

# Trajectories of Teacher Efficacy and Its Sources

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## Introduction

The purpose of this research was to explore preservice secondary mathematics teachers' teacher efficacy beliefs, the sources of teacher efficacy, and teacher concerns over the duration of a one-year teacher preparation program. The quantitative and quantized data collected four times each program year show important changes throughout each program. Patterns appearing across years provide potential insight into teacher learning readiness and associated positioning of aspects and content of teacher preparation programs and courses.

## Research Questions

1. How do preservice secondary school mathematics teachers' teacher efficacy, sources of teacher efficacy, and teacher concern change throughout a teacher preparation program?
2. How do the sources of teacher efficacy and teachers' concerns inform the development of preservice teacher efficacy about the teaching and learning of secondary mathematics throughout a teacher preparation program?

## Method

**Design:** A mixed methods pragmatic approach (Morgan, 2007) using a modified convergent (or parallel or concurrent) design was used (Creswell, 2012).

**Data Collection:** At four points in the year, preservice teachers completed a short form of the TSES (Tschannen-Moran & Woolfolk Hoy, 2001), and responded to two short answer questions:

- (1) Describe a concern you have with respect to being a secondary school mathematics teacher.
- (2) Describe one thing from the preservice program that you feel contributed to your level of efficacy.

**Data Analysis:** TSES data were analyzed using repeated-measures ANOVAs over time, and Bonferroni post-hoc pairwise comparisons as appropriate. Short answer questions were coded deductively using the three teacher concerns and the four sources of self-efficacy. Codes were then quantitized to analyze change over time.

## Selected References

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## Key Findings

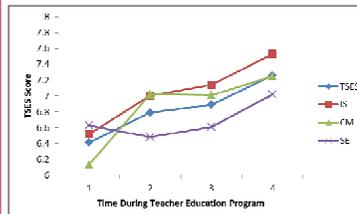


Figure 1. TSES and subscale scores – changes over time (2005/2006) (n = 31)  
TSES: Time 1 to Time 3 ( $p < .05$ ); Time 1 to Time 4 ( $p < .01$ )  
IS: Time 1 to Time 4 ( $p < .01$ ); Time 2 to Time 4 ( $p < .05$ ); Time 3 to Time 4 ( $p < .05$ )  
CM: Time 1 to Time 2; Time 1 to Time 3; Time 1 to Time 4 (all  $p < .01$ )  
SE: Time 2 to Time 4 ( $p < .05$ )

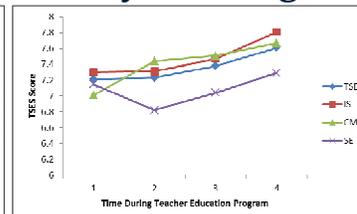


Figure 2. TSES and subscale scores – changes over time (2007/2008) (n = 33)  
TSES: Time 2 to Time 4 ( $p < .05$ )  
IS: Time 2 to Time 4 ( $p < .05$ )  
CM: Time 1 to Time 4 ( $p < .05$ )  
SE: Time 2 to Time 4 ( $p < .05$ )

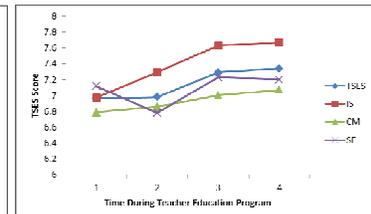


Figure 3. TSES and subscale scores – changes over time (2008/2009) (n = 25)  
TSES: Time 2 to Time 3 ( $p < .05$ ); Time 2 to Time 4 ( $p < .05$ )  
IS: Time 2 to Time 4 ( $p < .05$ )  
CM: none  
SE: Time 2 to Time 3 ( $p < .05$ )

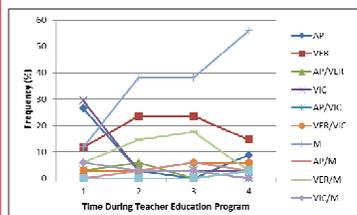


Figure 4. Sources of teacher efficacy-frequencies as percent of sample (2007/2008)  
Change in sources were significant Time 1 to Time 2, and Time 1 to Time 3 ( $p < .05$ ).  
Sources were not significantly correlated with TSES scores.

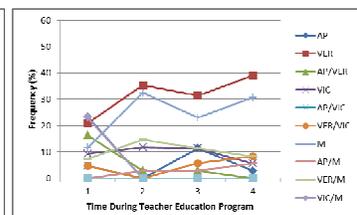


Figure 5. Sources of teacher efficacy-frequencies as percent of sample (2008/2009)  
Change in sources over time were not significant.  
Sources were not significantly correlated with TSES scores.

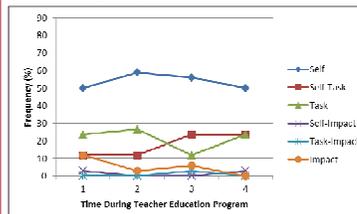


Figure 6. Teacher concern-frequencies as percent of sample (2007/2008)  
Change in teacher concern over time was not significant.  
Teacher concern was not significantly correlated with TSES.

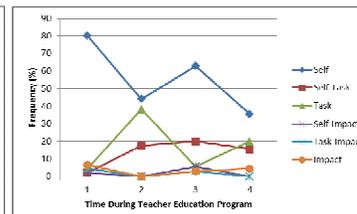


Figure 7. Teacher concern-frequencies as percent of sample (2008/2009)  
Change in teacher concern over time was not significant.  
Teacher concern was not significantly correlated with TSES.

### Legend

TSES = Teacher Sense of Efficacy  
IS = Instructional Strategies  
CM = Classroom Management  
SE = Student Engagement  
AP = Affective/Physiological States  
VER = Verbal Persuasion  
VIC = Vicarious Experiences  
M = Mastery Experiences

### Note:

Teacher Concerns were quantitized for analyses:  
1=Self, 2=Self/Task, 3=Task, 4=Self/Impact,  
5=Task/Impact, 6=Impact.

Sources of efficacy were coded into categorical values of single sources in no particular order:  
1=Affective/Physiological States, 2=Verbal Persuasion, 4=Vicarious Experience, and 8=Mastery Experiences.  
Pairs of sources were computed as appropriate.

## Discussion

First, changes in preservice teachers' TSES, IS, CM, and SE scores and reported sources of teacher efficacy suggest the importance of positioning program aspects and anticipating learner readiness for acquiring new skills. AP appears to follow the same pattern over both years, higher at the start, with a large drop right away, ending low. The VER, M, VER/M sources appear to have similar trajectories across both years, being relatively more important than the other individual and combined sources.

Second, Self-concern appears to dominate preservice teachers' thoughts throughout the program. Wavering Impact concerns, lower at the end of program, suggests that (i) limited time in the program does not allow preservice teachers to appreciate the impact of their practice on student learning (e.g., Berliner 1994), and (ii) teacher learning must continue in a programmatic and intentional manner as an inservice teacher.

Next steps and questions: Significance of changes in the sources to teacher efficacy was inconsistent across two years. What is the consistent nature of the sources of teacher efficacy? Or, for example, considering the strong Mastery Experiences source at the end of the program, is it the program that affects these changes of source of efficacy or is it the learner who moves naturally through these changes of source of efficacy?