefer to break complex concepts down into simpler parts and to teach those parts in a series of instructional sequences. Rooted in Skinner’s behavioral psychology theory, this represents a “traditional” approach to educational practice. Proponents of beginning with the “whole,” returning to the “parts” and then constructing understanding of the “whole” believe that the human mind first perceives reality in a holistic manner, and that this perception fuels motivation to learn (Bransford, Brown & Cocking, 1999, p. 30). This is not a new idea (Hanawalt, 1934; Ormrod, 1995), but its popularity
and usage had grown and waned over the years. Current research supports long-held understandings of the nature of the learning process. We know, for example, that when knowledge is presented in abstractions students may do very well on formalized tests, but have little ability to apply that knowledge in contextualized settings (Brown, Collins & Duguid, 1989; Clouse, Goodin, Aniello, McDowell & McDowell, 2013; Cognition and Technology Group at Vanderbilt, 1990). Knowledge not linked to application leads to failure to remember information or to transfer learning to different situations. Hannafin and Land (1997) reported that students retain “fundamentally naive beliefs” following traditional instructional methods which had produced good test results.

**Multiple Learning Styles**

The concept of “multiple intelligences” (Gardner, 1993) suggests that there are different ways for individuals to view and interact with their world. Though some question Gardner’s methods and definitions, there is broad agreement that learners have different preferences when it comes to how they like to receive information: visually, aurally, or in a kinesthetic approach. Good teachers take these preferences into account when designing curricular materials (Goldberg, 2006). There is little doubt that learners do tend to approach the task of learning in fundamentally different ways, and prefer to experience learning in methods that align well with those preferences. Creating a space for students to take control of their learning can greatly enhance their ability to learn from experience (Kolb & Kolb, 2005). One of the assets of problem-based learning (PBL) is that students are able to move around in a learning space and collaboratively take control of the direction that the learning takes. Students are not passive recipients of knowledge; they actively construct their understandings based on where and how they move in that learning space.
Adult learning theory

The problem-based learning approach to teacher preparation takes advantage of adult learning theory (Knowles, 1984) in that it recognizes the particular needs of adult learners. Andragogy, as opposed to pedagogy, reflects four assumptions. Adults need to: (1) Know why they need to learn something (2) Learn experientially, (3) Approach learning as problem-solving, and (4) Recognize the subject’s immediate value.

Problem-Based Learning and Teacher Preparation

The Problem-Based Learning (PBL) approach to teaching and learning thrives in a culture of collaborative learning and contextualized knowledge, allows for teaching to all styles, addresses the need for teacher candidates to feel a sense of control over their own learning, and so is particularly suited for the task of preparing future teachers. Bridges and Hallinger (1995, p. 5) describe problem-based learning as resting on a different set of assumptions than traditional approaches. Rather than viewing “teaching as the transmission of knowledge and learning as acquisition of that knowledge,” PBL emphasizes a student’s role in his/her learning.

The authors adopt “knowing with doing” as a core belief. Knowledge and application are of equal importance. PBL designers assume that students bring knowledge to each learning experience. Moreover, PBL adherents assume that students are more likely to learn new knowledge when the following conditions are met: 1) their prior knowledge is activated and they are encouraged to incorporate new knowledge into their preexisting knowledge; 2) they are given numerous opportunities to apply it; 3) they encode the new knowledge in a context that resembles the context in which it subsequently will be used (Bridges & Hallinger, 1995, p. 5).

The method also assumes that future learning will occur as students experience situations similar
to those presented in the problem-based learning scenario, and that formative assessments, such as reflections, will aid in student learning.

**Statement of the Problem**

Preservice teachers often enter the profession with what Weinstein (1988) a quarter century ago framed as “unrealistic optimistic" expectations. Today’s new teachers, once faced with the realities of the practice, often report that their college training did not adequately prepare them. New teachers report frustration and suffer from a feeling of insufficiency as a result. This lack of professional self-efficacy often evidences itself in a dearth of instructional methods, a limited use of instructional resources, and a decreased professional commitment compared to their peers with higher self-efficacy (Henson, 2001). This has also been shown to adversely impact their students’ self-efficacy, motivation, and achievement (Tschannen-Moran & Woolfolk Hoy, 2007).

**Research Questions**

With the aforementioned in mind, this investigation addressed the following questions:

1) What are the teacher training topics most important to first-year teachers, according to experienced teachers?

2) How do these topics compare with current teacher preparation curricula?

3) How can current curricula be modified to meet the needs of both theory and practice?

4) What are the salient features of this new curricular approach?

5) What effect does this approach have on teacher candidates' feelings of self-efficacy?

6) What sorts of programmatic improvements are suggested as a result of this study?
Methodology

This research took place in the context of the year-long residency program mentioned previously. Pertinent details of that program include Residency 1, the first semester of the teacher candidate’s senior year, and Residency 2, which followed the model of “traditional” student teaching wherein teacher candidates taught five days per week in their subject area and under the guidance of a mentor (cooperating) teacher. Assessment of a teacher candidate’s readiness was based on their performance in the areas of planning, instruction, assessment, reflection, and academic language as measured by the Education Teachers Performance Assessment, or edTPA. The edTPA was first developed at Stanford University and has been adopted by a large number of states, including Tennessee.

This research was composed of two phases. The first phase began in the spring of 2012 and was completed in the summer of 2013; the second phase took place in the fall semester of 2013. Results of teacher and administrator focus groups and faculty meetings during the year of the first phase were analyzed for trends and issues and informed development of the second phase, the data for which was collected, analyzed, and reported in the spring of 2014.

Phase One addressed research questions one through four. Data were collected from two one-week focus groups including: experienced teachers, instructional coaches, superintendents, assistant superintendents, principals, assistant principals, university dean, department chair, and faculty members. Teacher/Administrator Focus Groups met during the spring of 2013 to compare existing teacher preparation programs with the newly proposed problem-based learning program. The traditional program was composed of introductory courses in the foundations of education and courses in technology, classroom management, reading and teaching methods in the pre-service teacher education program. The program also featured a semester of student
teaching. The new program took the approach of first identifying the competencies required to become a successful practitioner. The focus groups worked together to create a list of needed skills and knowledge.

Phase Two of the research built upon question four, the salient features of the new PBL program, and moved on to address the fifth and sixth questions, which were targeted at an exploration of the program’s initial effectiveness in teacher candidate preparation. The fifth question, regarding teacher candidates' feelings of self-efficacy, was addressed in a pre- and post-test research design. The Teachers’ Sense of Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk Hoy, 2001) was administered to teacher candidates at the beginning of the fall semester in 2013 upon their entry into the first semester of the year-long residency program, Ready2Teach. The TSES was administered at the conclusion of the fall semester and the two scores were analyzed using a t-test to determine statistical significance of changes in teacher candidates' reports of self-efficacy. Moreover, these post-test results were compared with those from a previous cohort of teachers who completed this field-based experience course prior to restructuring, and who were administered the TSES prior to student teaching.

Further data were collected through teacher candidate journals and interviews. These data were analyzed qualitatively for emerging trends and themes that both informed the current questions and identified areas for future research. These data also informed question six by identifying improvements that may be made to existing curricula.

Results

Development of PBL-Based Course

Regarding questions one and two, the following are the trends and issues identified in the data collected from teacher and administrator focus groups and faculty meetings
1. Data Driven Decision Making
2. Common Core State Standards
3. Classroom Management
4. Special Education
5. Literacy
6. Technology Integration
7. ELL
8. Assessment

Those categories were then compared to existing college teacher preparation curricula to determine potential connections and to identify common themes, as shown in the following list.

1. Professional Learning Communities
2. Relationships & Interactions
3. Classroom Management
4. Teacher Assessment (TEAM and EdTPA models)
5. Common Core/Next Generation Science Standards
6. Technology Integration
7. Literacy
8. Differentiated Instruction – Pre-assessment, Data Analysis, Diversified Instruction in General, Learning Styles
9. SPED, ELL, Multicultural Education
10. Formative & Summative Assessment (Test design and EOC), Data Analysis, RTI

University faculty then began the process of building a new curriculum based on the PBL approach used by certain medical school physician training programs. It was conjectured that this PBL approach, deeply rooted in constructivist learning theory, and consonant with models used in the field-based experiences of the medical professions, would help develop students’ problem-solving acumen and cultivate reflective practices that focus on challenges more consistent with those required in their first year in the profession, and beyond that of the oftentimes antiseptic student teaching experience.

The initial teacher focus groups identified eight areas of concern, the greatest of which was that of “data-driven decision making.” The teachers, when encouraged to expound upon this topic, related that they were most concerned that new teachers did not know enough about
reading and reacting to student learning data. The primary concern seemed to revolve around not just student learning, but also on teacher and school evaluation. As much as teachers are concerned with student learning, it is apparent that they are also very aware of the fact that they are under increased scrutiny, and they feel the stress that accompanies that realization. The next category related to the Common Core State Standards, and the teachers expressed a certain amount of frustration with the fact that they seem to spend so much time in responding to external pressures. Classroom Management was of great concern for the experienced teachers, and they expressed their view that new teachers often enter the profession with a great sense of naïveté regarding the actual difficulties of managing large numbers of students. The remaining categories, although vital to the practice of teaching, elicited less discussion by the focus groups. Of significant and growing concern was the changing demographics of the local schools, including a dramatic increase in students who are classified as ELL. Technology integration was of concern, and teachers realized that the problem was not with students as much as with teachers who are not comfortable with using teaching technology. Social media, while in the area of technology, was more of a classroom management issue.

Faculty took the information provided by the practicing teachers into consideration as the PBL curriculum was developed. It became apparent to the development team, which included three practitioners, that certain areas did not seem to receive as much attention as would perhaps have been expected. This resulted in the team adding some curricular emphases. Categories that university faculty developed from Phase One data collection and analysis were: (a) relationships and interactions (students and peers), (b) classroom management, (c) special education, (d) diversity (multicultural and learning styles), (d) technology integration, (e) literacy strategies, (f) formative assessment, (g) academic feedback, (h) summative assessment, (i) data analysis, and
(j) response to intervention (RTI). A sufficient repertoire of instructional strategies was a theme that also emerged from the data, identified as a constituent element relating to numerous of the aforementioned categories.

The faculty then developed a series of PBL experiences that enfolded several of these areas into holistic scenarios, which were presented in narrative format, with progressive disclosure of information. The first PBL event was one of general overview, and presented teacher candidates with the reality of their own first student teaching experience. The main character in the story felt ready to teach but, because of a disastrous first day, found that she was not at all prepared for the complex world that is modern education. Small groups of teacher candidates identified learning tasks, distributed them to their group members, and then went into the field to investigate the realities of the profession, and gained information through personal interviews with practicing teachers along with research from literature on the subject. Seven subsequent PBL events addressed the issues identified by the practicing teachers and the university faculty. Students were exposed to a new PBL each week, as in the following example:

Day 1 – PBL groups of Teacher Candidates received PBL and identified problems and possible research topics, under the guidance of the faculty facilitator. Research topics were chosen by individual group members.

Day 2 through 4 – Teacher Candidates researched literature, conducted interviews on the topic as assigned by their group members, and submitted research briefs for assessment by their faculty facilitator.

Day 5 – Teacher Candidates spent the day in the field, observing and interacting with teachers and schools while compiling more information on the topic that they were researching. They then briefed each other on that topic, such that each member had a working knowledge of the topic.

Day 6 – Teacher Candidates adjusted or expanded their research as needed.

Day 7 – Teacher Candidates spent another day in the field, then met at night to debrief, to receive the “back story” (the real event upon which the PBL was based), and to experience the next PBL.
As these PBL modules were enacted, certain trends emerged from the first semester experience. First, teacher candidates’ comments and journals revealed that they struggled with the workload during the course of the semester, especially with the writing component. Each research assignment was evaluated for quality, and each was held to a very rigorous standard by the faculty facilitators, with the view that this was preparing the teacher candidates for their evaluations during Residency 2 the following semester. Another concern surfaced as teacher candidates became weary with the frequency of PBL events, and the events began to be more of a traditional “student” exercise. More and more, they placed emphasis on satisfying the facilitators and less upon their own learning experience. They also began to anticipate the subject of the PBL topics at hand, and showed a tendency to do what it took to get by. Following the course, however, students returned to comment on how effectively the Residency 1 course prepared them for the writing assignments that composed the teacher candidate evaluations (edTPA). Overall, it appeared that their sense of self-efficacy seemed to improve somewhat after the course had ended and during the first parts of their Residency 2 program.

Teacher Candidates’ Self-Efficacy

To provide further insight into the course’s potential influence of teacher candidates’ feelings of self-efficacy in the redesigned course, they were administered the TSES prior to beginning the fall semester and again at semester’s end. On average, teacher candidates had higher self-efficacy at the beginning of the course (M = 180.29, SE = 2.27) than at the course’s completion (M = 177.00, SE = 3.45). A dependent-means (paired-samples) t-test indicated that this difference was not significant for candidates’ total self-efficacy t(30) = 3.29, ns, nor for the
three subscales (Student Engagement, Instructional Strategies, and Classroom Management) of the TSES.

The self-efficacy of teacher candidates who completed the redesigned course (N = 33) was then compared to teachers who had completed the previous course prior to their student teaching experience (N = 101). On average, teacher candidates from the redesigned course had a greater total self-efficacy (M = 178.73, SE = 3.43) than teacher candidates who complete the previous program (M = 166.58, SE = 1.93). The same was evidenced across the three subscales of the TSES (Instructional Strategies: M = 63.51 to 59.15; Classroom Management: M = 54.39 to 50.55; Student Engagement: M = 60.81 to 56.87) for completers of the redesigned program versus those completing the old program, respectively. The results of an independent-means t-test indicated a significant difference between the two groups for total self-efficacy, t(128) = 3.14, p < .01, in addition to the three subscales of the TSES (all significant at p = .01). The effect size for these differences in total self-efficacy was weak (r = .07). An analysis of the skewness and kurtosis of the distribution of scores on the TSES indicated a significant departure from normality for scores on the Instructional Strategies and Classroom Management subscales, so those results should be interpreted with caution.

Programmatic Improvements

Question six dealt with the types of programmatic improvements that would be suggested by the research from the first semester of implementation. During the winter break between semesters, the PBL team met to consider the types of changes that could be made on such short notice. Of special interest were the qualitative findings that revealed the sense of weariness felt by students. Based on student feedback, we believed that the issue was two-fold. First, each PBL research tasks required deep inquiry and astute observation on the part of the teacher candidates.
Second, the duration of each unit did not allow enough time to explore each topic in the detail necessary for successful completion of the learning objectives. We concluded that the PBL units were moving at too rapid a pace to allow for a complete exploration of each problem, and that overwhelmed by the task size of each unit. While we did not wish to simplify the tasks, we did feel it appropriate to make certain other improvements.

**Time and duration per PBL unit.** To address the issue of time and duration, the problem-based learning units were condensed from seven to six in number, with numbers six and seven combined to form one PBL on assessment. In addition, the course calendar was changed so that PBL units could be given longer durations. Units delivered in the first semester had been presented on a weekly basis, with students receiving research and reflection assignments each week. The spring semester saw us lengthening the time frame to two weeks per PBL, in order to allow for a richer experience with research topics.

**Product revision.** Following our PBL model, products originally were linked to the types of job requirements likely to be experienced in real life teaching situations. We discovered that our products, while realistic, did not offer enough information to permit teacher candidates to meet the requirements of their edTPA teaching segment, which they were to complete during the first placement of their second Residency experience. For this reason, we adjusted the PBL products to meet real world requirements while at the same time addressing the needs of the edTPA.

**Curriculum enrichment.** We recognized the need for additional exposure to certain topics that were uncovered during the PBL process. Some students encountered these topics during their field work; however, not all students had this opportunity. Therefore, we made the
addition of special topics speakers, practitioners in the field, to address topics such as special education, gifted, ELL, and technology.

**Conclusions**

In general, this mixed-methods investigation examined the influence of a Problem-Based Learning field experience course on preservice teachers’ self-efficacy, an approach conspicuously absent from research on teacher preparation. Moreover, as problem-based learning has typically been evaluated qualitatively, the quantitative components of this research contribute to scholarship examining the instructional potential of PBL. The PBL approach, in general, appears more consonant with calls for teacher preparation that, in the words of Hollins (2011) “integrate academic knowledge of theory, pedagogy, and curriculum across experiences in authentic contexts that are embedded in focused inquiry, directed observation, and guided practice” (p. 395).

Regarding teacher candidates’ feelings of self-efficacy, the results of the inferential tests generate more questions regarding the fifth research question than they answer. First, teacher candidates that completed the new redesigned PBL-based course showed no significant change in their self-efficacy after completing the course. While it was conjectured that making teachers’ more aware of the constellation of factors outside of their daily classroom practice, as typically addressed in subject-area methods courses, for example, would potentially impact their self-efficacy, such was not the case.

One potential explanation is that by presenting these topics identified in research questions one and two (i.e., PLCs, data driven decision-making, etc.) through the aforementioned PBL modules, teacher candidates felt more empowered regarding their ability to bring about change (Vinson, 1994). This conclusion could potentially be supported by the significant
difference in self-efficacy between teacher candidates completing the new PBL course versus who did not. To the former group of teacher candidates, this hypothesized increase in self-efficacy may have off-set the potential decrease in candidates’ beliefs as they became increasingly more concerned with the myriad “external issues” addressed in the PBL-based course (Adams, 1982). That said, the lack of change in the teacher candidates’ self-efficacy may be attributable to what Wienstein (1988) saw as their unrealistically high opinion of, or overconfidence in, their abilities related to effective classroom teaching. A continued analysis of data for teacher candidates as they matriculate to their formal clinical internship, and as other enter the profession in earnest, will hopefully provide additional clarity.

In conclusion, this study addressed, at a preliminary level, the content and practicality of a PBL approach in preparing teacher candidates, in addition to gauging the influence of such a course on teacher candidates’ feelings of self-efficacy. While these findings reveal some improvement in terms of perceived self-efficacy in the students who experienced the problem-based learning approach, it is clear that there remains a need for continuing to study this novel approach to teacher preparation, and its potential impact on future teachers.
References


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