

Examining the Relationship between E-Coaching and the Self-Efficacy of Novice Teachers Seeking Certification through Alternative Routes

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***Abstract:** A study was conducted to examine the relationship between first-year teachers' self-efficacy and their participation in e-Coaching designed to positively influence development of mathematics content knowledge, development of pedagogical content knowledge, and teacher retention. Teachers who most frequently participated in e-Coaching, on average, reported lower levels of self-efficacy at the start of the school year and a greater annual gain in self-efficacy than teachers who participated in e-Coaching less frequently. Study findings suggest that with careful planning and collaboration, e-Coaching can be used as a virtual and distributed context for supporting beginning teachers' self-efficacy development.*

***Key Words:** alternative certification, e-Coaching, beginning teachers*

Alternative certification programs are increasingly preparing teachers in order to address staffing needs and effectively foster student learning and development (Chin & Young, 2007; Clewell & Vilegas, 1999; Feistritz, 2009; Gimbert, Cristol, & Sene, 2007; Guarnio, Santibanez, & Daley, 2006). Such work necessitates that teachers have content knowledge and can enact principles of teaching and learning within complex environments (Darling-Hammond & Bransford, 2005; Grant, 2005; National Commission on Teaching and America's Future,

1996). Given the expectation that “tomorrow’s teachers will need to be even more talented than today’s” (Goldhaber & Hannaway, 2009, p. 2), the work of preparing teachers is challenging for all teacher preparation programs, traditional and alternative alike. Despite shortened teacher training time periods and a diverse pool of candidates (Martin Haberman, 2006), alternative certification programs are expected to prepare teachers with dispositions, knowledge, and skills that mirror those of their traditionally trained counterparts.

Many teacher preparation programs are using e-learning and other information technology (IT) systems to deliver instruction, enhance course work, encourage reflection of course readings and field experiences, and manage student portfolios and accreditation documentation (Hirtle & Hadaway, 2003; Rock, Gregg, Gable, & Zigmond, 2009; Vavasseur & MacGregor, 2008; Zirkle, 2005). As the use of e-learning and other IT systems become more prevalent in teacher education, it is imperative that such tools are designed and employed to address teacher candidate, teacher educator, and programmatic needs. The carrying out of such work necessitates that teacher educators and information systems designers have an in depth understanding of how teacher education programs can be structured, the nature of teaching and learning, and how technology-rich learning environments can be designed to support teacher learning (Anthony, Gimbert, Kashou, & Parker, 2010). Furthermore, empirical research regarding the use of such systems will provide insights into contextual, systemic, and user factors that can inform subsequent development and use of teacher education, technology-rich learning environments. Assembling a comprehensive body of research on IT systems in teacher education becomes challenging given the diversity in teacher preparation programs as well as the ever-growing ways that IT systems can be customized and employed to support teacher learning. The challenge for researchers is to not only examine the effectiveness of IT systems on teacher candidates, but also to document how technology is being used in particular contexts. Given that the common usage of the term *alternative certification* has resulted in programs that differ in terms of requirements and structures (Feistritzer, 2009; Martin Haberman, 2006), context-specific research is needed that can help inform program leaders’ decisions as they consider if and how to use technology to support teacher training. This article presents findings from a pilot study conducted to examine the impact of participation in e-Coaching on the self-efficacy development of novice teachers who were trained by an alternative certification program.

Teacher Mentoring

Mentoring is a common element of alternative certification programs designed to provide guidance and support to teachers in their beginning teaching experiences. (Feistritzer, 2008; Gratch, 1998; Smith & Ingersoll, 2004). Mentoring is done for a number of reasons. Given the need for teachers learn to make teaching decisions within highly context-specific activities that are influenced by many variables such as school structure, school culture, subject matter, and student background (Darling-Hammond, 2001; Pugach & Raths, 1983), it is not surprising that the early experiences of non-traditional pre-service teachers have been described as isolating, challenging and overwhelming (Gratch, 1998). Teachers recognize the benefit of mentoring and support (National Retired Teacher's Association, 2003) to help teachers develop expected knowledge and dispositions during the shortened training component of their certification programs. For without adequate knowledge, novice teachers may focus on survival rather than providing students with optimal learning experiences (Chesley, Wood, & Zepeda, 1997). In

addition to addressing teachers' knowledge needs, research suggests that mentoring can be an effective strategy for positively influencing teachers' long-term experiences and perspectives (U.S. Department of Education, 2002) and retention in the teaching profession (Chin & Young, 2007; Feiman-Nemser, 1996; Smith & Ingersoll, 2004).

A variety of mentoring arrangements can be employed to provide support to novice teachers. Mentoring typically occurs through on-the-job training during the first year of teaching (Humphrey & Wechsler, 2007; Little, 1990). Arrangements may include mentoring from a team consisting of veteran teachers and support from fellow colleagues who are new teachers (National Retired Teacher's Association, 2003). Teachers may also be paired with a mentor in a specific subject area (National Retired Teacher's Association, 2003). Mentoring activities often include sharing of ideas between mentors and mentees, as well as opportunities for beginning teachers to engage in reflective practice (Bradbury & Koballa, 2007). Other activities may include demonstrations of lessons, mentor-mentee lesson planning, sharing of curricular resources, and discussion of novice teachers' strengths and needs (Humphrey, Wechsler, & Hough, 2005)

Despite the promise of providing mentoring to novice teachers, a number of concerns have been identified that could limit mentoring effectiveness, including organizational issues and quality of mentoring. In regards to organizational culture and politics, one concern is that mentors may promote conventional norms and practices, thus limiting beginning teachers' adoption of reform-oriented practices (Feiman-Nemser, Parker, & Kenneth, 1993). Additionally, mentees may find it difficult to share confidences with senior colleagues who are employed by the same district (Bloom, Castagna, & Warren, 2003). Just as alternative certification programs differ in terms of structure, mentoring arrangements may also differ across programs, resulting in varied experiences and quality (Darling-Hammond, 1990; Humphrey & Wechsler, 2007). This problem is further exacerbated when expectations for mentoring are placed on veteran teachers who already have heavy workloads (Steadman & Simmons, 2007). In one study, teachers who received less support from mentors reported more difficulty with classroom organization, working with at-risk students, and using varied instructional strategies (Chesley et al., 1997). Quality differences are also influenced by differences in content of mentoring. One study found that guidance and support from mentors centered on general pedagogical knowledge such as the management of the classroom environment and pacing of lessons as opposed to content specific knowledge (Bradbury & Koballa, 2007).

Research has documented that despite mentoring opportunities, teachers from alternative certification programs have reported feeling unprepared for the realities and complexities of teaching. In particular, they have indicated a need for additional help with classroom management and motivating students, making effective use of limited instructional planning time, and learning to work with minority study populations (Chesley et al., 1997). In an effort to address mentoring gaps, it has been suggested that programs have clear goals, improve communication with mentors and candidates, ensure that mentoring includes a strong instructional focus (Utsumi & Kizu, 2006), and provide support with working with students from urban communities (King & Bey, 1995).

Teacher Coaching

Coaching is one strategy for supplementing and addressing gaps in teacher mentoring. Coaching is a professional learning strategy that addresses learning and professional needs of working individuals. The focus is on goal achievement and improving individual performance. Such professional learning experiences tend to be on-going instead of occurring during discrete workshops, embedded in authentic practice, and guided by professionals and peers who can support novice teachers as they engage in lesson planning and teaching activities. While mentors are typically senior organizational insiders in job positions similar to mentees, coaches tend to be carefully-selected organizational outsiders who can provide support to working individuals while minimizing concerns about privacy and organizational politics (Bloom et al., 2003). Coaching may be provided by an external coach or a consultant who can provide expert support around wide-ranging issues with an intent of helping an individual meet their personal goals for improving professional performance (Bloom et al., 2003; Thompson, Vickers, London, & Morrison, 2008)

Several studies have documented the benefit of coupling mentoring and coaching to increase support for alternatively certified teachers who teach in hard-to-staff schools. In a study situated in Milwaukee Public Schools, Haberman (1999) found that coupling mentoring and coaching was effective with preparing alternatively certified teachers, maintaining higher retention rates, and teachers positive appraisals by principals. Another study on the Northwest Indiana Urban Teacher Preparation Program, which provided teachers with mentoring and coaching, yielded feedback from students, their mentors, principals, and university faculty, that suggested that the program successfully prepared teachers to teach in urban districts (Schoon & Sandoval, 2000). One caution, however, of coupling mentoring and coaching is that program leaders need to ensure that such support is complementary instead contradictory, resulting in additional confusion for candidates or practicing teachers (Humphrey & Wechsler, 2007). Given that mentoring and coaching are two different activities, teacher preparation programs are increasingly turning towards e-learning solutions as a means to accomplish both tasks in attempts to adequately prepare teachers. The next section reviews literature on e-learning in teacher preparation.

Blended Learning in Teacher Education

Blended learning, which is a combination of face-to-face instruction and e-learning, is increasingly being used in teacher education for teacher training, induction programs for beginning teachers, and professional development (Barab, MaKinster, & Scheckler, 2004; Dukes & Jones, 2007; Whitehouse, Breit, McCloskey, Ketelhut, & Dede, 2006). Blended learning can be implemented through a range of structures, such as e-learning being supplemental to traditional face-to-face instruction, e-learning replacing face-to-face activities, or as an emporium that offers instructional resources and learning opportunities that are available to learners on demand (Stacey & Gerbic, 2009). Extant research suggests that a blended learning environment can be just as effective as a traditional training program in preparing teachers to pass state licensure exams (Gimbert, Moore, & Sahin, 2010), that online professional development can have a positive impact on teacher knowledge (O'Dwyer et al., 2010), and that online courses can promote contextual learning opportunities for teachers (Mackey, 2009).

E-Coaching is one form of blended learning that has been used to promote the professional learning (Webster-Wright, 2009) of practicing teachers (Rock, Gregg, Gable et al., 2009; Vavasseur & MacGregor, 2008). Such coaching is often job-embedded, and can be delivered using telecommunication technologies and devices such as telephones, online discussion boards, instant messaging, video conferencing, and Bluetooth devices (Costello-Dougherty, 2008; Rock, Gregg, Howard et al., 2009; Rossett & Marino, 2005). E-coaching benefits include the ability to address constraints related to location, scheduling, and costs. Additionally, coaching sessions can be easily stored and retrieved for later use and coaches can provide support and expertise to a greater number of individuals and organizations (Rossett & Marino, 2005).

One study on the benefits of e-coaching found that through its use, teachers gained deeper content knowledge, enacted research-based instructional practices, viewed technology as powerful in supporting teaching and learning processes, and were successful in improving student engagement and enthusiasm (Rock, Gregg, Gable et al., 2009). Yet, as advances in technology expand end-users' ability for customization, and as technology is increasingly used as a distributed environment for supporting teacher development, there is a lack of research that examines the effectiveness of blended learning in preparing teachers to work in highly complex settings. In conducting this study, researchers examined whether teachers' participation in a blended learning environment supported their development of self-efficacy. The next section elaborates on why self-efficacy was designated as an outcome variable and summarizes research on the efficacy of teachers trained through alternative routes.

Teacher Self-Efficacy

Regardless of teachers' pathway for entering the teaching profession and the type of on-the-job support they receive, self-efficacy is a construct that if developed could increase teachers' capacity to teach in hard-to-staff schools. Self-efficacy is a teacher's belief in his or her capacity to organize and execute a course of action to successfully accomplish a teaching task, even in highly complex settings (Guskey, 1987; Knoblauch & Woolfolk Hoy, 2008; Rose & Medway, 1981). It has been described as the most powerful teacher attribute (Guskey, 1987) in light of its hypothesized and demonstrated influence on teaching practice and student achievement (Gibson & Dembo, 1984; Knoblauch & Woolfolk Hoy, 2008). Research also suggests that self-efficacy is related to teacher motivation to improve practice (Rose & Medway, 1981), teacher retention (Glickman & Tamashiro, 1982), and student efficacy (Knoblauch & Woolfolk Hoy, 2008). Given the complexities of teaching in hard-to-staff school districts, teachers are sure to face challenges. It is important that teachers sustain their efforts to provide rich learning experiences for students in the face of adversity.

Self-efficacy can be developed through exposure to mastery learning experiences in which learners receive explicit instruction on how to perform a task, observe modeled performance, and receive feedback on practice (Bandura, 1977). Teacher self-efficacy can be developed through gaining content knowledge (Swackhamer, Koellner, Basile, & Kimbrough, 2009), observing behaviors of highly efficacious teachers (Gibson & Dembo, 1984), receiving social support (Woolfolk Hoy, Hoy, & Davis, 2009), and encouragement to attribute instructional success to teacher efforts (Pintrich & Schunk, 1996). Additionally, a host of

contextual factors have been linked to teachers' development of self-efficacy, including school setting, urban, rural and suburban context, school collective efficacy, efficacy of the cooperating teacher (Knoblauch & Woolfolk Hoy, 2008), and student ability (Guskey, 1987).

Because existing research suggests that teacher preparation programs (Darling-Hammond, Chung, & Frelow, 2002) and school settings (Glickman & Tamashiro, 1982) can influence teacher self-efficacy, it is reasonable to assume that alternative certification programs that couple mentoring and coaching might successfully support teachers with facing the realities and complexity of teaching and developing self-efficacy. Given differences in the length and types of pre-service teaching experiences teachers trained through alternative and traditional routes receive, a number of studies have sought to investigate whether differences in teacher self-efficacy or perception of preparedness for teaching exist due to preparation pathway. Research results are inconclusive, with a number of studies suggesting that teachers trained through traditional routes have greater self-efficacy (Darling-Hammond et al., 2002; Flores, Desjean-Perrotta, & Steinmetz, 2004; Isaacs et al., 2007) and some finding no difference in self-efficacy between teachers trained through traditional and alternative routes (Tournaki, Lyublinskaya, & Carolan, 2009). Several studies have identified nuanced differences in teacher efficacy depending on preparation route taken. For example, one study found differences in personal efficacy between traditionally and alternatively certified teachers, but no difference in teaching efficacy (Flores et al., 2004). Another study compared teachers' sense of self-efficacy and found no significant difference between teachers who received a master's degree with certification and teachers trained through alternative routes. Yet teachers in the undergraduate program had higher levels of efficacy. (Forsbach-Rothman, Margolin, & Bloom, 2007).

Although a number of studies have compared self-efficacy of teachers trained through traditional undergraduate, master's, and alternative routes, there is a lack of research that examines within-group differences in self-efficacy among alternatively certified teachers. This pilot study on whether e-Coaching was effective in supporting teachers seeking certification through alternative routes was conducted to contribute to this knowledge gap.

Program Description

Project KNOTtT (Kansas, Nevada, Ohio, and Texas Transition to Teaching) is a multi-state, multi-agency collaboration funded in 2007 by a five-year Transition to Teaching grant through the U.S. Department of Education's Office of Innovation and Improvement. KNOTtT partners work independently and collectively to recruit, prepare, support, and retain teachers of record in high need, hard to staff school districts. Project KNOTtT aims to support the ongoing work of alternative certification programs as well as novice teachers who enter the teaching profession through alternative routes. Through its partnerships, Project KNOTtT is a constellation comprising multiple professional communities of practice (Wenger, 1998). Teachers who participate in Project KNOTtT have opportunities to learn across a number of contexts: (1) the alternative certification programs in which they enroll, (2) the schools in which they teach, and (3) participation in the project's online learning environment that houses self-paced modules and e-Coaching with subject matter experts across content areas.

Drawing on Wenger’s communities of practice model, and in line with Cobb, McClain, Lamberg, and Dean’s (2003) conceptualization of schools as lived organizations that are configurations of communities of practice, relationships between communities involved in Project KNOTtT include the interconnections of boundary encounters, brokers, and boundary objects. Boundary encounters are when members of one community engage in activities with members of another community. Brokers are individuals who are members of two or more communities. As Cobb and colleagues state, the role of brokers “can be important in developing alignment between enterprises of different communities of practice” (p. 19). Boundary objects are experiences that have been reified into mutually beneficial artifacts that participating communities can utilize as they continue to construct experiences and meanings through use across communities.

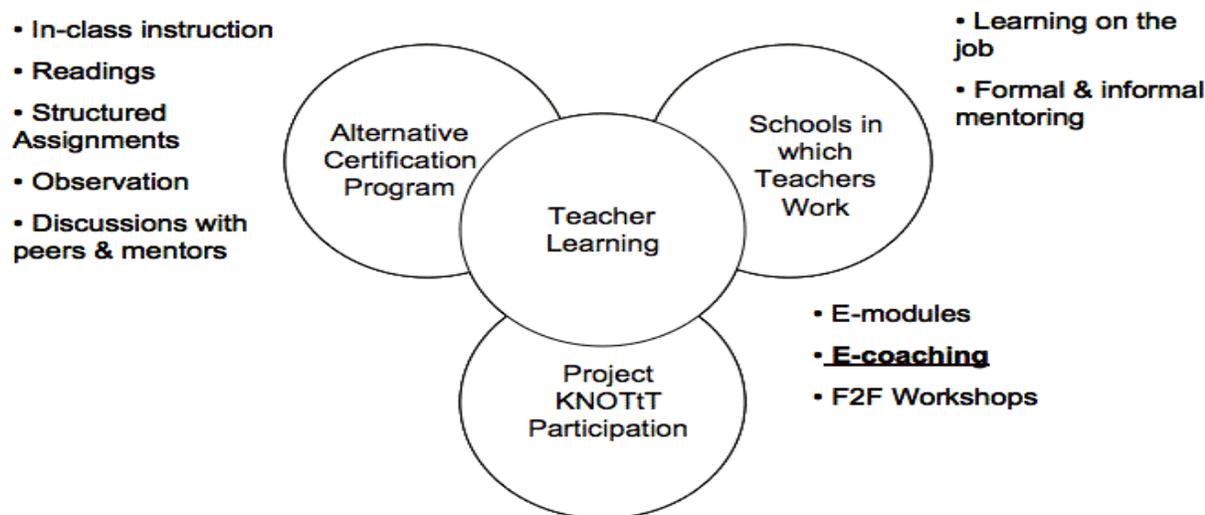


Figure 1. Shared work between Project KNOTtT, alternative certification programs, and schools to support novice teachers.

Teacher interns who receive Project KNOTtT services benefit from the boundary encounters that brokers participate in. Through KNOTtT boundary encounters, brokers become community members of KNOTtT as well as their employing organizations (i.e., school districts, alternative certification programs, universities). Spaces for boundary encounters include annual strategic planning meetings where representatives from member organizations and agencies meet to determine KNOTtT structures and services that will be provided to support alternative certification programs and teacher interns. Other boundary encounters include e-Coaching sessions and e-Coaching planning meetings. During the planning meetings, e-Coaches, alternative certification program coordinators, and the KNOTtT e-Coaching project manager meet to discuss teachers’ learning needs and determine the focus of upcoming e-Coaching sessions. Alternative certification program coordinators who attend the planning meetings engage in ongoing interaction with teachers and their mentors and are aware of the school

settings teachers work in and particular challenges they face on the job, of which e-Coaching could help address.

One of several mechanisms Project KNOTtT uses to support partners' teacher preparation efforts is the KNOTtT blended learning environment, which combines elements of traditional face-to-face instruction and online instruction across a variety of contexts. These contexts include face-to-face training sessions conducted during on-site visits with partnering preparation programs, face-to-face national meetings that provide a venue for KNOTtT partners to collaboratively plan and improve program quality, and the KNOTtT website. The Project KNOTtT website is a boundary object that supports teacher preparation efforts in unique ways across programs. The KNOTtT website design was informed by adult and continuing education (Aragon, 2003; Knowles, Holton, & Swanson, 1998; Pappas & Jerman, 2004; Wolf, 2006), and instructional design that supports adult learners. (Berge, 1995; Bonk & Graham, 2006).

During Year 1 of Project KNOTtT, members of the strategic planning team worked with instructional designers to develop e-Modules, which are programmed instruction training modules that teacher interns can complete in preparation for their licensure exams. Another feature of the KNOTtT website is e-Coaching, which is a bi-weekly virtual meeting and mechanism for program capacity-building, teacher exam preparation, and teacher learning of professional skills and strategies for teaching in chronically low-performing, hard to staff, and high-poverty schools. This reification of e-Coaching as a boundary object continues during each planning session, as the interactions and interpreted needs of practicing teachers who are preparing for licensure exams are reified in each e-coaching session.

The e-Coaching boundary object becomes a space for participation within and between communities. Such participation varies across programs. Much of this is due to not only cultural differences across alternative certification programs, but also differences in program structures. Given that programs participating in the KNOTtT partnerships are in different states, they have different state requirements for recruitment, selection, and preparation. For example, Ohio has one alternative certification program in which teachers can take courses from any higher education institution that offers courses that meet state requirements. In Nevada and Kansas, teachers must pass exams prior to enrolling in their preparation program. Yet, in Texas, teachers can become teachers of record upon completion of 6-week summer training. After summer training, and while working as novices, teachers are allotted two years to pass their licensure exams. Thus, in Texas, teacher interns often begin using KNOTtT e-Modules during their 6-week summer training and utilize e-Coaching during their early teaching experiences to support their ongoing development of content and practice knowledge.

Examining the Relationship between e-Coaching Attendance and Teacher Self-Efficacy

A study was conducted over a one-year period to investigate whether teachers' participation in the KNOTtT blended learning environment had a positive impact on their sense of self-efficacy. We first investigated whether the teachers who attended e-Coaching experienced higher gains in self-efficacy than teachers who did not attend e-Coaching. We then further investigated whether the amount of e-Coaching sessions attended corresponded with gains teacher self-efficacy.

Methods

In conducting this study, a decision was made to focus on one alternative program because of structure and process differences across programs. Additionally, by focusing on mathematics teachers in one program, researchers were able to control for some contextual influences on teacher self-efficacy. In September 2009 thirty-five mathematics teachers who had recently completed a 6-week summer training session in a Texas alternative certification program were recruited to participate in this study. Teacher interns who had not successfully passed their state mathematics licensure exam by January 2009 were required by the alternative teacher preparation program to attend e-Coaching sessions.

The 12-item version of the Teachers' Sense of Efficacy Scale was used to measure participants' sense of self-efficacy. Participants indicated their response to each statement on a 9-point Likert scale ($\alpha = .90$) that included the dimensions efficacy in student engagement (4 items, $\alpha = .81$), efficacy in instructional strategies (4 items, $\alpha = .86$), and efficacy in classroom management (4 items, $\alpha = .86$). Validity and reliability of the instrument have been well documented (Tschannen-Morgan & Hoy, 2001). The survey also included self-report items questioning teachers about their use of KNOTtT's blended learning environment. A pre-survey was administered in October 2009, and a post-survey was administered in June 2010. Of the 35 mathematics teachers, 20 completed both the pre- and post-survey. Due to sample size, the non-parametric 2-tailed Wilcoxon signed rank test was used to analyze paired data from each teacher to examine whether e-Coaching attendance resulted in significant gains in self-efficacy. In addition to the survey, observation data was recorded to track teachers' e-Coaching attendance between October 2009 and October 2010.

Findings

The average pre-survey efficacy score of the 35 teachers recruited to participate in this study was 7.06 (SD = 1.18). Interestingly, the average mean and standard deviation appeared to closely resemble the average efficacy scores of traditionally trained teachers whose responses informed the development of the Teacher Sense of Efficacy Scale (Mean = 7.1, SD = .98).

Of the 20 participants who completed the pre- and post-survey, teachers who were required to attend KNOTtT e-Coaching because they had not yet passed their licensure exam on average reported higher self-efficacy pre-survey scores than teachers who successfully pass their licensure exam and were not required to attend KNOTtT e-Coaching (**Table 1**) for self-efficacy overall (7.46 > 6.75) and in all dimensions of self-efficacy - student engagement (7.17 > 6.64), instructional strategies (7.38 > 7.36), and classroom management (7.81 > 6.25).

The teachers who attended KNOTtT e-Coaching also reported higher post-survey scores than teachers who did not attend KNOTtT for self-efficacy overall (7.77 > 6.89) and in all dimensions of self-efficacy - student engagement (7.50 > 6.50), instructional strategies (7.96 > 6.89), and classroom management (7.85 > 6.61). Interestingly, teachers who did not attend KNOTtT e-Coaching reported a decrease in student engagement efficacy (-0.14) and

instructional strategies efficacy (-0.47) over the course of the academic school year. Unlike teachers who did not attend KNOTtT e-Coaching, teachers who attended e-Coaching reported gains and no decrease over the school year in self-efficacy overall (0.31) and in all dimensions of self-efficacy - student engagement (0.33), instructional strategies (0.58), and classroom management (0.04). However, none of the gains or decreases in self-efficacy scores were statistically significant.

Table 1. Teacher self-efficacy scores at beginning and end of school year based on whether teachers attended e-Coaching

	Mean (SD)		Gain	P Value
	AU09	SP10		
Passed exam & did not attend e-Coaching (n=7)				
Overall Efficacy	6.75 (1.06)	6.89 (.78)	0.14	.60
Student Engagement Efficacy	6.64 (1.23)	6.50 (.85)	-0.14	.80
Instructional Strategies Efficacy	7.36 (1.13)	6.89 (2.07)	-0.47	.67
Classroom Management Efficacy	6.25 (1.49)	6.61 (1.38)	0.36	.35
Did not pass exam & attended e-Coaching (n=13)				
Overall Efficacy	7.46 (1.28)	7.77 (.62)	0.31	.36
Student Engagement Efficacy	7.17 (1.59)	7.50 (.88)	0.33	.56
Instructional Strategies Efficacy	7.38 (1.47)	7.96 (.67)	0.58	.23
Classroom Management Efficacy	7.81 (1.30)	7.85 (.72)	0.04	.79

* $p < 0.10$

Additional analysis was conducted on the teachers who did not pass their licensure exam and were required to attend e-Coaching in order to investigate whether the amount of e-Coaching sessions attended had an impact on self-efficacy. The results are displayed in **Table 2**. Teachers

Table 2. Teacher self-efficacy scores at beginning and end of school year by number of e-Coaching sessions attended

	Mean (SD)		Gain	P Value
	AU09	SP10		
Attended 5 or less e-Coaching sessions (n=7)				
Overall Efficacy	8.01 (1.04)	7.74 (.80)	-0.27	.18
Student Engagement Efficacy	7.68 (1.64)	7.32 (1.10)	-0.36	.35
Instructional Strategies Efficacy	8.07 (1.12)	7.96 (.73)	-0.11	.69
Classroom Management Efficacy	8.28 (.94)	7.93 (.75)	-0.35	.14
Attended 6 or more e-Coaching sessions (n=6)				
Overall Efficacy	6.81 (1.30)	7.81 (.40)	1.00	.075*
Student Engagement Efficacy	6.58 (1.42)	7.71 (.60)	1.13	.14
Instructional Strategies Efficacy	6.58 (1.51)	7.96 (.66)	1.38	.094*
Classroom Management Efficacy	7.25 (1.52)	7.75 (.74)	0.50	.46

* $p < 0.10$

who attended 5 or fewer e-Coaching sessions reported a decrease in self-efficacy overall (-0.27) and in all dimensions of self-efficacy - student engagement (-0.36), instructional strategies (-0.11), and classroom management (-0.35). However, the decrease in self-efficacy was not statistically significant. Teachers who attended 6 or more e-Coaching sessions reported gains in self-efficacy overall (1.00) and in all dimensions of self-efficacy - student engagement (1.13), instructional strategies (1.38), and classroom management (0.50). The gains were statistically significant for self-efficacy overall (Wilcoxon signed rank test, 2-tailed, $P = .075$) and instructional strategies efficacy (Wilcoxon signed rank test, 2-tailed, $P = .094$).

Conclusion

The current study presents findings about the impact of participation in Project KNOTtT's e-Coaching on teachers' self-efficacy. Beginning teachers who had not yet passed licensure exams, and who the literature suggests are most in need of on-the-job professional learning opportunities (Chesley et al., 1997; Humphrey & Wechsler, 2007; Schoon & Sandoval, 2000), reported higher levels of self-efficacy at the beginning and end of the school year than teachers who had successfully passed their content exams. These findings suggest that teachers trained through alternative routes may enter the teaching profession with a high degree of self-confidence to carry out teaching tasks. Teachers who enter the teacher profession through alternative routes may have higher levels of confidence because they are typically, although not always, older and have some degree of substantial work and life experience (Chesley et al., 1997; Chin & Young, 2007; Guarnio et al., 2006; Kennedy, 1991). It may then be that once teachers have passed licensure exams and attempted to reconcile differences between book knowledge and the demands of teaching in complex settings, that their levels of self-efficacy decrease and more closely resemble levels of their traditionally trained colleagues.

Further analysis of teachers who attended KNOTtT e-Coaching revealed that teachers who attended most frequently were those who began the school year with lower levels of efficacy than their colleagues. Additionally, teachers who attended KNOTtT most frequently reported statistically significant gains in self-efficacy overall and in instructional strategies efficacy. This suggests that the teachers who made the most use of e-Coaching were those who perceived that their teaching practice and students' learning would benefit from their attempts to gain more content and pedagogical content knowledge. Our findings are consistent with a recent study that found that teachers who tend to take advantage of professional learning opportunities are those who are personally motivated to improve their practice (Swackhamer et al., 2009). Our research extends these findings by demonstrating that teachers who participated in e-Coaching also experienced significant gains in overall efficacy and instructional strategies efficacy.

The previously summarized two key findings from this study differ from existing research on relationships between teacher efficacy and teacher qualifications and teaching experience. Previous research suggests that teachers with higher levels of efficacy are more likely to remain in the teaching profession (Glickman & Tamashiro, 1982). Inferring from the Glickman & Tamashiro study, the finding that teachers who had not yet passed licensure exams had higher levels of self-efficacy than teachers who did pass licensure exams would suggest that these less qualified teachers with high levels of self-efficacy might remain in the teaching

profession. Yet, recent research also suggests that teachers trained through alternative routes have a high likelihood of leaving the teaching profession within in five years (Darling-Hammond & Berry, 1999; Shen, 1997). Furthermore, previous research suggests that self-efficacy increases after teaching experience (Fortman & Pontius, 2000; Hoy & Woolfolk, 1990; Woolfolk Hoy & Burke Spero, 2005). However, in this study, teachers who had lower levels of participation in KNOTtT e-Coaching, on average, experienced declines in self-efficacy by the end of the school year. Inferring from these more recent studies would suggest that the relationship between efficacy and retention might differ for teachers depending on whether they trained through alternative or traditional routes. Given the link between teacher qualifications and efficacy that surfaced in this study, more research is needed that examines the relationship between efficacy and other outcomes for alternatively certified teachers.

Limitations

The findings and conclusions drawn from this pilot study have limitations, and the results should be considered suggestive rather than conclusive. Given the diversity across alternative certification programs, the numerous factors involved in teachers' development of self-efficacy, and the small sample size for this study, we are aware that our findings may not generalize to alternative certification preparation programs that are characteristically different from the Texas program that participated in Project KNOTtT's blended learning environment. Although this study suggests that e-learning (in this instance, e-Coaching) may be a new virtual and distributed context for supporting teacher self-efficacy, this study should be expanded to examine the effects of participation in e-Coaching on a larger number of teachers from a range of preparation programs.

Implications for Teacher Education

Study findings have implications for the design of blended learning environments for use in teacher preparation. Blended learning or e-learning is not a panacea for teacher education or professional learning (Njenga & Fourie, 2010). Instead, programs that intend to benefit from blended learning should provide organizational support to learners to ensure their participation and successful completion (Park & Choi, 2009; Southern Regional Education Board, 2006). Blended learning does not "replace" physical structures and process for teacher support. This works still requires careful planning, collaboration, and perhaps restructuring. Beyond programmatic attention to the design of blended learning environments, programs intending to make use of such environments should also consider whether learner characteristics influence their decisions to participate in and benefit from blended learning opportunities.

Partnerships can help distribute work and bring about systemic change. It has been suggested that school-university partnerships can lead to effectiveness in teacher preparation (Whitford & Metcalf-Turner, 1999). Partnerships can support exemplary practice across multiple institutions (Griffin & Associates, 2002) and can enable non-profit organizations and school districts to work together in the joint pursuit of effective and adaptive teacher preparation (Solomon, 2009). As discussed in this article, the KNOTtT partnership enabled multiple teacher preparation programs to access and utilize e-Coaching to supplement teacher training, exam preparation, and job-embedded professional development. Despite rapid technological advances

and the opportunities for end-users to customize systems to support the work of teacher training, programs should be mindful to consider the costs and benefits of investing in e-learning versus leveraging the power of partnerships and networks to support programs in their existing work. If partnerships are pursued to use technology in teacher preparation, then alternative certification programs should have a voice in design and implementation to ensure that e-learning solutions are employed in ways that align with program goals, structures, and processes.

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