A Problem-Based Learning Approach to Teacher Training: Findings After Program Redesign

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This study reports on Residency I, the first semester of a yearlong residency that utilizes problem-based learning scenarios, combined with field work, that covers both content and context and is meant to positively impact teacher candidates' self-efficacy as well as their actual efficacy as measured by scores on the edTPA. This quantitative research study takes place over two semesters with two sets of students and compares edTPA scores and self-efficacy scores of teacher candidates in the old program and teacher candidates in new program. Implications for teaching, learning, and teacher preparation are reported as results of the problem-based learning curriculum.

In today's climate of increased emphasis on test scores, teacher education programs are under pressure to respond to both criticism and competition. New teachers are expected to perform "flawlessly" (Littleton & Littleton, 2010). Most are not ready for such pressure, which results in a high attrition rate. As many as 50% of teachers who enter the teaching profession leave after just five years (Ingersoll & Perda, 2012). Charges that colleges of teacher education are not adequately preparing future teachers are coupled with the introduction of alternative pathways to certification. One such conspicuous program is Teach for America. The perception in Tennessee is consistent with the following claim.

> Teach for America and Career Ladder teachers have higher math effects on average than other novices in their first year by 0.05 and 0.03 standard deviations respectively, which is roughly equivalent to one to two months of additional learning. These differences persist over time (SDP, 2012).

In response, teacher education programs are retooling themselves to highlight their strengths. One approach is that of problem-based learning (PBL). PBL features a "hands-on" approach to teaching and learning, blending theory and practice through the use of a problem scenario to focus learning (Hmelo-Silver, 2004).

This study addresses the realities of changing student populations, budget cuts, changes in teacher evaluation, changes in teaching standards, classroom discipline, motivating students, individual differences in learning, assessment, parent relationships, organization of class work, insufficient and/or inadequate teaching materials and supplies, and individual student problems (Britton, Paine, & Raizen, 1999). Concurrently, new teachers often enter the profession with unrealistic and optimistic expectations (Weinstein, 1988). The realities of practice often cause a loss of professional self-efficacy, which then results in poor performance (Henson, 2001; Tschannen-Moran & Woolfolk Hoy, 2007).

It is important to improve the relevance of university teacher training by shifting emphasis away from the authoritarian approach of traditional teacher education programs (Zeichner, 2010). To accomplish

this goal the teacher preparation program at this university incorporated a yearlong residency experience for teacher candidates called Residency I and Residency II. Residency I is a school immersion experience that blends theory and practice incorporating a PBL format and components of the edTPA. Residency II is student teaching that has a more intense involvement in field activities.

Conceptual Framework

Problem-Based Learning

The PBL method of instruction has been adopted by an increasing number of institutions and across a spectrum of disciplines (Boud & Feletti, 1991). PBL is suited to professional fields like medicine, engineering, and education (Barrows & Tamblyn, 1980). The method stresses diagnosis and application of knowledge in order to reach an acceptable range of possible solutions, any of which might work to address the problem under consideration (Bridges & Hallinger, 1997). The idea of "knowing *and* doing" gains renewed emphasis in PBL, where knowledge and application are of equal importance. The focus of this research is on adult learners (teacher candidates) who tend to be more engaged when they know why they need to learn and have opportunities to experience the learning as problem-solving in personally relevant situations (Knowles, 1984). PBL assumes that future learning will occur as students experience situations similar to those presented in the PBL scenario, and that formative assessments, such as reflections, will aid in student learning (Bridges & Hallinger, 1999). PBL is helpful in assisting learners to transfer knowledge and apply it to other situations, rather than just on formalized tests (Brown, Collins & Duguid, 1989; Cognition and Technology Group at Vanderbilt, 1990).

A PBL Approach to Teacher Training

Hannafin and Land (1997) report that students who experience traditional instructional methods, ones that produce good test results, retain "fundamentally naive beliefs" (p. 196). Such beliefs may positively affect teacher candidate self-efficacy, while negatively affecting actual teacher candidate performance assessments. The *Ready2Teach* Residency I program addresses these naïve beliefs through the problem-based learning format, which requires that students experience learning in real settings and that they make decisions based on actual practice rather than on the assumptions made in traditional abstract analyses. The student's role thus becomes instrumental in guiding learning (Bridges & Hallinger, 1999).

Statement of the Problem

With the inception of the new teacher training program, *Ready2Teach (R2T)*, comes questions regarding its effectiveness. One aspect of *R2T* is a yearlong residency program, the first semester of which is called Residency I. The effectiveness of the Residency I program is key to the success of the overall initiative. Comparing edTPA and self-efficacy scores of teacher candidates in the traditional program (old program) and the redesigned program (Cohort 1 and Cohort 2) as well as comparing pre and post self-efficacy scores of Cohort 1 and Cohort 2 can provide some evidence of the effectiveness of the redesigned program. Likewise, the program designers need to know how candidates perceive themselves, how others view their performance, and eventually, how that translates into success or failure in the profession of teaching.

Research Questions

This investigation addresses the following questions:

1) Does performance differ for teacher candidates completing a Problem-Based Learning approach to teacher preparation (redesigned program) versus a traditional preparation course (old program)?
2) Do teacher candidates' views of self-efficacy change during the course of a Problem-Based Learning approach to teacher preparation?

Methodology

This quantitative study compared edTPA scores for teacher candidates in the traditional teacher preparation program (old program) and those in the first two cohorts of the redesigned program. After determining normal distribution of scores, a Mann-Whitney U test, was used to determine statistical significance.

Teacher candidates' feelings of self-efficacy were measured in a pre and post-test research design. The *Teachers' Sense of Efficacy Scale* (TSES) (Tschannen-Moran, Woolfolk, & Hoy, 2001) was administered to Residency I – Cohort 1 at the beginning of the 2013 fall semester upon their entry into Residency I and again at the conclusion of the semester. The TSES was also administered to Residency I - Cohort 2 at the beginning and end of the 2014 spring semester. After determining normal distribution of scores, the two sets of scores were analyzed using paired samples *t*-tests to determine statistical significance of changes in teacher candidates' reports of self-efficacy.

Results

This study reports on the comparison of edTPA scores for teacher candidates in the old program compared to two different cohorts in the redesigned program as well as the change in self-efficacy that teacher candidates' experience after a semester of Residency I.

Question 1: Does teacher performance differ for teacher candidates completing a Problem-Based Learning approach to teacher preparation versus a traditional preparation course?

Teacher performance was measured using edTPA scores. The three edTPA task scores (Planning, Instruction, Assessment) and the total score were compared for teacher candidates in the old program and those in Residency I (Cohort 1 and Cohort 2) using a Mann-Whitney U test. Cohort 1 and Cohort 2 across all three tasks of the edTPA and the total edTPA score on average outscored their old program counterparts. Table 1 shows the result of comparing the mean edTPA scores for teacher candidates in the old program and in Residency I Cohort 1 and Cohort 2.

Table 1

Comparison of edTPA Scores Between the Old Program, Residency I - Cohort 2, and Residency I – Cohort 2

edTPA	Old Program	Cohort 1	Cohort 2
N	39	36	26
Total Planning	13.05	14.25	14.96
Total Instruction	12.44	13.97	13.71
Total Assessment	9.82	13.67	13.13
Total Score	35.31	41.89	41.81

Table 2 shows the level of significance for the differences between scores of teacher candidates in the Old Program and Residency I - Cohort 1 and 2 across Planning, Instruction, and Assessment as well as the total edTPA scores.

Table 2

Level of Significance Between the Old Program and Residency I Cohort 1 & Cohort 2
Candidates' edTPA Scores Mann-Whitney U Tests to Compare Means.

Program	Significance
Cohort 1 & Old Program	
Planning	.042
Instruction	.007
Assessment	.000
Total Score	.000
Cohort 2 & Old Program	
Planning	.005
Instruction	.009
Assessment	.000
Total Score	.000

Question 2: Do teacher candidates' views of self-efficacy change during the course of a Problem-Based Learning approach to teacher preparation?

Teacher self-efficacy was measured using TSES (*Teachers' Sense of Efficacy Scale*). Residency I - Cohort 1 and 2 teacher candidates took the TSES at the beginning and at the end of the semester that they were enrolled, fall 2013 and spring 2014, respectively. A paired samples *t*-test indicated that there were no statistically significant differences in average pre and posttest scores for either Cohort 1 or 2 teacher candidates. Tables 3 shows the sample size, mean, standard deviation, and *t* scores for the pre and post TSES scores, as well as the degrees of freedom and significance.

Table 3

Residency I – Cohort 1 & 2 Average TSES Mean Pre and Post Comparison

TSES	N	Mean	SD	*t*	*df*	Sig
Cohort 1 Pre	30	7.82	.866	.720	29	.477
Cohort 1 Post	30	7.81				
Cohort 2 Pre	25	7.23	.711	-.680	24	.503
Cohort 2 Post	25	7.32				

Conclusions

The findings for the differences between edTPA scores of teacher candidates in the old program compared to those in the redesigned program (Cohort 1 and Cohort 2) are what program designers expected. Teacher candidates in the old program had a brief crash course on edTPA prior to participating in the assessment. Teacher candidates in Residency I engaged in part or in whole in edTPA Task 1 (Planning). Cohort 1 wrote a learning segment and answered the prompt for planning commentary 1 (Identifying the central focus of the lesson and articulating how the lessons build on one another). Cohort 2 wrote their learning segment as they answered all five planning commentaries. As such, this provides evidence that the redesign has been effective in improving teacher candidate performance on the edTPA.

The self-efficacy of Cohort 1 and Cohort 2 teacher candidates was not changed over the course of one semester in Residency I. For the purposes of our study, self-efficacy is defined as the belief in one's ability to successfully engage in the task at hand. The level of self-efficacy that one has can determine the ability to develop organization structures, coping strategies, and successful habits, such as persistence, associated with the task (Bandura, 1997; 1977). Teacher efficacy has been shown to contribute heavily to student success (Armor, Conroy-Oseguera, Cox, King, McDonnel, Pascal, Pauly, & Zellman, 1976). Teacher efficacy has also been linked to student motivation, teacher implemented innovations, classroom management, teacher ratings by supervisors, and the frequency of referrals to special education. One of the best boosts to teaching efficacy comes from having positive performance experiences during student teaching. On the other hand, vicarious experiences can have a positive effect on teacher efficacy, for example, observing a teacher engage in an effective practice (Bandura, 1977; Hoy, 2000, Protheroe, 2008). During Residency I, while all students spent time in the classroom every week, most are not directly teaching, therefore may not get the chance for a positive performance experience, but hopefully observed effective

practices. Hoy and Spero (2005) report on studies that show that during teacher preparation, efficacy does not change in some while others do show a change; however it is noted that once efficacy beliefs are established, they are resistant to change. In their own longitudinal study, they found efficacy scores tended to increase during teacher preparation and student teaching and then decline after the first year of teaching.

Significance

This investigation examines the influence of a redesigned teacher preparation program that uses PBL experiences as a way to address the learning outcomes of teacher candidates along with the needs identified by school teachers and district officials. Improving teacher preparation, including increased accountability for the teachers that universities graduate, has become the focus of the federal government (Teacher Preparation Issues, 2014). The demand for increased accountability places great stress on practicing K-12 teachers, as they try to juggle the learning goals for their students with the need to survive high-stakes evaluations themselves. Teacher performance models that reward certain teaching styles, such as didactic lesson delivery, serve to limit the creative teaching methods and experimentation that can result in teacher improvements, in professional exploration, and in the satisfaction of teaching.

Employing strategies that better prepare teacher candidates for the accountability measures and the issues that they will face in the field has become a priority in many universities. PBL strategies such as the ones used in this teacher preparation program allow students to experience content and gain teaching strategies in a meaningful context as well as developing collaborative teamwork

skills (Murray-Harvey, Curtis, Cattley, & Slee, 2005; Hmelo-Silver, 2005). This study continues to explore the idea that a PBL approach can effectively bridge the divide between teacher candidate self-efficacy and actual efficacy.

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