Answering the Call to Improve STEM Education: A STEM Teacher Preparation Program

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Abstract

This study examined a program that gives undergraduate candidates options for teacher certification. Candidates in STEM majors were recruited in order to provide them with a compact, flexible, and innovative option for adding teacher licensure to their bachelor degrees. This program used early field experiences that allow candidates to practice inquiry-focused teaching during their first class in an effort to expose them to the teaching profession and to secure their commitments to earning a teaching license in mathematics or science. The purpose of the study was to uncover the variables that contributed to this initial growth. The researchers found that candidates were highly satisfied with the program and were completing the first course with motivation to continue in the program.

Keywords: teacher preparation, STEM education, undergraduate education

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Introduction

The following excerpt is from a mentor teacher who observed a candidate teach multiple lessons over the course of the semester and provided this feedback as a summary of the experience.

> *The teacher interacted well with each group. He probed students with questions and showed a comprehensive knowledge of [the subject]. The lab was well planned and organized, and the hands-on activity was geared so that every student was actively involved. He used prior knowledge and the knowledge gained during the lesson to question students. [He] moved among the groups asking questions, waiting a proper amount of time for responses. He encouraged students to think and to ask questions.*

Responses such as this one would likely be expected on evaluations for teacher candidates who are nearing the completion of their preparation program. The mentor's assessment described a prospective teacher who demonstrated a depth of content knowledge, an ability to engage all students, and a capacity to deepen student understanding through questioning. Surprisingly, the subject of this comment was not a college senior nearing graduation after completing an internship and capstone experience of a four-year program of study. Rather, the candidate was a college sophomore who was taking an introductory course in a teacher education program (*Step 1: Inquiry Approaches to Teaching*). The candidate, like all participants in the program, was seeking a bachelor degree in a science, technology, engineering, or mathematics (STEM) discipline and is exploring the option of teaching at the same time through an innovative program known on the university campus in which this study took place as STEMteach, a replication of the national UTeach model that began at the University of Texas at Austin in 1997. The UTeach program is intended to increase the number of quality STEM teachers through a combination of STEM degrees with teacher preparation that is intended to keep undergraduate students on-time with graduation.

Mathematics and science content majors are targeted by STEMteach to add teaching licenses to their bachelor degrees while leaving other post-baccalaureate plans open. Candidates complete their original program of study in their selected STEM content area and the coursework for a teaching license simultaneously. In addition to those who entered college with the goals of becoming educators, STEMteach seeks candidates who are drawn to the additional options offered, but who may not want to abandon their original plans. The program is also attractive to those who decide to consider the teaching profession within the final semesters of their degrees since the program can be completed in as few as four semesters.

Candidates in the STEMteach program begin with a one-credit hour course, *Step 1: Inquiry Approaches to Teaching*, which introduces them to inquiry-based learning. The methods of the course are appealing to most mathematics and science majors due to the focus on experimentations and investigations. As recommended by Duschl, Schweingruber, and Shouse, (2007), the master teacher (i.e., instructor for the course) presents lessons in a way that models how the candidates will teach. To provide early experiences in the schools, candidates observe and teach three lessons in a third or fourth grade classroom. Although candidates are completing requirements for secondary licensure, working with children in earlier grades allows candidates to experience teaching in a low-risk environment while focusing primarily on the practice of

teaching. To promote confidence in teaching, UTeach recommends candidates in *Step 1* begin their field experiences in elementary grades (The UTeach Institute, 2013a). Early grade experiences minimize classroom management concerns, allow candidates who have little experience in their content courses to have a sufficient depth of understanding to teach a topic in an investigative way, and reduce additional hurdles that would prevent candidates from having a positive experience. These early experiences can frustrate candidates who are anxious to observe and teach in secondary schools; however, UTeach recommends scaffolding field experiences from elementary in *Step 1*, to middle school in *Step 2*, and secondary in the remainder of the courses (The UTeach Institute, 2013a).

In the second semester, candidates continue to explore teaching in *Step 2*: *Inquiry-based Lesson Design*. Following a similar approach as *Step 1*, this class gives candidates the opportunity to develop lessons in the university classroom and then teach those lessons to children in area schools. However, by *Step 2* the candidates teach middle school students. All lessons, from both *Step 1* and *Step 2*, are designed to be age-appropriate and highly engaging. To further encourage candidates to continue in the program, those who successfully complete *Step 1* receive tuition rebates. If candidates choose to continue in the program, they are required to complete an additional nine courses beyond *Step 2*, with at least 480 hours of field experience.

Unlike most traditional teacher education programs, STEMteach gives candidates the opportunity to experience teaching from the first semester in the program while continuing to pursue their academic goals of a baccalaureate degree in a STEM area. Focusing introductory classes on practical rather than theoretical aspects of teaching encourages candidates to enroll in a course that is also an enjoyable experience. In the introductory courses, program faculty demonstrate the importance and rewards of teaching, thus encouraging candidates to remain in the program.

Theoretical Framework

Recent calls to improve K-12 STEM education (Committee on Science, Engineering, and Public Policy, 2007; National Research Council [NRC], 2012; National Science Board [NSB], 2010), address a growing need for qualified secondary STEM teachers. Many secondary STEM teachers are not well prepared to lead students in content-rich, inquiry-based quality instruction that is recommended by the Common Core State Standards (CCSS, 2013) and the Next Generation Science Standards (NRC, 2012). To place this in perspective, Augustine (2007) found that 69% of grade five to eight students were taught by mathematics teachers who were either not mathematics certified or did not have a mathematics degree. Even more alarming, 93% of middle school physical science students did not have a teacher who was science certified or who possessed a degree in physical science. Regrettably, this same trend continued in high school (31% mathematics; 61% chemistry; 67% physics). Change the Equation (2012) reported similar results, which found that only 31% of eighth grade students were taught mathematics by teachers with undergraduate degrees in mathematics and only 48% of their science teachers had degrees in science.

The key to improving student achievement in the STEM disciplines ultimately begins with the teacher. Research suggests that among educational variables influencing student achievement,

the quality of teaching is the most important (Darling-Hammond, Berry, & Thoreson, 2006; Hanushek, 2011; RAND Education, 2012). Unfortunately, many teacher preparation programs are not adequately preparing today's teachers. Specifically, U.S. Secretary of Education Arne Duncan repeatedly indicated that the majority of teachers say that their university preservice education left them unprepared for the classroom, citing studies that revealed between 67% and 82% of principals indicated they are dissatisfied with the preparation their teachers received through university programs (U.S. Department of Education, 2011). In interviews with first year middle school mathematics teachers, Desimone and colleagues (2013) found that many teachers indicated that they were poorly prepared for the job. In the interviews, teachers stated they lacked either overall mathematics content or the specific content they needed to teach at their grade level. One teacher in particular said that her training focused on pedagogy and classroom management and that she did not receive instruction in high-level mathematics content. In contrast, another teacher that had multiple high-level mathematics courses was asked to teach algebra. She said she struggled because it had been many years since she had an algebra course. Many of the teachers stated that they were "learning as they go" (p. 65) or learning "with the kids" (p. 65). Other teachers complained that they possessed insufficient pedagogical knowledge to reach the students (Desimone et al., 2013).

To address issues with content knowledge, Tairab (2010) recommended teacher education programs emphasize a deep level of content attainment, along with pedagogical practices. Tairab (2010) suggested subject matter specialists and education specialists devise plans to insure prospective teachers gain the content knowledge and pedagogical skills needed to be effective teachers. Additionally, Otero, Finkelstein, McCray, and Pollack (2006) stressed the importance of content knowledge for science teachers and maintained that teacher preparation should not be the sole responsibility of the schools of education. To improve teacher preparation programs and specifically address the K-12 science education problems, Otero and colleagues (2006) recommended that the colleges of science support the interest of education by becoming more involved in teacher recruitment and preparation.

Investigations into best practices in teacher preparation suggested that promoting closer contact between higher education faculty and school district personnel, increasing field experiences, providing a sequence of courses, and connecting programs to state student content standards demonstrated promise (American Association of State Colleges & Universities [AASCU], 2004). In a study of seven exemplary teacher education programs, Darling-Hammond, Hammerness, Grossman, Rust, and Shulman (2005) found that high quality teacher preparation programs had strong connections between coursework and clinical field experiences and a consistent vision of good teaching practice. Similarly, Szabo, Scott, and Yellin (2002) stated that field experiences are essential for preservice teachers in making connections between theory and practice.

Researchers noted that early field experiences are necessary and provide prospective teachers with a *glimpse* of what it means to be a teacher. In a recent study, Schuster (2013) found early field experiences allowed candidates to familiarize themselves with teaching before making a commitment to a teaching degree. Researchers also found that early field experiences were instrumental in the recruitment of teachers. After an early field experience, Schuster (2013) found that five out of 15 candidates indicated they would pursue a STEM teaching certificate while the others stated they would consider teaching as a career option. In another study,

Fletcher and Luft (2011) suggested freshman or sophomore teacher recruitment courses, utilizing a field experience, allowed candidates to experience the excitement of teaching. In addition to using field experiences to excite candidates, Fletcher and Luft (2011) indicated the instructors utilized inquiry-based learning in these recruitment classes to *hook* candidates and to encourage them to establish reform-based teaching beliefs.

To encourage preservice teachers and eventually in-service teachers to utilize inquiry-based practices, they need ample opportunities to experience and practice this type of learning and teaching. Taskin-Can (2011) suggested the establishment of inquiry-based instruction is difficult if time is limited, as in most traditional preparation programs. By offering freshman and sophomore recruitment courses with field experiences, preservice teachers have greater opportunities to improve their inquiry-based teaching practices. In addition, Tatar (2012) found that when instructors in undergraduate programs utilized inquiry-based instruction, preservice teachers developed positive beliefs about learning through inquiry and improving their inquiry skills. In another study, Tessier (2010) reported increased excitement about teaching when preservice teachers experienced inquiry-based instruction in their undergraduate biology course. With these results, Tessier (2010) recommended teacher preparation programs utilize inquiry-based teaching and learning.

Establishing quality early experiences in both the classroom and the field is instrumental in successful teacher preparation. When one considers that a teacher's view of self-efficacy forms early in the career and is difficult to change, it becomes critical to develop teacher's knowledge and skills early in the career (Darling-Hammond, 2002). Effective teacher preparation programs allow for extended mentoring and quality experiences in both the classroom and the field, and provide early opportunities to shape teacher beliefs and self-efficacy toward effective, reform-based teaching (Taskin-Can, 2011; Tatar, 2012).

Need for Change

The lack of production of STEM-content teachers was exemplified at the university in this current study. The teacher preparation programs on this campus were similar to the programs found on many other campuses, which means candidates interested in teaching mathematics or science would declare a major in mathematics or science education and then begin an exploration of pedagogical and theoretical courses that would lead to teacher licensure. Near the end of this program, candidates would put their learning to practice in a semester-long early field experience called Internship I. This first field experience was primarily observational with limited teaching experience during a one-day per week visit to an area school. The program ended with a capstone Internship II that required full-time experience in an area school where the intern would transition to become the daily teacher of one or more classes.

The mathematics and science education programs at the described institution were often touted as among the state's best. One principal commented, "If I want a great math teacher, [this university] is where I look first." Candidates completing the program had a near perfect record of employment and districts often contacted the program to seek potential teachers to fill job vacancies. Despite its reputation, the program had an issue that needed attention, which was the low production of mathematics and science teachers. In the 2012-2013 academic year, only 13

candidates completed the licensure program for mathematics education with only four completing the science education program. More typically, the university averaged only eight mathematics teachers and two science teachers annually.

Informal conversations among candidates suggested that the teacher education program was undesirable because it was not consistent with their freshmen and sophomore year career goals, which often included medical school, graduate engineering programs, or other professional school options. At the point that these candidates changed directions, for example, not going to medical school, they were too committed to their programs of study to reverse course without adding additional years to their university careers. Transitioning to the university's teacher education program at this late point was a challenge due to the sequential nature of the course work and the necessary admission requirements such as Praxis I and Praxis II examinations. As such, candidates who might otherwise consider the teaching option would decide instead to complete their original pathways and then search for other options.

Concerned that the university was not sufficiently meeting the state's demands for highly qualified mathematics and science teachers, college personnel considered options to boost the enrollment in its mathematics and science licensure programs. The university has a strong enrollment in its STEM disciplines; very few of those sought a teaching license, however. In the most recent year, nearly 1100 candidates had declared majors in one of the available five STEM options (Table 1), yet only an average of 10 candidates were completing teacher licensure in a STEM content area each year.

Table 1

Total Number of STEM Majors

Content Area	2009	2010	2011	2012
Biology	655	649	640	645
Chemistry	120	130	126	126
Computer Science	126	121	160	130
Mathematics	142	147	130	130
Physics and Astronomy	51	69	58	68
Total	1094	1116	1114	1099

To address this need, the university decided to replicate the UTeach model. As indicated by a recent national report (UTeach Institute, 2013b), 78% of UTeach candidates entered the teaching profession upon graduation; therefore, the UTeach Model appeared to be an avenue for this university to take to increase the number of candiates seeking a teaching license in a STEM content area. Since the university replicated the UTeach model, more STEM content majors are entering the teaching licensure program. In the first semester, 19 candidates enrolled in the first course, *Step 1: Inquiry Approaches to Teaching*. This number increased to 29 candidates in the second semester, and 50 in the following semester.

Purpose of the Study

The program of focus in this study utilized a number of the recommendations that the literature suggested are important for recruiting candidates into teacher preparation and for developing effective educators. As Schuster (2013) and Fletcher and Luft (2011) recommended, the program offers an early field experience to engage candidates from the beginning of their coursework. Further, the inquiry-based approach to teaching garnered positive reactions from the program participants, which is consistent with the findings of Taskin-Can (2011), Tatar (2012), and Tessier (2010). The strategies appear to be effective as more candidates are enrolling in the program's first course.

Growing from a program that produced on average 10 mathematics and science teachers per year to one that has more than 50 candidates in the initial course (and over 70 participants taking one or more classes) in its third semester prompted researchers to explore the motivation for candidates seeking this degree option. In order to maintain and increase candidates' persistence in the program, the researchers wanted to understand how candidates viewed the program and their reasons behind their initial commitment. This exploratory study was designed to consider the following research questions:

- What are candidates' perceptions about the initial program course?
- What has contributed to candidates' success in this first course?
- How might the program better meet candidate needs for teacher education?
- What prompted candidates to take the course, particularly those who had not previously considered the teaching profession?

Method

In this exploratory study, researchers collected participant responses through focus groups and written responses to a prompt. The 50-minute interviews were conducted in the participants' regular classroom during their scheduled class time without the course instructor present and used 10 scripted, pre-determined questions. Responses were transcribed by the interviewers as well as audio recorded for reference as needed.

To enrich the data from the focus groups, participants also provided individual, anonymous written responses to the prompt, "How could this class be improved?" The intent of this process was to uncover any responses that individuals may have been reluctant to reveal in the group setting.

Participants.

The participants (N = 35) represented a cross-section of program candidates, enrolled in *Step 1: Inquiry Approaches to Teaching*. Seventeen of the participants are considering degrees in mathematics, and 18 are focused on science content with 16 female and 19 male participants.

Data Analysis.

After completing the interviews, responses were coded for themes by first examining the responses of each interview group independently of one another. For each question, participants'

responses were analyzed for the dominant response(s) to each. Responses from each of the separate interviews were then compared for overall common responses. The written responses were reviewed for their consistency with the responses to the interview questions. In all cases, themes that emerged from the responses of the interview sessions and written responses were consistent, which supports the validity of the data.

Results

Program Insights.

The first two interview questions sought to better understand participants' thoughts about the program and levels of success.

- What are your thoughts about the program so far?
- How successful do you feel in the program?

Participant satisfaction with the program was characteristic of the responses. A typical comment described the program as "great" and noted the actual experience in the classroom helps candidates decide if they want to continue teaching. The hands-on, interactive, and engaging nature of the course was appealing to many. One participant stated, "I now feel more confident about teaching…" Other responses noted the intrinsic rewards of the program, such as seeing the smiles and engagement of children they are instructing. One candidate stated, "After realizing the students have learned something is when I feel most successful."

Factors of Success.

To better establish the contributing factors of the participants' success, the following questions explored the specific influences that promoted their feelings of achievement.

- What has been the greatest contributing factor to your success in the program?
- What does the Master Teacher do to promote your success?

Participants most commonly responded that the guidance and mentoring of the Master Teacher was the greatest contributing factor to their success. One commented, "[She] teaches the way you are going to teach when you go out into the schools." Another stated, "If we get in trouble while teaching, she will step in and help us but then will bow out to let us finish." Another common theme acknowledged the role of constructive and directive feedback. Participants appreciated the opportunity to construct and teach lessons, and then receive immediate feedback about their efforts. One participant shared, "I like that [the instructor is] so supportive and helpful. It blows me away how hard [she works] to make it as easy as possible for me to just teach and learn to teach."

The early experience in the schools, as compared to traditional teacher education programs, boosted participants' confidence and helped them to make their decisions about a future in teaching. Participants noted that these experiences gave them a good introduction to the teaching profession and provided a context for the remaining courses. One participant explained, "I have learned a lot about developing my teaching skills. I think getting field experience early will help me understand what's going on in my other education classes. It's better than the traditional education route."

The instructor received a great deal of credit for participant success. Her encouragement and positive reinforcement promoted much of the participants' feelings of success in the class. Participants acknowledged her availability and open line of communication as her two primary qualities.

Meeting Candidates' Needs.

Participants' feedback on areas of concern or needing to be improved was balanced between programmatic issues and individual matters. Programmatic issues included candidates' calling for an increased number of field experiences, the chance to switch teaching partners, and the opportunity to teach alone rather than with a partner. Other participants attributed the program's challenges to their own decision-making, procrastination, and time management.

Participants provided more detailed concerns in their written responses to "How could this class be better?" The results indicated that *time* (46%, $n = 16$) was the dominant concern with comments divided between the amount of time needed to be successful in the classroom and the amount of time required for the course as compared to the amount of course credit received. It should be noted that the course meets 75 minutes per week for one credit hour.

Among participants who expressed concerns about the amount of time needed to be successful, one stated, "The only thing I found wrong with this class is that I wasn't aware to begin with how much time it would take. Had I known that, I would have changed around my schedule to fit the class better." Another expressed, "The lesson plans were tedious but necessary, and it was hard at times to get with my teaching partner for practice."

More commonly, participants shared concerns about the amount of work required to earn a single credit hour. As one participant noted, "The only thing I would have changed is how much knowledge I had of the class prior to being in it. One-hour credit seems deceiving. I spent much more time working on lessons and observations." Another candidate similarly stated, "I did not know this is only a 1 credit hour course. I spent as much time preparing and teaching outside of class as I do for my 4 credit hour class."

Another theme emerged from the participant responses regarding the structure of the class (20%, $n = 7$). Participants expressed concerns about being partnered with a classmate who did not share the same level of concern for performance or who did not share the same academic background (e.g., a mathematics major paired with a science major). One participant claimed, "Not being able to teach lessons or classes that more closely fit with different majors was a significant drawback. Mathematics majors will do better if they are able to teach mathematics, biology for biology, etc."

The most prevalent concern about course structure was the absence of a high school experience. All of the participants are seeking 7-12 grade licenses, yet the initial field experiences in the program are with third and fourth grade students to give participants a less threatening environment in which to begin their teaching. Participants expressed their eagerness to experience a high school classroom with comments such as, "The only thing I would like to see is a way for *Step 1* students to observe secondary classes. This would provide a link between what we are learning and where we will end up."

Of the remaining 13 comments, six expressed individual concerns that did not seem to represent the views of others and seven expressed no concerns at all. One participant who had no concerns wrote, “It is difficult to make improvements on this class. The materials, instructor, and help truly made this class a joy and a great learning experience.”

Motivation.

The final four questions posed to the focus group sought to uncover motivation for entering the program.

- Why did you choose to take this course?
- How likely is it that you would have considered teaching before this program?
- Why would you select this program but not the traditional teacher education program?
- What would you say about this degree option to people who are not in the program?

Participants’ decisions to take the course were divided among a preexisting interest in the teaching profession, accepting the recommendation of an advisor, and the opportunity to explore the option with little risk. For those who had not previously considered the teaching profession, participants noted that the immediate opportunity for fieldwork was a primary consideration in their choosing to enroll in the course. The course takes an inquiry approach to learning and teaching, which seemed to appeal to mathematics and science majors. One noted that his interest in science in general stems from the amount of time spent in laboratory experiences. This course appeared like another chance to be engaged in learning in an authentic environment. Specifically, this participant shared, “I like learning by doing things. This class seemed like a chance to do stuff instead of just listening to somebody talk.”

Others commented on the ability to continue with their content degrees while adding an additional post-graduation option. The program is marketed as *One degree. Endless possibilities.*, and that tagline is aimed at informing potential candidates that participating in the program does not require that they abandon their original college plans. In the interviews, participants described the program as “opening up more opportunities” and as providing “more experience.”

Finally, participants were asked to share what they would tell others who are not in the program. The dominant theme was “it’s a great program if you think you might be interested in teaching” and it is "better than the traditional path,” a reference to the previous teacher education program for mathematics and science teachers. Others noted that the program was “lots of hard work but worth it” and that it is the “best program with endless possibilities.” The overall theme was to encourage others to try it as a way to help make a decision. One continued, “You have nothing to lose. It’s only a one hour course and getting paid for it is a plus,” referencing the tuition reimbursement candidates receive upon successful completion of the *Step 1* course.

Discussion

The program referenced in this study began as a response to the call from the state’s governor to increase the numbers of mathematics and science teachers in the state. The decision to replicate the UTeach model was made based on the successes of the program at the current 27-replication

sites. Attracting content majors to add a teaching license to their degree adds to the number of potential teachers the university can produce annually. As a recent UTeach Institute report detailed, candidates are entering the profession upon graduation at a significant rate and a noteworthy number of those who do begin teaching work in low-income schools. The report revealed that nationally 78% of UTeach program graduates entered the teaching profession during the year after graduation and 69% of national UTeach partner program graduates teach in low-income schools (UTeach Institute, 2013b).

The lessons learned from this group study give program directors information to make adjustments and revisions to their programs and to share with potential candidates to improve recruitment. The increased numbers in the program seem to stem from a dynamic instructor who makes the class relevant and enjoyable. Program candidates will likely share this information with others who are considering the option. The course is viewed as one worthy of *trying out* to see if teaching is a good fit. Participants acknowledged that the hands-on nature of the course was appealing and matched their preferred learning styles. Further, participants recognized that adding the teaching option to the undergraduate degree is a pragmatic choice.

Using the information from this study, program coordinators have a number of opportunities to revise the course to address candidates concerns. The course workload is heavy for a one credit hour course. Candidates meet once per week for 75 minutes, observe their mentor teacher in an area school twice, and teach three lessons with a partner. The class time is used for demonstration lessons, modeling activities, and direct instruction on how to write lesson plans that are linked to national and state standards. Candidates learn how to write effective instructional objectives and how to use questioning as a primary component of an inquiry-based lesson. The lesson planning, meeting with co-teaching partners, and collecting and organizing supplies happen outside of class. Many candidates must also drive to neighboring towns for their assigned classroom. Program coordinators must be sensitive to candidates' concerns about time and strive to use time as efficiently as possible.

Coordinators can also consider candidates' concerns about the structure of the course. Currently, partners are assigned based on common availability times that match with the availability of one of the mentor volunteers. Candidate schedules are compared and then matched with the schedule of an area classroom teacher who has agreed to serve as a mentor. Regarding those who expressed an interest in a high school experience in this first class, instructors can better explain the rationale for using third and fourth grade classrooms for these first experiences. Candidates can focus more on the teaching process rather than content at this level. Children in early grades also tend to be more receptive of visiting teachers and their non-traditional techniques.

Limitations and Implications for Further Study

The small, homogenous sample size and the use of a purposive sample limit generalizability to a population beyond this university. All participants were enrolled in a section of the course that shared the same instructor who is well known to employ unique and high-energy techniques. The instructor's style may have overly influenced participant responses. Since the instructor is the only person who teaches the course, this potentially confounding variable could not be controlled. Finally, social influences may have shaped some responses. Participants may have

been reluctant to share all of their thoughts, particularly negative ones. Future studies can explore more deeply into the themes that emerged in this initial exploratory study.

Conclusion

Results from this study indicated that candidates perceived participation in the program to be beneficial and preferred this program to the traditional teacher education degree option. The candidates enrolled in the initial program course suggested that the in-class experiences with their dynamic instructor provided them with the knowledge and skills to go into the field, and the field experiences gave them a glimpse of what it means to be a teacher. With traditional teacher preparation programs no longer meeting the demand to produce mathematics and science teachers, innovative programs such as STEMteach are necessary. In addition, programs such as STEMteach that engage candidates in active, inquiry-based learning and provide them with early field experiences serve to bolster their beliefs and self-efficacy for teaching (Taskin-Can, 2011; Tartar, 2012).

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